1990

Depositional history at a site in the northwestern Gulf of Mexico revealed by tephrochronology and oxygen isotope stratigraphy

Cynthia Louise Brown
San Jose State University

Follow this and additional works at: https://scholarworks.sjsu.edu/etd_theses

Recommended Citation

Brown, Cynthia Louise, "Depositional history at a site in the northwestern Gulf of Mexico revealed by tephrochronology and oxygen isotope stratigraphy" (1990). *Master's Theses*. 38.
DOI: <https://doi.org/10.31979/etd.eqnj-5ez4>
https://scholarworks.sjsu.edu/etd_theses/38

This Thesis is brought to you for free and open access by the Master's Theses and Graduate Research at SJSU ScholarWorks. It has been accepted for inclusion in Master's Theses by an authorized administrator of SJSU ScholarWorks. For more information, please contact scholarworks@sjsu.edu.

INFORMATION TO USERS

The most advanced technology has been used to photograph and reproduce this manuscript from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each original is also photographed in one exposure and is included in reduced form at the back of the book.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

U·M·I

University Microfilms International
A Bell & Howell Information Company
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA
313/761-4700 800/521-0600

Order Number 1342700

Depositional history at a site in the northwestern Gulf of Mexico revealed by tephrochronology and oxygen isotope stratigraphy

Brown, Cynthia Louise, M.S.

San Jose State University, 1990

U·M·I

**300 N. Zeeb Rd.
Ann Arbor, MI 48106**

**DEPOSITIONAL HISTORY AT A SITE IN THE NORTHWESTERN GULF OF
MEXICO REVEALED BY TEPHROCHRONOLOGY AND OXYGEN ISOTOPE
STRATIGRAPHY**

A Thesis

Presented to

**The Faculty of the Department of Geology
San Jose State University**

In Partial Fulfillment

**of the Requirements for the Degree
Master of Science**

By

Cynthia Louise Brown

December, 1990

APPROVED FOR THE DEPARTMENT OF GEOLOGY

Dr. Michael Ledbetter

Dr. David Andersen

Dr. Jenny Metz

APPROVED FOR THE UNIVERSITY

PLEASE NOTE

**Page(s) missing in number only; text follows.
Filmed as received.**

iii

University Microfilms International

ACKNOWLEDGEMENTS

This thesis would not have been completed without the time and encouragement provided by Jeff Brown and Mary Ellen and Allen Benson. Joe Wooden at the U. S. Geological Survey provided the laboratory space needed for some of the sample preparation. Dick Tosdal at the U. S. Geological Survey provided the computer for the editing and printing of this thesis. Ken Bork, Jeff Muller, Carol Ostergren, and Bob Fehr assisted in some of the sample preparation. Sample analysis on the electron-microprobe was done by Charles Meyer at the U. S. Geological Survey. Michael Ledbetter, David Andersen and Jenny Metz provided critical comments and valuable suggestions in reviewing this manuscript. Drafting of most of the figures was done by Lynn McMasters at Moss Landing Marine Laboratories. I thank you all.

TABLE OF CONTENTS

ABSTRACT	viii
INTRODUCTION	1
Geologic History of the Gulf of Mexico	2
Geologic Setting of the Study Area	7
METHODS	10
RESULTS	13
DISCUSSION	19
Alteration	19
Tephrochronology	21
Sedimentary History	23
CONCLUSIONS	27
REFERENCES CITED	29
APPENDIX A	32
APPENDIX B	39
APPENDIX C	69
APPENDIX D	76

LIST OF ILLUSTRATIONS

1. Tephra Source Map for the Gulf of Mexico	3
2. Bathymetric Index Map with Major Geomorphic Provinces and Current Pattern	6
3. Schematic Profile of Pliocene-Pleistocene Sediments and Contour Map Showing Location of Core	8
4. Graph of Core Data	14
5. Comparison of Chemistry of Core with Other Marine and Terrestrial Tephra	16
6. Oxygen Isotope Stratigraphy	22
7. Seismic-reflection Profile of Core Location Showing Erosional Channel	24
8. Seismic-reflection Profiles of Diapir Showing Erosional Channel Similar to That in Which Core Was Drilled	25

LIST OF TABLES

1. Late Pliocene and Pleistocene Volcanic Eruptions of North America, Mexico, and Central America		4
2. Chemical Data of Tephra for Core		15
3. Comparison of Homogeneity Indices		18

ABSTRACT

Microprobe analyses of tephra have been used in conjunction with oxygen isotope ($\delta^{18}\text{O}$) and seismic reflection data in a sedimentary study of the 1000 foot-long deep-sea core E67-113 from the northwestern Gulf of Mexico (longitude $95^{\circ}54'\text{W}$, latitude $27^{\circ}28'\text{N}$). The core is composed mainly of clay with few silt and sand laminae and sections rich in foraminifera. No megascopic tephra layers are found in this core, but electron-microprobe analysis of glass shards ($38\text{--}63\text{ }\mu\text{m}$) from five intervals of dispersed rhyolitic tephra indicate that the tephra are both heterogeneous and altered. Extensive hydration and mobility of iron and other ions into carbonate material hinder accurate geochemical fingerprinting. The coincidence of intervals of dispersed tephra with sections of the core composed mainly of terrigenous material suggests that the tephra were reworked from land deposits and redeposited via fluvial systems in the Gulf.

Volcanic tephra widespread in the region are absent from core E67-113. The oxygen isotope stratigraphy in the core indicates two hiatuses, one from 0 - 0.093 million years and the other from 0.12 - 1.2 million years. A discrete tephra layer found in another core (E67-126A) in the same region is geochemically and biostratigraphically correlated with the Lava Creek rhyolitic eruption from Yellowstone (0.6 ± 0.02 million years). This tephra layer, as well as many other region-wide tephra, fall into the missing time spans in E67-113. Therefore, the absence of discrete tephra layers in core E67-113 was due to deep-sea erosional processes that removed sediment at the core site. The seismic reflection data show that core E67-113 was drilled in a channel adjacent to a large salt diapir. This channel cuts into overlapping sediments. As the diapir ascended through the overlying sediments, bottom currents in the Gulf were diverted around the diapir, eroding significant amounts of sediment while creating a channel or moat.

INTRODUCTION

Marine tephra layers are useful time stratigraphic markers because of their widespread distribution and geologically "instantaneous" deposition (Kennett, 1981). There are numerous ways to date marine tephra in deep sea sediments. In earlier studies, the biostratigraphy and oxygen isotope stratigraphy were determined first, and used to give a relative age for distinctive ash layers in sedimentary cores (Kennett and Huddlestun, 1972; Thunell, 1976). Chemical correlations of marine tephra layers with terrestrial sources allow tephrochronology to be used as a primary stratigraphy (Ledbetter, 1984). This method can be quicker and more accurate than biostratigraphy and oxygen isotope stratigraphy, and can be applied to dispersed ash zones as well as layers in a core.

A number of widespread, megascopic and dispersed tephra layers have been found throughout the western Gulf of Mexico, and have been studied by several authors (Kennett and Huddlestun, 1972; Thunell, 1976; Rabek and others, 1985; Ledbetter, 1985). The most common megascopic layers, W1, Y8 and Y6, were named and correlated by Kennett and Huddlestun and Thunell based on the biostratigraphic subzone in which they occur. The definition of these subzones is based on the distinct planktonic foraminifera zones within the Pleistocene zonation of Ericson and Wollin (1968), and the zones are correlated with oxygen isotope stratigraphy. Rabek and others (1985) have determined the chemical composition of these layers (and dispersed tephra horizons X2, W2, and Y5) in the Gulf and correlated them with the layers of Kennett and Huddlestun and Thunell based on the tephra stratigraphy. Chemical analysis can also be used to correlate marine tephra with terrestrial sources and thus an absolute, rather than relative, age may be determined in many cases. In other instances, correlation of the terrestrial ash with a marine tephra layer in a well-dated core may be used to date the terrestrial ash. For example, the Y8 layer is correlated with the Los Chocoyos eruption in Guatemala (Drexler and others, 1980), which

is correlated with another marine tephra layer, the Worzel-D layer, found in the Pacific Ocean (Bowles and others, 1973), and an age of 84 ka was determined.

The Los Chocoyos Ash is the most widely distributed tephra in the Gulf of Mexico (Drexler and others, 1980) (fig. 1). It is the result of just one of many eruptions producing large volumes of silicic ash during the Pleistocene in western North America, Mexico and Central America. Table 1 lists other large eruptions that could be expected to extend to the northwestern Gulf. The volumes of these eruptions, their proximity to the Gulf (fig. 1), and the general prevailing wind patterns, indicate the Gulf of Mexico as a possible location for deposition of the tephra in table 1. One of those, the Lava Creek B tephra, is found as a discrete tephra layer in a core (E67-126A) from the same region as the core used in this study (C. L. Ostergren, 1989, personal communication).

The purpose of the study is to apply tephrostratigraphic techniques to determine the stratigraphy of deep sea core E67-113 from the northwest Gulf of Mexico. Location and identification of tephra in the core were difficult due to sedimentological processes in the area. Salt diapirism in the area creates an increased saline environment, affecting the chemistry of the immediately surrounding sediments and causing alteration of the volcanic ash. Salt diapirs also disrupt the depositional environment by enhancing erosion, slumping, and sliding. Oxygen isotope stratigraphy for a portion of the core (upper 40%) and seismic-reflection profiles of the core and the surrounding region provide the necessary information to identify these sedimentological processes at the core site.

Geologic History of the Gulf of Mexico

The Gulf of Mexico began to form during the Late Paleozoic. Oceanic crust beneath the abyssal gulf developed by rifting and sea floor spreading. This formed an epicontinental sea in the Jurassic where thick layers of salt were deposited. The oceanic

Figure 1. Index map showing the locations of the Late Pliocene and Pleistocene eruptions listed in table 1, the locations of cores E67-113 and E67-126A (Core Sites), and the distribution of the Los Chocoyos tephra from Lake Atitlan. This tephra has been correlated to the Y8 tephra that is present in the western Gulf of Mexico and the Worzel Layer "D" that is present in the eastern Pacific Ocean.

TABLE 1. LARGE VOLUME LATE PLIOCENE AND PLEISTOCENE VOLCANIC ERUPTIONS OF NORTH AMERICA, MEXICO, AND CENTRAL AMERICA

Eruption Unit or Ash Bed	Date	Source Location	Volume km ³	Reference
Huckleberry Ridge	2.01 Ma	Yellowstone, Wyoming	2000	Izett, 1981
Lava Creek B	0.61 Ma	Yellowstone, Wyoming	1000	Izett, 1981
Bishop Tuff	0.74 Ma	Long Valley Caldera, California	500	Izett, 1981
Tsankawi Upper Bandelier	1.15 Ma	Jemez Mountains, New Mexico	300	Izett, 1981
Guaje Lower Bandelier	1.47 Ma	Jemez Mountains, New Mexico	300	Izett, 1981
Los Chocoyos	84 ka	Lake Atitlan, Guatemala	200	Rose and others, 1981 Drexler and others, 1980
Faby Tuff	0.24 Ma	Los Humeros, Puebla, Mexico	40	Ferriz and Mahood, 1984
Tala Tuff	90 ka	Sierra La Primavera, Jalisco, Mexico	20	Mahood, 1980

crust continued to cool and subside until the late Cretaceous. By this time the Gulf had subsided by several kilometers. The Gulf became isolated by continuous growth of surrounding carbonate platforms, the Florida and Yucatan peninsulas (fig. 2), that formed in the Jurassic and Cretaceous. These are made of authigenic, shallow water carbonates and anhydrite (Wilhelm and Ewing, 1972). Low rates of sediment accumulation within the Gulf, together with the continued growth of these carbonate platforms around the Gulf, caused a deepening of the Gulf. Figure 2 shows the major geomorphic provinces and current patterns in the Gulf.

The primary current in the Gulf is the Florida Current. It forms from the Caribbean Current which enters the Gulf by the Yucatan Channel and exits by the Straights of Florida, and therefore is called the Loop Current. The Loop Current extends from the surface to the sea floor along the continental margins. The change in intensity of this current is recorded in sediments by the amount of winnowing observed. At approximately 3.1 Ma, there was a significant increase in the winnowing of the sediments, which continued in numerous cycles into the Pleistocene. This created an increasing number of hiatuses in the sediment record. This increase correlated with the closing of the Central American Passage at approximately 3.1 Ma, diverting most of the Caribbean Current into the Gulf, and later with the glacial-interglacial cycles, which began approximately 2.5 Ma (Late Pliocene), due to the major growth of the ice sheets on the northern continent (Brunner, 1984; Hodell and others, 1985).

The glacial-interglacial cycles that began in the late Pliocene continued into the Pleistocene with increased frequency and decreased duration. Productivity during the Pleistocene increased globally, especially during the glacials. This increase in productivity was due to an increase in current circulation both horizontally and vertically, creating

Figure 2. A. Bathymetric map of the Gulf of Mexico showing core locations; B. Major current pattern in the Gulf (after Brunner and Cooley, 1976); C. Major geomorphic provinces in the Gulf (after Wilhelm and Ewing, 1972).

greater upwelling. Terrigenous sediment accumulation rates also increased due to lowered sea level during glacial periods (Brunner, 1984; Hodell and others, 1985).

Salt diapirs dominate the continental slope of the western Gulf of Mexico. The salt diapirs rise due to the density contrast between the less dense salt below and the denser overlying sediments. Diapiric activity increased during the Pleistocene due to the increased sediment accumulation. The salt diapirs form structural highs covered by sediments (Wilhelm and Ewing, 1972). The Sigsbee and Campeche Knolls are results of the extensive diapiric activity (fig. 2).

Today the Gulf is covered by a thin accumulation (approximately 20-50 cm) of foraminiferal ooze on the continental shelves, slopes, rises and abyssal plains as well as on the Mississippi Fan (Davies, 1972). The terrigenous sediments that enter the Gulf are deposited primarily in the western Gulf. This supply of terrigenous sediments also slightly increases productivity by bringing more nutrients into the western part of the Gulf (Jendrzcejewski and Hart, 1978). The present current pattern varies seasonally from spring to winter. In spring, the Caribbean Current impinges on the Gulf, creating the "spring intrusion." This current increases with time, and by the fall, begins to spread into the rest of the Gulf and is termed the "fall spreading." As the current begins to wane during the winter months, eddies are left in the western and northern Gulf (Leipper, 1970).

Geologic Setting of the Study Area

The continental slope in the northern Gulf of Mexico is dominated by salt ridges, domes, and spines, the emplacement and movement of which greatly affect the deposition of the sediments on the slope (fig. 3a). Those sediments are deposited by turbidity currents and hemipelagic sedimentation. Movement of the salt structures causes disruption of these sediments, such as slumping, sliding, faulting and erosion. Salt structures can also

Figure 3. A. Schematic profile of offlapping Pliocene-Pleistocene sediment wedges, showing sand-mud transitions and emplacement of salt structures (after Stuart and Caughey, 1977). B. Structural contour map of the diapir adjacent to core E67-113. Contour intervals are 100 feet. (after Lehner, 1969) Point a is the location of figure 11 and point b is the location of figure 12.

facilitate chemical alteration of adjacent sediments that differs from "normal" alteration of deep sea sediments. The core used for this study, core E67-113 (drilled by the Shell Oil Company in 1967), was drilled at longitude 95°54'W and latitude 27°28'N adjacent to a large salt structure (fig. 3b) in the northwestern Gulf on the upper continental slope (fig. 2). The structure has steep flanks and a flat top covered with caprock, which is typical of an extrusive salt plug, and forms a low-relief promontory (Lehner, 1969).

METHODS

Core E67-113 was chosen for this study because of its continuity (88% recovered) compared to other cores available. The coring data and a brief paleontologic report supplied by Shell are in Appendix A. The core is stored in the U. S. Geological Survey Warehouse in Corpus Christi, Texas. Samples were collected as one inch slices at one foot intervals. This was done by personnel at the storage warehouse. The samples were then sent to Moss Landing Marine Laboratories, California. They arrived as chunks of dried clay in individual plastic bags. Sample preparation consisted of weighing each dry sample, dispersing it in a Calgon solution to disaggregate the clay, then wet-sieving each sample with a 38 μm screen. The >38 μm (coarse) fraction was dried and weighed. A final sieving of the dry coarse fraction with a 63 μm sieve was done to separate the 38 - 63 μm fraction for analysis.

Identification of the tephra involved preparing smear slides from the 38 - 63 μm fraction. Using a petrographic microscope, the amount of tephra in each slide was estimated and recorded in one of five categories. These categories are none, trace (<1%), rare (1-4%), common (4-10%), and abundant (>10%). Additional information recorded for each slide included the estimated amount of terrigenous material relative to biogenic material (minus the opaque material) and the amount of opaque material relative to the total sample on the slide (% opaques). The samples that contain >1% ash were put into a 10% HCl solution to dissolve the biogenic material (CaCO_3). The end product of this procedure was then put into a mixture of methylene iodide and acetone in a density-gradient column to get a clean ash separate.

Chemical "fingerprinting" of volcanic glass was used as the method of correlating the marine tephra with its terrestrial source. The ash was mounted and analyzed on the electron-microprobe for 9 major elements (Si, Al, Fe, Mg, Mn, Ca, Ti, Na, and K).

Natural glasses and silicate minerals that were analyzed by conventional wet-chemical methods were used as standards. Up to 20 shards were analyzed for each sample. The data were recalculated to 100%, then added to the tephra database at the U. S. Geological Survey in Menlo Park, California. This database contains electron-microprobe data of major element chemistry for tephra from most North American and many Central and Latin American volcanic eruptions. Similarity coefficients were calculated for every sample analyzed with every sample in the tephra database. The similarity coefficient is an average of ratios of element concentrations in two glass samples. The ratios of individual elements are calculated by dividing the concentration in one sample by the concentration in another. The lower concentration is always divided by the higher so the ratio is always less than or equal to one. The coefficients are averaged for all elements in the comparison. The ideal value of this coefficient equals one for an identical pair. Similarity coefficients with values of 0.35 - 0.94 are for different units. Values of 0.94 - 0.96 are intervals of uncertain correlation. Values of 0.96 and higher are considered to be from a single source (Sarna-Wojcicki and others, 1984).

Four different combinations of elements were used for the correlations. These combinations are:

Na₂O, Al₂O₃, SiO₂, CaO, K₂O, Fe₂O₃
 Na₂O, Al₂O₃, SiO₂, CaO, K₂O, MgO
 Na₂O, Al₂O₃, SiO₂, CaO, K₂O
 Na₂O, Al₂O₃, SiO₂, CaO.

An element is useful in the correlation if it is homogeneously distributed within the glass of a single layer, if it differs in concentration in layers of different ages, and if a full range of concentrations can be accurately measured (Sarna-Wojcicki and others, 1984). A list of the best 50 matches was determined for each combination of elements for each sample.

The homogeneity index is calculated for each sample also. This is done by dividing the standard deviation of the counts accepted for each element in each sample by the square

root of the mean. A homogeneity index of 0-2 indicates a very homogeneous sample and suggests that shards are from a single source. Homogeneity indices of 3 or greater indicate increasing heterogeneity (C. E. Meyer, 1990, personal communication).

RESULTS

The opaque material consists of small round beads of pyrite. They appear to be formed by pyritization of organic structures (C. E. Meyer, 1987, personal communication). Appendix B contains the data collected for each sample. Twelve samples contained more than 1% tephra, but no megascopic or discrete tephra layers were found. There was a background level of a few tephra shards in almost every sample. The samples with > 1% tephra came from zones of enriched organic material and > 50% terrigenous material (fig. 4). Samples 1563, 1617, 1629, 1630, 1644, 1653, and 1659 (sample numbers correspond to depth, in feet, below sea level) were not analyzed due to extensive alteration. Samples 1543, 1564, 1640, 1856, and 2178 were less visibly altered and were analyzed. Sample 1640 had the most tephra and is the least altered, so it was analyzed twice, using 15 - 20 grains in each analysis. Two of the samples (1543 and 1564) contained only 3 - 10 acceptable grains.

The chemical data for the five tephra samples analyzed are listed Appendix C and summarized in table 2. The tephra are rhyolitic (75 - 77% SiO_2). The total weight percent of the oxides for all of the samples is low (87 - 91%). This indicates that the tephra have been hydrated. Some of the hydration occurs during the diagenesis of the volcanic glass (Summa and Verosub, 1987).

The best 50 matches (correlations) and chemistry for the samples are in Appendix D. The iron and magnesium of the core samples are significantly different from any other analyses in the database. The iron is very depleted and the magnesium is very enriched. Figure 5 is a comparison of the core sample chemistry with some of the tephra found in the western Gulf. The Faby is represented because of its proximity to the Gulf and possible occurrence within the Gulf (it has not yet been found in the Gulf), and the fact that it appears in some of the correlations for this study. Sample 2040 is from core E67-126A.

Figure 4. Graph of the data for core E67-113. Ash Content categories: N = 0%, T = < 1%, and R = 1-4%. % Bio - % Terr = amount of biogenic material vs amount of terrigenous material (of total non-opaque material). % Opaques = amount of pyritized organic structures (pyrite beads) compared to the total sample. % Coarse fraction = Weight of >38 μ fraction divided by the the total sample.

TABLE 2. CHEMICAL DATA OF TEPHRA AT CORE SITE E67-113.

Oxide	<u>Sample No.</u>					
	<u>1543</u>	<u>1564</u>	<u>1640</u>	<u>1640-2</u>	<u>1856</u>	<u>2178</u>
SiO ₂	64.655	66.267	67.225	70.011	69.779	68.775
Al ₂ O ₃	14.915	14.715	14.502	14.474	14.134	14.594
Fe ₂ O ₃ *	0.083	0.186	0.207	0.270	0.210	0.405
MgO	0.073	0.626	0.611	0.535	0.445	0.517
MnO	0.008	0.008	0.015	0.006	0.000	0.011
CaO	0.243	0.414	0.407	0.439	0.462	0.384
TiO ₂	0.026	0.000	0.000	0.007	0.000	0.000
Na ₂ O	2.133	1.795	2.464	2.200	2.249	3.245
K ₂ O	<u>4.028</u>	<u>4.107</u>	<u>3.180</u>	<u>3.204</u>	<u>3.100</u>	<u>2.834</u>
Total	86.825	88.118	88.612	91.146	90.380	90.766

Recalculated to 100%

SiO ₂	74.47	75.20	75.86	76.81	77.21	75.77
Al ₂ O ₃	17.18	16.70	16.37	15.88	15.64	16.08
Fe ₂ O ₃ *	0.10	0.21	0.23	0.30	0.23	0.45
MgO	0.08	0.71	0.69	0.59	0.49	0.57
MnO	0.01	0.01	0.02	0.01	0.00	0.01
CaO	0.28	0.47	0.46	0.48	0.51	0.42
TiO ₂	0.03	0.00	0.00	0.01	0.00	0.00
Na ₂ O	2.46	2.04	2.78	2.41	2.49	3.58
K ₂ O	<u>4.64</u>	<u>4.66</u>	<u>3.59</u>	<u>3.52</u>	<u>3.43</u>	<u>3.12</u>
Total	99.25	100.00	100.00	100.01	100.00	100.00

Results are in weight %

*Total iron is recalculated as Fe₂O₃.

Figure 5. Comparison of chemistry of the samples from core E67-113 with two marine ashes found in the western Gulf of Mexico (2040 and Y8) and two terrestrial ashes (Lava Creek B and Faby).

Y8 and 2040 are marine tephra from the Gulf. The Faby and Los Chocoyos are terrestrial tephra shown here to compare chemical differences between marine and terrestrial tephra. The tephra analyzed throughout core E67-113 are similar to each other, but are very different from the other tephra related to the Gulf (and anywhere else).

Each of the five samples consists of shards that are very heterogeneous. This is indicated by the homogeneity index (Appendix C). Table 3 lists the homogeneity indices for the samples from the core and also samples known to be from single sources for comparison. The majority of indices of the elements from the samples in the core are greater than 3. This provides good evidence that shards in a single sample are differentially altered and possibly from different sources.

The similarity coefficients and lists of 50 best matches for the individual core samples to tephra in the database are in Appendix D. The tephra from the database that appear in the lists of correlations typically represent older, altered tephra that could not stratigraphically occur in the core due to their age (Early Pliocene and older). When Fe_2O_3 or MgO is used in the correlation, the core samples correlate mainly with each other. This is due to the distinct differences between these oxides in the core samples and the tephra in the database. However, a few samples do appear in the correlations that represent Pleistocene tephra found in the western Gulf of Mexico, or that could occur due to the proximity of the source to the western Gulf (fig. 1). These are the Los Chocoyos (Y8 - marine layer) and the Faby Tuff, respectively. Their similarity coefficients are low, typically 70 - 85 %, but appear in the lists in Appendix D as high as the third best match for samples 1564 and 1640.

TABLE 3. COMPARISON OF HOMOGENEITY INDICES OF THE ELEMENTS IN TEPHRA FROM CORE SITE E67-113 TO SOME SINGLE SOURCE SAMPLES

Oxide	<u>Samples from Core E67-113</u>					
	1543	1564	1640	1640-2	1856	2178
SiO ₂	10.539	13.584	16.801	7.377	6.708	8.594
Al ₂ O ₃	4.644	3.489	4.622	3.941	3.506	4.338
FeO	1.158	2.901	6.084	9.853	4.751	10.586
MgO	9.918	6.523	8.754	9.951	6.252	9.001
MnO	1.331	1.479	0.872	1.451	0.665	1.116
CaO	3.908	5.408	7.226	9.463	5.612	7.096
TiO ₂	1.364	1.047	1.221	2.136	0.819	0.878
Na ₂ O	3.476	2.558	7.664	8.506	2.443	3.641
K ₂ O	9.745	8.308	9.799	13.506	10.017	10.380

Oxide	<u>Single Source Samples</u>			
	2040	Faby	Y8	La Primavera
SiO ₂	1.348	1.341	1.578	0.979
Al ₂ O ₃	1.930	1.322	1.652	1.145
FeO	2.838	0.804	1.095	1.249
MgO	0.938	0.939	1.053	1.147
MnO	1.083	0.673	0.767	1.100
CaO	2.155	1.450	1.828	1.175
TiO ₂	1.853	1.136	1.163	1.166
Na ₂ O	1.654	2.552	1.920	1.903
K ₂ O	4.130	0.948	4.069	1.103

Sample 2040 is a marine tephra layer from Core E67-126A from the Gulf of Mexico.
 Sample Y8 is a marine tephra from the Gulf of Mexico.
 The Faby and La Primavera samples are terrestrial tephra layers from Mexico.

DISCUSSION

Alteration

The tephra in core E67-113 have been highly altered as indicated by the low total weight % of the oxides, enrichment of magnesium, and depletion of the iron, titanium and manganese in each sample. Volcanic glass readily alters due to its thermodynamic instability and poorly ordered internal structure. Low temperature alteration of silica glass typically occurs in two stages. The initial stage consists of hydration and alkali ion exchange. In the second stage, destruction of the glass matrix begins and there is precipitation of secondary phases in the newly created pore spaces (Fisher and Schmincke, 1984).

Subaerial alteration depends on changes in the glass/water system. Leaching of elements from the glass rapidly occurs in a well-flushed fluvial system due to the oxygenated fresh water, which is undersaturated in the elements with respect to the glass. The released ions are then carried downstream. Clay minerals (commonly montmorillonite) are the typical alteration product in these conditions (Fisher and Schmincke, 1984).

Low-temperature marine alteration depends on the same glass/water system as in subaerial conditions. However, the tephra pick up ions (Mg^{2+} , Na^{+}) as well as release them (Ca^{2+}) (Brownlow, 1979). The tephra alter to clays (commonly smectites) and zeolites (Summa and others, 1984). Volcanic tephra in the sediment column act as a chemical source and sink. The ions that are released influence the pore water chemistry in the surrounding marine sediments (Fisher and Schmincke, 1984).

The tephra in core E67-113 appear to have been reworked from subaerial deposits and redeposited via fluvial and coastal systems in the Gulf. The homogeneity indices provide some evidence for this. High indices can indicate a number of possible influences

on the tephra. One is that some grains are altered more than others within the sample. Another possibility is that individual grains are heterogeneous initially. They may contain bubbles or lithic intrusions. The third possibility, and typically the most common, is post-depositional reworking. There may be glass incorporated from other eruptions (C. E. Meyer, 1990, personal communication). The tephra in the core occur in zones of increased terrigenous material. This suggests that the tephra were subaerially deposited, then reworked by fluvial and coastal systems to be finally deposited in the Gulf.

Marine alteration has also influenced the tephra in the core as indicated by the enrichment of magnesium and the depletion of iron. The altered tephra probably has picked up extra magnesium from the sea-water. The depletion of iron may be due to the adjacent salt diapir (fig. 3b). The dissolution of near-surface salt increases the salinity of pore fluids and creates anoxic conditions, which preserve marine organic matter and produce a reducing environment (Lehner, 1969; Williams and Lerche, 1987). The tephra samples come from zones enriched in organic material. Pyritization readily occurs in a reducing environment and is seen throughout the core as opaque, pyritized organic structures. Sulfur is associated with the caprock of a salt dome (Krauskopf, 1967); in this case, the caprock is mainly comprised of anhydrite (Lehner, 1969). The reducing environment may have helped the iron to be mobilized from the tephra. This iron, combined with the sulfur, may have contributed to the pyritization. Sample 2178 (the lowermost sample that contains ash in the core) is enriched in magnesium as are the other samples, but it is not significantly depleted in iron. This may be due to the depth at which the sample is located. Compaction at depth, due to overburden of the overlying sediments prior to the ascent of the diapir, could have reduced the pore space. The increase in salinity of the water due to the ascended diapir may not have affected the sediment at this depth because of the inability of the water to enter the pore spaces. The magnesium would be enriched, as in the other

samples in the core, if the tephra has picked up the magnesium from the sea-water in which the sediment was deposited.

Tephrochronology

No correlations can be made with any source of tephra or other marine tephra due to the extensive alteration. It is interesting to note, though, that the Faby, Los Chocoyos, and Y8 ashes do appear in some of the correlations (Appendix D). However, the oxygen isotope stratigraphy ($\delta^{18}\text{O}$) for the core indicates that these ashes would not occur in the core (fig. 6). Two major hiatuses occur (D. F. Williams, 1988, written communication), one at 0 - 0.093 Ma (1474 ft below sea level) and one at 0.12 - 1.2 Ma (1728 ft below sea level). The paleontologic report from Shell (Appendix A) indicates a datum line at 1728 ft as a change from Lower Pleistocene to Upper Pleistocene. This datum line correlates with the depth of the lower hiatus that Williams noted in the oxygen isotope stratigraphy. Both of these hiatuses encompass the times that many of the widespread ashes found in the Gulf would occur.

In another core (E67-126A), from the same region as E67-113, where water depth is 1064 ft, a discrete ash layer is found at 2040 ft below sea level. Core E67-126A was drilled on the shelf-slope break (fig. 2). There is less alteration of this ash, and the average homogeneity index is 1-2 (indicating a single source). Electron-microprobe analyses of the ash indicate a correlation with either the Huckleberry Ridge or the Lava Creek B ash (Table 1). Further analysis with X-ray fluorescence, in conjunction with biostratigraphy and oxygen isotope stratigraphy, indicate that the ash layer correlates with the Lava Creek ash (C. L. Ostergren, 1989, personal communication). This ash is not found in core E67-113 because it falls within the 0.12 - 1.2 Ma hiatus.

Figure 6. Oxygen isotope stratigraphy for the upper 40% of core E67-113 (From D. F. Williams, 1988, written communication). X, W, S, and R correspond to foraminifera zones and 5c-5e and 29 correspond to oxygen isotopic stages within the foraminifera zones.

Sedimentary History

The proximity of core E67-113 to a large salt diapir is the cause of the major hiatuses indicated by the oxygen isotope stratigraphy. The seismic-reflection profile shows the effect of the adjacent salt diapir on the sediment of the core (fig. 7). Three sections of sediment (A, B, and C) record the history of the rising diapir. Section A shows undisturbed, parallel reflectors, indicating little diapiric activity or activity that had little influence on the sedimentation of the strong reflectors (sedimentation in balance with the ascending diapir). Section B indicates important diapiric activity during deposition. The reflectors pinch out (converge) against the diapir. They show onlap of sediments on a topographic high, or variable compaction due to the rising diapir. Section C consists of parallel reflectors filling a channel. The reflectors at the top of section B are truncated by the channel fill reflectors in section C.

As this diapir ascended, the bottom currents were diverted around this new topographic feature, creating an erosional channel or moat around the diapir in which the core was drilled. As the activity of the diapir slowed, erosion decreased, and eventually deposition increased and the channel that was created was draped with sediment. The upper hiatus of 0 - 93 ka may be due to reactivity of the salt diapir, which may have increased the diverted current activity within the channel and eroded the top 93,000 years of sediment. Figures 8a and 8b are seismic-reflection profiles from the U. S. Geological Survey of the area surrounding the core location. They show a similar channel on the northwestern flank of the diapir, approximately 3,000 meters from the location of the core (points a and b in fig. 3b). This channel is inferred to have been eroded by the same diverted currents.

High rates of sedimentation after the 0.12 - 1.2 Ma hiatus may have caused the renewed activity in the diapir to create the 0 - 93 ka hiatus. Sedimentation rates vary greatly

Figure 7. Seismic-reflection profile showing location of core E67-113. (after Lehner, 1969) A = undisturbed parallel reflectors; B = converging reflectors against the diapir; C = parallel channel fill reflectors.

Figure 8. Seismic reflection profiles of the northwestern side of the diapir showing erosional channels similar to the one in which the core was drilled. The top profile (a) corresponds to point a in figure 3 and the bottom profile (b) corresponds to point b in figure 3.

in the Gulf. Thunell (1976) reported rates of 2 - 8 cm/ka, and Kennett and Huddleston (1972) reported 10 - 30 cm/ka rates and noted that those rates are commonly highly variable within and between cores. The sedimentation rates for core E67-113, based on the oxygen isotope stratigraphy, range from 2.4 cm/ka prior to the hiatus at 0.12 - 1.2 Ma, to 340 cm/ka after the same hiatus, with a section of only 42.2 cm/ka at the 5d isotopic stage (Fig 6). After the erosion stopped, sedimentation rates greatly increased, and large amounts of sediment were deposited prior to renewed activity of the diapir (seen by the second hiatus at 0 - 93 ka). This renewed activity may be due to the rapid accumulation of overburden, causing the less dense salt below to flow upward again.

The depth of the unconformity between sections B and C in the seismic-reflection profile (fig. 7) correlates with the 0.12 - 1.2 Ma hiatus determined by the oxygen isotope stratigraphy (at approximately 1728 ft, fig. 6), and the datum determined by the paleontologic report (at 1728 ft, Appendix A). Seismic velocities recorded for sediments in the Gulf of Mexico range from 1.7 - 1.92 km/sec for the upper kilometer (3281 ft) of sediment on the continental slope (Locker and Chatterjee, 1984). When 1.7 km/sec is used with 0.62 sec for the two-way travel time at the location of the unconformity on the seismic profile, the approximate depth of the unconformity is 527 m (1729 ft).

CONCLUSIONS

The high degree of alteration and hydration of the tephra in core E67-113 (located in the Gulf of Mexico, longitude 95°54'W, latitude 27°28'N) indicate that the tephra have been reworked from land deposits. High homogeneity indices of the electron-microprobe data support the theory of reworked tephra. The tephra occur in zones of comparatively high terrigenous material, indicating that the tephra were redeposited with terrigenous sediment via fluvial and coastal systems. Post-depositional alteration in the marine environment also is indicated by the significant enrichment of magnesium and the depletion of iron in the tephra. Magnesium enrichment may be due to the uptake of magnesium from the sea-water. Iron depletion may be due to the proximity of a salt diapir to the core. The high salinity in the pore fluids in the sediment created an anoxic environment, preserving organic matter and thus forming a reducing environment, ideal for the formation of pyrite, which contains iron from the tephra.

No correlation with any source is possible due to the great amount of alteration. However, poor correlations with a few widespread tephra found in the Gulf are noted. These include the Faby Tuff (0.24 ± 0.03 Ma) and the Los Chocoyos (Y-8) tephra (84 ka). A discrete tephra layer occurs in another core (E67-126A) from the same region and is correlated with the Lava Creek Tuff (0.6 ± 0.02 Ma). Oxygen isotope stratigraphy ($\delta^{18}\text{O}$) indicates two major hiatuses occurring at 0 - 0.093 Ma and 0.12 - 1.2 Ma. These time spans include the eruption of the Faby, Los Chocoyos, and Lava Creek tephra. If these tephra are present in the core (indicated by the poor correlations for the Faby and Los Chocoyos), then their stratigraphic position would not be of the time of eruption but of the time the tephra entered the Gulf of Mexico via fluvial and coastal systems.

Seismic reflection profiles show that the core was drilled in a small channel adjacent to a large salt diapir. The reflectors in the profile indicate changes in the sedimentation due

to changes in the activity of the rising diapir. The unconformities may be related to times of increased activity of the diapir. As the diapir rose, currents were diverted around the new topographic high and eroded sediments to form a channel. An unconformity is indicated in the reflection data and approximately correlates with the timing of the large hiatus from 0.12 - 1.2 Ma. High sedimentation rates based on the oxygen isotope stratigraphy after the 0.12 - 1.2 Ma hiatus may have caused the renewed activity of the diapir to create the 0 - 0.093 Ma hiatus at the top of the core.

REFERENCES CITED

- Bowles, F. A., Jack, R. N., and Carmichael, I. S. E., 1973, Investigation of deep-sea volcanic ash layers from equatorial Pacific cores: Geological Society of America Bulletin, v. 84, p. 2371-2388.
- Brownlow, A. H., 1979, Geochemistry: New Jersey, Prentice-Hall, Inc., 498 p.
- Brunner, C. A., 1984, Evidence for increased volume transport of the Florida current in the Pliocene and Pleistocene: Marine Geology, v. 54, p. 223-235.
- Brunner, C. A., and Cooley, J. F., 1976, Circulation in the Gulf of Mexico during the last glacial maximum 18,000 years ago: Geological Society of America Bulletin, v. 87, p. 681-686.
- Davies, D. K., 1972, Deep-sea sediments and their sedimentation, Gulf of Mexico: American Association of Petroleum Geologists Bulletin, v. 56, p. 2212-2239.
- Drexler, J. W., Rose, W. I., Jr., Sparks, R. S. J., and Ledbetter, M. T., 1980, Los Chocoyos ash, Guatemala: A major stratigraphic marker in Middle America and in three ocean basins: Quaternary Research, v. 13, p. 327-345.
- Ericson, D. B., and Wollin, G., 1968, Pleistocene climates and chronology in deep-sea sediments: Science, v. 162, p. 1227-1234.
- Ferriz, H. and Mahood, G. A., 1984, Eruption rates and compositional trends at Los Hornos Volcanic Center, Puebla, Mexico: Journal of Geophysical Research, v. 89, p. 8511-8524.
- Fisher, R. V. and Schmincke, H.-U., 1984, Pyroclastic rocks: New York, Springer - Verlag, 472 p.
- Hodell, D. A., Williams, D. F., and Kennett, J. P., 1985, Late Pleistocene reorganization of deep vertical water-mass structure in the western South Atlantic: faunal and isotopic evidence: Geological Society of America Bulletin, v. 96, p. 495-503.
- Izett, G. A., 1981, Volcanic ash beds: recorders of Upper Cenozoic silicic pyroclastic volcanism in the western United States: Journal of Geophysical Research, v. 86, p. 10200-10222.
- Jendrzewski, J. P. and Hart, G. E., 1978, Distribution of siliceous microfossils in surficial bottom sediments of the Gulf of Mexico: Palynology, v. 2, p. 159-166.
- Kennett, J. P., 1981, Marine tephrochronology, in Emiliani, C., ed., The oceanic lithosphere. The sea: New York, Wiley-Interscience Publishers, p. 1373-1436.
- Kennett, J. P. and Huddleston, P., 1972, Late Pleistocene paleoclimatology, foraminiferal biostratigraphy and tephrochronology, western Gulf of Mexico: Quaternary Research, v. 2, p. 38-69.

- Krauskopf, K. B., 1967, Introduction to geochemistry: New York, McGraw-Hill, Inc., 721 p.
- Ledbetter, M. T., 1984, Late Pleistocene tephrochronology, *in* Healy-Williams, N., ed., Principles of Pleistocene stratigraphy applied to the Gulf of Mexico: International Human Resources Development Corporation, p. 119-148.
- Ledbetter, M. T., 1985, Tephrochronology of marine tephra adjacent to Central America: Geological Society of America Bulletin, v. 96, p. 77-82.
- Lehner, P., 1969, Salt tectonics and Pleistocene stratigraphy on continental slope of northern Gulf of Mexico: American Association of Petroleum Geologists Bulletin, v. 53, p. 2431-2479.
- Leipper, D. F., 1970, A sequence of current patterns in the Gulf of Mexico: Journal of Geophysical Research, v. 75, p. 637-657.
- Locker, S. D. and Chatterjee, S. K., 1984, Seismic velocity structure, *in* Buffler, R. T., Locker, S. D., Bryant, W. R., Hall, S. A., and Pilger, R. H., Jr., eds., Ocean Margin Drilling Program, Regional Data Synthesis Series, Atlas 6, Gulf of Mexico: Marine Science International, Woods Hole, p. 4.
- Mahood, G. A., 1980, Geological evolution of a Pleistocene rhyolitic center - Sierra La Primavera, Jalisco, Mexico: Journal of Volcanology and Geothermal Research, v. 8, p. 199-230.
- Rabek, K., Ledbetter, M. T., and Williams, D. F., 1985, Tephrochronology of the western Gulf of Mexico for the last 185,000 years: Quaternary Research, v. 23, p. 403-416.
- Rose, W. I., Hahn, G. A., Drexler, J. W., Malinconico, M. L., Peterson, P. S., and Wunderman, R. L., 1981, Quaternary tephra of northern Central America, *in* Self, S. and Sparks, R. S. J., eds., Tephra studies: Holland, D. Reidel Publishers Co., p. 193-211.
- Sarna-Wojcicki, A. M., Bowman, H. R., Meyer, C. E., Russell, P. C., Woodward, M. J., McCoy, G., Rowe, J. J., Jr., Baedeker, P. A., Asaro, F., and Michael, H., 1984, Chemical analyses, correlations, and ages of Upper Pliocene and Pleistocene ash layers of east-central and southern California: U. S. Geological Survey Professional Paper 1293, 41 p.
- Stuart C. J. and Caughey, C. A., 1977, Seismic facies and sedimentology of terrigenous Pleistocene deposits in northwest and central Gulf of Mexico, *in* Payton, C. E., ed., Seismic stratigraphy - applications to hydrocarbon exploration: American Association of Petroleum Geologists Memoir 26, p. 249-275.
- Summa, L. L., Guichard, F., and Verosub, K. L., 1984, Trace element mobility in tephra from three diagenetic environments [abs]: Geological Society of America, Annual Meeting, Abstracts with Programs, v. 16, p. 670.

- Summa, L. L., and Verosub, K. L., 1987, A catalog of North American ashes found in altered and unaltered states for use as a data base in studying tephra diagenesis: *Journal of Volcanology and Geothermal Research*, v. 32, p. 321-327.
- Thunell, R. C., 1976, Calcium carbonate dissolution history in Late Quaternary deep-sea sediments, western Gulf of Mexico: *Quaternary Research*, v. 6, p. 281-297.
- Wilhelm, O. and Ewing, M., 1972, Geology and history of the Gulf of Mexico: *Geological Society of America Bulletin*, v. 83, p. 575-600.
- Williams, D. F. and Lerche, I., 1987, Salt domes, organic-rich source beds and reservoirs in intraslope basins of the Gulf Coast region, *in* Lerche, I., and O'Brien, J. J., eds., *Dynamical geology of salt and related structures*: Orlando, Florida, Academic Press, Inc., p. 751-786.

APPENDIX A

Paleontologic report and coring data for core E67-113 provided by Shell Oil Co.

PALEONTOLOGIC REPORT**E67-113 (USGS-113)****WATER DEPTH - 1472'****First sample - 1472'****Recent-Upper Pleistocene mixed****Sample - 1728'****Lower Pleistocene****Last sample - 2391'****In Lower Pleistocene****TD - 2400'****Lower Pleistocene**

M/V EUREKA CORING DATA

Sheet 1 of 5

Hole No. E 67-113Date 7/17-18/67Drillers Water Depth 1472Coordinates 27°28' 95°54'Drillers Total Depth 2400

Raydist Loc. _____

On Location 1530 7/17/67Total Footage Cored 928'

Going in hole 1545 - APE trouble

Completed Hole 0250 7/19/67Total Footage Recovered 815'

No Log run

S.P. 928'

CORE NO.	CORED INTERVAL	RECOVERY IN FEET	REMARKS
1	1472-88	13/16'	Clay, soft, gm-gy, forams
2	1488-1504	15/16'	a.l.a.
3	1504-20	14/16'	Clay - becoming firmer - grn-gy - forams
4	1520-36	12/16'	Clay - soft - gm-gy - forams
5	1536-52	14/16'	Clay - mod firm - grn-gy - forams
6	1552-68	17/16'	a.l.a.
7	1568-84	16/16'	a.l.a. sli sdy at 1583
8	1584-1600	15/16'	Clay, brn-gy to med-gy interbedded, firmer
9	1600-16	16/16'	a.l.a., few forams
10	1616-32	17/16'	Clay, grn-gy, with white sand zones, firm, forams
11	1632-48	16/16'	a.l.a. but bec darker colored, little sand
12	1648-64	14/16'	a.l.a., but no sand
13	1664-80	17/16'	a.l.a.
14	1680-96	18/16'	a.l.a.

M/V EUREKA CORING DATA

Sheet 2 of 5

Hole No. E 67-113 Date 7/18/67
 Drillers Water Depth 1472 Coordinates _____
 Drillers Total Depth _____ Raydist Loc. _____
 On Location _____ Total Footage Cored _____
 Completed Hole _____ Total Footage Recovered _____

CORE NO.	CORED INTERVAL	RECOVERY IN FEET	REMARKS
15	1696-1712	15/16'	bottom 2-1/2' blew out of core bbl a.l.a. and landed on oily deck
16	1712-28	16/16'	As above, core #12, faint red cast 1714'-22'
17	1728-44	17/16'	As above, no red. Bottom 3 ft blew out on deck possible contamination
18	1744-60	17/16'	Clay, dark grn-gy, some color variation in shade
19	1760-76	17/16'	a.l.a.
20	1776-92	15/16'	Bottom 3 ft blew out of bbl - possible a.l.a. contamination
21	1792-1808	16/16'	a.l.a. Some forams and shell material
22	1808-24	16/16'	a.l.a.
23	1824-40	16/16'	a.l.a.
24	1840-56	17/16'	a.l.a.
25	1856-72	16/16'	a.l.a.
26	1872-88	17/16'	a.l.a.
27	1888-1904	16/16'	a.l.a. rare sdy laminae
28	1904-20	16/16'	a.l.a., silty-sandy at bottom 6'

M/V EUREKA CORING DATA

Sheet 3 of 5

Hole No. E 67-113 Date 7/18/67
 Drillers Water Depth 1472 Coordinates _____
 Drillers Total Depth _____ Raydist Loc. _____
 On Location _____ Total Footage Cored _____
 Completed Hole _____ Total Footage Recovered _____

CORE NO.	CORED INTERVAL	RECOVERY IN FEET	REMARKS
29	1920-36	11/16'	a.l.a. little silt
30	1936-52	16/16'	a.l.a., few silt to sand laminae
31	1952-68	16/16'	As above core #18, some sandy zones
32	1968-84	16/16'	a.l.a.
33	1984-2000	15/16'	Clay, dark brn-gy, & dk gm-gy, bedded & mottled in part, firm, forams, rare silty lams
34	2000-16	12/16'	a.l.a., lower 6' very dark, gritty zones-forams?Sd?
35	2016-32	6/16'	a.l.a. but bec lighter gy again
36	2032-48	6/16'	a.l.a. gm-gy, rich forams, clay very dry
37	2048-64	16/16'	a.l.a.
38	2064-80	11/16'	a.l.a., clam shell @ 2075-2076
39	2080-2096	12/16'	a.l.a.
40	2096-2112	14/16'	a.l.a.
41	2112-28	14/16'	firm. Clay, interbedded brn-gy & gm-gy, sandy laminae
42	2128-44	16/16'	a.l.a.

M/V EUREKA CORING DATA

Sheet 4 of 5

Hole No. E 67-113 Date 7/18-19/67
 Drillers Water Depth _____ Coordinates _____
 Drillers Total Depth _____ Raydist Loc. _____
 On Location _____ Total Footage Cored _____
 Completed Hole _____ Total Footage Recovered _____

CORE NO.	CORED INTERVAL	RECOVERY IN FEET	REMARKS
43	2144-60	12/16'	a.l.a.
44	2160-76	16/16'	a.l.a. and apparent 30°+ fracture? or dip?
45	2176-92	6/16'	a.l.a. bec more grn in bottom 6" - sharp contact
46	2192-2208	9/12'	Clay as above core #41
47	2208-24	10/16'	a.l.a.
48	2224-40	10/16'	a.l.a.
49	2240-56	15/16'	a.l.a.
50	2256-72	11/16'	a.l.a.
51	2272-88	12/16'	a.l.a. but slightly lighter shades of color
52	2288-2304	10/16'	Same as #51
53	2304-20	15/16'	same as core #41 darker again, very firm
54	2320-36	9/16'	a.l.a., well laminated zones
55	2336-52	13/16'	a.l.a.
56	2352-68	15/16'	a.l.a. with well defined thin beds.

Hole No. E 67-113

Date 7/18-19/67

Drillers Water Depth _____

Coordinates_____

Drillers Total Depth_____

Raydist Loc._____

On Location _____

Total Footage Cored_____

Completed Hole _____

Total Footage Recovered _____[illegible]

APPENDIX B

The appendix contains the observational data for core E67-113. Sample numbers correspond to number of feet below sea level. Water depth at the coring site is 1472 ft. The first two samples were lost (1472 and 1473). Samples in bold print are those with more than 1% ash.

Categories for amount of ash are: None = 0%
 Trace = < 1%
 Rare = 1-4%

No sample contained more than 4% ash.

The biogenic to terrigenous category is a semi-quantitative comparison of the non-opaque material in each sample. To graph these data, the following conversion was made:

f >>>> t 100% biogenic material
f = t 50% biogenic and 50% terrigenous
f <<<< t 100% terrigenous

The amount of opaque material is relative to the entire sample.

Sample Data for Core E67-113

Sample No.	Sample Weight (gm)	Coarse Weight (>38 μ) (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
1474	15.35	0.31	2.02	trace	f>>>t	1
1475	16.13	0.54	3.35	none	f>>>t	1
1476	26.34	1.15	4.37	none	f>>>t	2
1477	43.64	1.02	2.34	trace	f>>>t	1
1478	-	-	-	-	-	-
1479	21.07	0.17	0.81	trace	f<<<t	10
1480	15.05	0.27	1.79	trace	f>>t	20
1481	25.10	0.58	2.31	trace	f>>t	15
1482	30.08	1.60	5.32	trace	f>>>t	1
1483	23.25	0.48	2.06	none	f>>>t	5
1484	34.18	0.54	1.58	trace	f>>t	3
1485	26.78	1.06	3.96	none	f>>t	<1
1486	-	-	-	-	-	-
1487	-	-	-	-	-	-
1488	-	-	-	-	-	-
1489	47.37	2.02	4.26	trace	f>>>t	1
1490	29.00	0.81	2.79	trace	f>>>t	<1
1491	29.18	1.17	4.01	none	f>>t	1
1492	25.42	0.92	3.62	none	f>>t	2
1493	23.67	0.69	2.92	trace	f>>>t	1
1494	30.04	0.77	2.56	trace	f<t	5
1495	19.13	1.07	5.59	trace	f>t	1
1496	-	-	-	-	-	-
1497	38.45	1.20	3.12	trace	f>t	3
1498	22.04	0.81	3.68	trace	f>>t	1
1499	14.24	0.47	3.30	none	f>>>t	<1
1500	27.94	0.62	2.22	none	f>>t	2
1501	31.08	0.76	2.45	trace	f>>t	1
1502	-	-	-	-	-	-
1503	-	-	-	-	-	-
1504	19.75	0.47	2.38	trace	f>t	2

Sample No.	Sample Weight (gm)	Coarse Weight (>38 μ) (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
1505	-	-	-	-	-	-
1506	21.76	0.84	3.86	none	f >> t	2
1507	30.27	0.96	3.17	none	f >> t	1
1508	18.33	1.27	6.93	trace	f > t	not recorded
1509	16.06	0.44	2.74	trace	f > t	not recorded
1510	22.61	0.62	2.74	none	f = t	not recorded
1511	27.24	0.91	3.34	trace	f >> t	not recorded
1512	15.35	0.32	2.08	trace	f >> t	not recorded
1513	30.41	1.52	5.00	trace	f >> t	not recorded
1514	52.22	1.00	1.91	trace	f >> t	not recorded
1515	17.60	0.39	2.22	none	f >>> t	not recorded
1516	14.07	0.29	2.06	trace	f >> t	not recorded
1517	28.79	0.40	1.39	trace	f >> t	not recorded
1518	-	-	-	-	-	-
1519	-	-	-	-	-	-
1520	19.85	0.93	4.69	trace	f >> t	not recorded
1521	18.80	0.48	2.55	none	f >> t	not recorded
1522	23.00	0.37	1.61	trace	f >> t	not recorded
1523	31.54	0.70	2.22	trace	f >>> t	not recorded
1524	32.27	0.55	1.70	trace	f >> t	not recorded
1525	19.12	0.28	1.46	trace	f >> t	not recorded
1526	39.24	0.86	2.19	trace	f >> t	not recorded
1527	41.12	1.16	2.82	trace	f > t	not recorded
1528	29.15	0.79	2.71	trace - rare	f >> t	not recorded
1529	41.59	1.66	3.99	trace	f >> t	not recorded
1530	23.26	1.46	6.28	trace	f >> t	not recorded
1531	-	-	-	-	-	-
1532	-	-	-	-	-	-
1533	-	-	-	-	-	-
1534	-	-	-	-	-	-
1535	-	-	-	-	-	-
1536	-	-	-	-	-	-
1537	24.25	0.39	1.61	trace	f >> t	not recorded

Sample No.	Sample Weight (gm)	Coarse (>38 μ) Weight (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
1538	18.22	0.26	1.43	trace	f > t	not recorded
1539	28.52	0.46	1.61	trace	f = t	not recorded
1540	42.71	0.86	2.01	trace	f > t	not recorded
1541	31.46	0.77	2.45	trace	f = t	not recorded
1542	31.11	0.42	1.35	trace	f = t	50
1543	24.58	0.49	1.99	rare	f < t	50
1544	-	-	-	-	-	-
1545	-	-	-	-	-	-
1546	-	-	-	-	-	-
1547	-	-	-	-	-	-
1548	31.54	0.47	1.49	trace	f > t	10
1549	40.56	0.45	1.11	trace	f = t	15
1550	-	-	-	-	-	-
1551	-	-	-	-	-	-
1552	-	-	-	-	-	-
1553	-	-	-	-	-	-
1554	-	-	-	-	-	-
1555	55.46	0.70	1.26	trace	f > t	5
1556	28.87	0.38	1.32	trace	f > t	3
1557	-	-	-	-	-	-
1558	-	-	-	-	-	-
1559	-	-	-	-	-	-
1560	-	-	-	-	-	-
1561	15.49	0.21	1.36	trace	f = t	10
1562	27.48	0.42	1.53	trace	f >> t	5
1563	28.97	0.39	1.35	rare	f = t	10
1564	40.58	0.84	2.07	rare	f < t	15
1565	12.62	0.26	2.06	trace - rare	f = t	20
1566	-	-	-	-	-	-
1567	21.70	0.34	1.57	trace	f > t	3
1568	25.65	0.25	0.97	trace	f < t	30
1569	26.73	1.14	4.26	trace	f = t	5
1570	-	-	-	-	-	-

Sample No.	Sample Weight (gm)	Coarse Weight (>38 μ) (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
1571	-	-	-	-	-	-
1572	-	-	-	-	-	-
1573	-	-	-	-	-	-
1574	-	-	-	-	-	-
1575	-	-	-	-	-	-
1576	-	-	-	-	-	-
1577	-	-	-	-	-	-
1578	-	-	-	-	-	-
1579	-	-	-	-	-	-
1580	-	-	-	-	-	-
1581	-	-	-	-	-	-
1582	-	-	-	-	-	-
1583	-	-	-	-	-	-
1584	-	-	-	-	-	-
1585	-	-	-	-	-	-
1586	-	-	-	-	-	-
1587	-	-	-	-	-	-
1588	-	-	-	-	-	-
1589	-	-	-	-	-	-
1590	-	-	-	-	-	-
1591	-	-	-	-	-	-
1592	-	-	-	-	-	-
1593	-	-	-	-	-	-
1594	-	-	-	-	-	-
1595	-	-	-	-	-	-
1596	-	-	-	-	-	-
1597	-	-	-	-	-	-
1598	-	-	-	-	-	-
1599	-	-	-	-	-	-
1600	-	-	-	-	-	-
1601	39.97	0.39	0.98	trace	f << t	10
1602	22.84	0.43	1.88	trace	f < t	3
1603	18.48	0.45	2.44	trace	f << t	5

Sample No.	Sample Weight (gm)	Coarse Weight (>38μ) (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
1604	-	-	-	-	-	-
1605	24.52	0.77	3.14	trace	f = t	3
1606	18.57	2.09	11.25	trace	f < t	3
1607	13.10	2.60	19.85	none	f > t	1
1608	21.98	1.49	6.78	trace	f < t	3
1609	21.30	0.96	4.51	none	f > t	3
1610	18.28	1.01	5.53	trace	f = t	3
1611	20.02	1.63	8.14	trace	f = t	2
1612	45.74	0.80	1.75	trace	f > t	5
1613	17.20	0.25	1.45	trace	f << t	7
1614	26.49	0.73	2.76	trace	f < t	3
1615	23.12	0.78	3.37	trace	f < t	2
1616	18.84	0.71	3.77	trace	f < t	3
1617	26.87	0.57	2.12	rare	f << t	3
1618	12.93	0.34	2.63	trace	f <<< t	1
1619	37.29	1.36	3.65	trace	f << t	2
1620	-	-	-	-	-	-
1621	-	-	-	-	-	-
1622	25.38	0.87	3.43	trace	f < t	1
1623	34.60	1.43	4.13	trace	f < t	1
1624	22.48	0.70	3.11	trace	f = t	1
1625	23.58	1.93	8.18	trace	f < t	2
1626	22.47	0.69	3.07	trace	f = t	1
1627	18.32	0.30	1.64	trace	f << t	1
1628	22.14	0.67	3.03	trace	f << t	1
1629	40.28	0.52	1.29	rare	f << t	2
1630	24.20	0.31	1.28	rare	f < t	5
1631	16.71	0.44	2.63	trace	f < t	5
1632	19.99	0.58	2.90	trace	f <<< t	1
1633	-	-	-	-	-	-
1634	20.27	0.69	3.40	trace	f > t	1
1635	15.45	0.56	3.62	trace	f = t	1
1636	24.06	0.40	1.66	trace	f << t	1

Sample No.	Sample Weight (gm)	Coarse (>38 μ) Weight (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
1637	36.42	0.96	2.64	trace	f > t	1
1638	20.23	1.10	5.44	trace	f > t	3
1639	33.94	2.12	6.25	trace	f > t	2
1640	23.78	0.87	3.66	rare	f <<< t	2
1641	33.03	1.62	4.90	trace	f <<< t	1
1642	15.10	0.87	5.76	trace	f <<< t	1
1643	24.14	1.71	7.08	trace	f <<< t	1
1644	37.32	0.25	0.67	rare	f << t	10
1645	23.38	0.38	1.63	trace	f > t	20
1646	23.33	0.40	1.71	trace	f < t	15
1647	13.25	0.11	0.83	trace	f = t	20
1648	31.74	0.79	2.49	trace	f << t	10
1649	-	-	-	-	-	-
1650	23.27	0.59	2.54	trace	f << t	1
1651	24.72	0.53	2.14	trace	f << t	1
1652	18.86	0.57	3.02	trace	f <<< t	2
1653	16.09	0.24	1.49	rare	f << t	1
1654	25.50	0.25	0.98	trace	f < t	10
1655	22.37	0.22	0.98	trace	f < t	20
1656	-	-	-	-	-	-
1657	18.71	0.06	0.32	trace	f = t	90
1658	29.72	0.10	0.34	trace	f <<< t	60
1659	17.49	0.14	0.80	rare	f = t	30
1660	24.70	0.14	0.57	trace	f < t	70
1661	25.53	0.28	1.10	trace	f <<< t	1
1662	27.90	0.12	0.43	trace	f < t	10
1663	-	-	-	-	-	-
1664	-	-	-	-	-	-
1665	27.04	0.04	0.15	trace	f > t	20
1666	35.96	0.10	0.28	trace	f >> t	30
1667	18.73	0.13	0.69	trace	f >>> t	50
1668	-	-	-	-	-	-
1669	35.09	0.07	0.20	trace	f = t	90

Sample No.	Sample Weight (gm)	Coarse (>38 μ) Weight (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
1670	16.56	0.08	0.48	trace	f > t	80
1671	33.74	0.21	0.62	none	f >>> t	2
1672	21.60	0.15	0.69	trace	f >>> t	5
1673	47.96	1.17	2.44	trace	f >>> t	3
1674	14.63	0.34	2.32	trace	f >>> t	1
1675	19.05	0.18	0.94	trace	f >>> t	3
1676	29.87	0.26	0.87	none	f >>> t	25
1677	22.54	0.73	3.24	trace	f >>> t	25
1678	31.94	0.19	0.59	trace	f >>> t	30
1679	9.87	0.06	0.61	trace	f >>> t	15
1680	25.73	0.40	1.55	trace	f >>> t	15
1681	29.02	0.47	1.62	trace	f > t	1
1682	19.58	0.07	0.36	trace	f >>> t	5
1683	28.45	0.08	0.28	trace	f >>> t	7
1684	13.68	0.15	1.10	trace	f > t	5
1685	17.10	0.09	0.53	trace	f > t	5
1686	15.57	0.08	0.51	trace	f >>> t	5
1687	22.18	0.51	2.30	trace	f = t	5
1688	17.01	0.14	0.82	trace	f >>> t	15
1689	19.59	0.30	1.53	none	f < t	2
1690	16.16	0.32	1.98	trace	f < t	<1
1691	24.97	0.52	2.08	trace	f < t	1
1692	14.84	0.69	4.65	trace	f << t	<1
1693	21.63	0.60	2.77	trace	f > t	1
1694	26.40	0.42	1.59	trace	f > t	1
1695	8.06	0.10	1.24	trace	f > t	3
1696	24.42	0.23	0.94	trace	f >>> t	2
1697	34.73	0.25	0.72	none	f >>> t	25
1698	12.27	0.16	1.30	trace	f = t	5
1699	8.77	0.04	0.46	none	f > t	5
1700	24.21	0.20	0.83	none	f >>> t	35
1701	13.30	0.05	0.38	trace	f >>> t	50
1702	19.99	0.09	0.45	none	f > t	15

Sample No.	Sample Weight (gm)	Coarse (>38μ) Weight (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
1703	25.16	0.11	0.44	trace	f > t	10
1704	22.95	0.15	0.65	trace	f >>> t	15
1705	26.29	0.08	0.30	trace	f >>> t	15
1706	13.14	0.07	0.53	none	f >>> t	15
1707	17.24	0.13	0.75	none	f >>> t	20
1708	12.38	0.14	1.13	none	f >>> t	5
1709	27.15	0.35	1.29	trace	f >> t	3
1710	22.83	0.17	0.74	trace	f >>> t	10
1711	15.88	0.15	0.94	none	f >>> t	1
1712	-	-	-	-	-	-
1713	-	-	-	-	-	-
1714	34.82	0.03	0.09	trace	f >> t	85
1715	25.87	0.00	0.02	none	f >> t	50
1716	17.35	0.14	0.81	none	f >> t	40
1717	18.20	0.02	0.11	none	f >> t	90
1718	21.14	0.01	0.05	none	f >> t	45
1719	23.12	0.03	0.13	none	f >> t	20
1720	35.87	0.09	0.25	trace	f > t	75
1721	22.92	0.06	0.26	trace	f = t	90
1722	21.17	0.00	0.02	trace	f = t	<1
1723	42.32	0.03	0.07	trace	f >> t	25
1724	27.44	0.75	2.73	trace	f >>> t	<1
1725	-	-	-	-	-	-
1726	28.38	0.43	1.52	trace	f >>> t	1
1727	35.36	0.89	2.52	trace	f >> t	1
1728	29.70	1.57	5.29	trace	f >>> t	<1
1729	33.94	0.92	2.71	trace	f > t	1
1730	26.58	1.91	7.19	trace	f >> t	<1
1731	27.47	1.90	6.92	trace	f > t	10
1732	15.30	2.24	14.64	trace	f >> t	2
1733	21.60	0.70	3.24	trace	f >> t	1
1734	22.65	0.54	2.38	trace	f >>> t	2
1735	36.75	1.08	2.94	none	f >>> t	1

Sample No.	Sample Weight (gm)	Coarse Weight (>38 μ) (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
1736	37.35	0.79	2.12	none	f>>>t	1
1737	30.49	1.55	5.08	none	f>>>t	<1
1738	22.81	1.68	7.37	trace	f>>>t	2
1739	9.63	0.54	5.61	none	f>>>t	<1
1740	29.47	1.58	5.36	trace	f>>>t	1
1741	29.38	1.70	5.79	none	f>>>t	1
1742	19.41	1.01	5.20	trace	f>>>t	<1
1743	23.79	1.27	5.34	trace	f>>>t	<1
1744	26.43	0.17	0.64	trace	f>>>t	25
1745	20.28	0.09	0.44	none	f>>>t	30
1746	23.99	0.06	0.25	trace	f>>>t	25
1747	40.01	0.22	0.55	trace	f>>>t	30
1748	-	-	-	-	-	-
1749	18.99	0.06	0.32	trace	f>>>t	30
1750	24.79	0.22	0.89	trace	f>t	40
1751	37.75	0.17	0.45	trace	f>>>t	25
1752	13.37	0.11	0.82	trace	f>t	50
1753	25.14	0.18	0.72	trace	f>t	20
1754	21.10	0.13	0.62	none	f>>>t	20
1755	-	-	-	-	-	-
1756	39.15	0.96	2.45	trace	f=t	30
1757	28.12	0.16	0.57	none	f>t	10
1758	12.68	0.09	0.71	none	f>t	30
1759	33.86	0.34	1.00	trace	f>t	40
1760	35.62	0.42	1.18	trace	f>>>t	10
1761	38.39	0.21	0.55	none	f>>>t	5
1762	22.86	0.12	0.52	trace	f>>>t	20
1763	37.87	0.14	0.37	trace	f>>>t	15
1764	23.32	0.14	0.60	none	f>>>t	25
1765	16.46	0.07	0.43	trace	f>>>t	35
1766	27.28	0.14	0.51	trace	f>>>t	50
1767	36.51	0.08	0.22	trace	f>>>t	70
1768	21.73	0.08	0.37	trace	f>>>t	30

Sample No.	Sample Weight (gm)	Coarse (>38μ) Weight (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
1769	43.86	0.18	0.41	none	f >>> t	45
1770	28.41	0.19	0.67	trace	f >>> t	30
1771	21.05	0.13	0.62	trace	f >>> t	45
1772	32.82	0.17	0.52	trace	f >>> t	20
1773	33.58	0.13	0.39	trace	f >>> t	30
1774	35.30	0.18	0.51	trace	f >>> t	5
1775	23.40	0.06	0.26	trace	f >>> t	30
1776	30.24	0.07	0.23	trace	f >>> t	45
1777	33.91	0.16	0.47	trace	f >>> t	60
1778	17.74	0.07	0.39	none	f > t	30
1779	21.95	0.07	0.32	none	f >>> t	20
1780	30.92	0.16	0.52	none	f >> t	20
1781	29.44	0.36	1.22	none	f >>> t	45
1782	20.68	0.15	0.73	trace	f >>> t	25
1783	23.47	0.17	0.72	trace	f >>> t	50
1784	28.04	0.23	0.82	trace - rare	f >> t	40
1785	22.08	0.13	0.59	trace	f >> t	45
1786	20.60	0.13	0.63	trace	f >> t	50
1787	19.50	0.22	1.13	none	f <<<< t	0
1788	15.47	0.08	0.52	trace	f >> t	45
1789	30.84	1.31	4.25	trace	f >> t	5
1790	14.51	0.73	5.03	none	f >> t	3
1791	-	-	-	-	-	-
1792	26.52	0.17	0.64	trace	f >>> t	1
1793	27.41	0.05	0.18	trace	f >>> t	25
1794	23.27	0.05	0.21	trace	f >>> t	30
1795	19.15	0.09	0.47	none	f >>> t	5
1796	22.44	0.17	0.76	none	f >>> t	10
1797	25.58	0.30	1.17	none	f >>> t	10
1798	18.85	0.19	1.01	trace	f >>> t	10
1799	10.32	0.12	1.16	none	f >>> t	5
1800	33.35	0.48	1.44	none	f >>> t	10
1801	33.48	0.27	0.81	none	f >>> t	10

Sample No.	Sample Weight (gm)	Coarse (>38μ) Weight (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
1802	20.34	0.14	0.69	trace	f >>> t	1
1803	36.09	0.20	0.55	trace	f >> t	5
1804	43.63	0.41	0.94	trace	f >> t	5
1805	29.06	0.32	1.10	trace	f >> t	1
1806	33.98	0.34	1.00	none	f >>> t	1
1807	16.78	0.17	1.01	trace	f >>> t	1
1808	29.49	0.23	0.78	trace	f >>> t	10
1809	-	-	-	-	-	-
1810	16.40	0.24	1.46	none	f > t	1
1811	30.29	0.87	2.87	trace	f << t	1
1812	31.52	0.82	2.60	trace	f << t	0
1813	44.88	1.36	3.03	trace	f = t	1
1814	45.69	1.04	2.28	trace	f < t	5
1815	27.96	0.26	0.93	trace	f >>> t	10
1816	36.82	0.70	1.90	trace	f = t	5
1817	28.88	0.46	1.59	trace	f = t	15
1818	22.49	0.26	1.16	trace	f = t	10
1819	16.35	0.15	0.92	trace	f = t	5
1820	11.85	0.07	0.59	trace	f >>> t	20
1821	26.79	0.17	0.63	trace - rare	f >>> t	50
1822	24.04	0.32	1.33	trace	f = t	10
1823	41.14	0.23	0.56	trace	f >>> t	40
1824	14.05	0.06	0.43	trace	f >>> t	25
1825	18.65	0.60	3.22	trace	f >>> t	1
1826	34.13	1.56	4.57	trace	f >>> t	0
1827	39.51	1.74	4.40	trace	f >>> t	0
1828	19.76	0.31	1.57	trace	f >>> t	5
1829	32.79	1.29	3.93	trace	f >>> t	1
1830	18.11	0.73	4.03	trace	f >>> t	0
1831	30.41	1.97	6.48	trace	f >>> t	0
1832	27.00	1.49	5.52	trace	f >>> t	1
1833	22.98	1.13	4.92	trace	f >>> t	1
1834	25.34	1.93	7.62	trace	f >>> t	1

Sample No.	Sample Weight (gm)	Coarse Weight (>38 μ) (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
1835	24.25	1.34	5.53	trace	f >>> t	1
1836	20.15	0.15	0.74	none	f >> t	20
1837	35.03	0.23	0.66	trace	f >> t	10
1838	-	-	-	-	-	-
1839	30.21	0.21	0.70	trace	f >> t	5
1840	-	-	-	-	-	-
1841	30.92	0.42	1.36	trace	f >>> t	5
1842	20.23	0.27	1.33	trace	f >>> t	1
1843	20.95	0.24	1.15	trace	f >>> t	1
1844	37.07	0.51	1.38	trace	f >> t	5
1845	49.38	0.83	1.68	trace	f >>> t	1
1846	38.70	0.94	2.43	none	f >>> t	0
1847	24.99	0.81	3.24	none	f >>> t	5
1848	23.99	0.61	2.54	trace	f >>> t	1
1849	26.18	0.62	2.37	trace	f >>> t	5
1850	11.79	0.19	1.61	trace	f >> t	1
1851	14.81	0.21	1.42	trace	f >> t	0
1852	36.38	0.39	1.07	trace	f >> t	1
1853	18.70	0.34	1.82	trace	f = t	1
1854	17.66	0.26	1.47	trace	f > t	5
1855	28.46	1.05	3.69	trace	f < t	0
1856	37.31	0.59	1.58	rare	f <<< t	0
1857	25.22	0.72	2.85	trace	f <<< t	1
1858	-	-	-	-	-	-
1859	18.67	0.24	1.29	trace	f << t	5
1860	-	-	-	-	-	-
1861	25.82	0.24	0.93	trace	f << t	5
1862	35.13	0.42	1.20	trace	f = t	5
1863	22.56	0.25	1.11	trace	f = t	20
1864	37.38	0.31	0.83	trace	f < t	5
1865	41.86	0.68	1.62	trace	f = t	10
1866	16.91	0.09	0.53	trace	f > t	10
1867	22.19	0.21	0.95	trace	f >> t	10

Sample No.	Sample Weight (gm)	Coarse (>38 μ) Weight (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
1868	29.86	0.29	0.97	trace	f >> t	20
1869	27.46	0.23	0.84	none	f = t	30
1870	18.83	0.16	0.85	none	f = t	10
1871	31.84	0.31	0.97	trace	f > t	25
1872	-	-	-	-	-	-
1873	29.04	0.34	1.17	trace	f << t	5
1874	14.78	0.34	2.30	trace	f << t	5
1875	21.78	0.28	1.29	trace	f < t	3
1876	25.76	0.33	1.28	none	f << t	1
1877	-	-	-	-	-	-
1878	19.83	0.33	1.66	trace	f << t	5
1879	37.92	0.45	1.19	trace	f > t	15
1880	22.80	0.25	1.10	trace	f >> t	35
1881	24.83	0.28	1.13	trace	f >> t	40
1882	33.50	0.31	0.93	trace	f >> t	20
1883	15.64	0.16	1.02	none	f >>> t	15
1884	31.10	0.82	2.64	none	f >> t	10
1885	23.80	0.27	1.13	trace	f = t	10
1886	24.97	0.15	0.60	trace	f >> t	10
1887	25.54	0.14	0.55	trace	f >> t	10
1888	20.52	0.18	0.88	none	f >> t	5
1889	7.42	0.01	0.13	none	f >> t	75
1890	22.54	0.32	1.42	trace	f >> t	15
1891	25.00	0.31	1.24	trace	f >>> t	5
1892	21.09	0.15	0.71	none	f >>> t	20
1893	38.81	0.52	1.34	trace	f >>> t	25
1894	27.75	0.25	0.90	trace	f >>> t	15
1895	25.55	0.17	0.67	trace	f >>> t	5
1896	24.19	0.21	0.87	trace	f >>> t	10
1897	31.83	0.58	1.82	trace	f >> t	20
1898	30.89	0.61	1.97	trace	f >>> t	10
1899	25.95	0.16	0.62	none	f > t	10
1900	15.61	0.11	0.70	trace	f = t	10

Sample No.	Sample Weight (gm)	Coarse (>38 μ) Weight (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
1901	20.74	0.15	0.72	trace	f > t	15
1902	20.91	0.17	0.81	trace	f << t	30
1903	30.42	0.16	0.53	trace	f < t	20
1904	42.07	0.96	2.28	trace	f > t	25
1905	20.53	0.26	1.27	none	f > t	45
1906	46.15	0.73	1.58	trace	f < t	15
1907	36.86	0.29	0.79	trace	f >> t	10
1908	24.22	0.14	0.58	none	f >>> t	30
1909	50.31	0.38	0.76	trace	f >>> t	35
1910	38.24	0.42	1.10	trace	f >>> t	35
1911	-	-	-	-	-	-
1912	17.95	0.16	0.89	trace	f >>> t	25
1913	39.36	0.39	0.99	trace	f >>> t	50
1914	16.36	0.14	0.86	trace	f >>> t	25
1915	12.43	0.07	0.56	trace	f >>> t	25
1916	26.63	0.31	1.16	none	f >>> t	40
1917	19.52	0.10	0.51	trace	f >>> t	45
1918	26.07	0.37	1.42	none	f >> t	25
1919	32.38	1.04	3.21	none	f >>> t	1
1920	9.23	0.74	8.02	none	f >>> t	0
1921	20.95	0.69	3.29	none	f >>> t	5
1922	21.90	0.44	2.01	trace	f >>> t	5
1923	23.28	0.58	2.49	trace	f >> t	5
1924	25.03	0.61	2.44	trace	f >> t	1
1925	18.53	0.43	2.32	trace	f >>> t	20
1926	25.71	0.36	1.40	trace	f >>> t	10
1927	30.29	0.35	1.16	trace	f >>> t	5
1928	28.96	0.43	1.48	none	f >>> t	10
1929	31.73	0.42	1.32	none	f >>> t	15
1930	19.71	0.58	2.94	none	f >> t	3
1931	39.01	2.02	5.18	trace	f >> t	1
1932	-	-	-	-	-	-
1933	-	-	-	-	-	-

Sample No.	Sample Weight (gm)	Coarse (>38 μ) Weight (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
1934	-	-	-	-	-	-
1935	-	-	-	-	-	-
1936	-	-	-	-	-	-
1937	-	-	-	-	-	-
1938	25.23	0.50	1.98	trace	f << t	1
1939	32.23	1.04	3.23	trace	f = t	0
1940	41.25	2.18	5.28	trace	f >> t	0
1941	27.51	0.51	1.85	none	f >>> t	5
1942	22.89	0.52	2.27	trace	f >>> t	1
1943	-	-	-	-	-	-
1944	24.27	0.49	2.02	trace	f >>> t	5
1945	29.40	0.59	2.01	none	f >> t	5
1946	45.03	0.65	1.44	none	f >> t	5
1947	25.18	0.69	2.74	trace	f > t	1
1948	23.06	0.97	4.21	trace	f = t	0
1949	-	-	-	-	-	-
1950	29.18	1.14	3.91	trace	f > t	0
1951	46.44	1.32	2.84	none	f > t	5
1952	31.07	0.79	2.54	none	f >> t	1
1953	40.86	1.11	2.72	none	f >> t	5
1954	21.38	0.19	0.89	trace	f > t	45
1955	23.99	0.16	0.67	trace	f < t	20
1956	23.24	0.09	0.39	none	f >> t	50
1957	15.53	0.51	3.28	none	f <<< t	70
1958	25.12	0.32	1.27	trace	f = t	50
1959	-	-	-	-	-	-
1960	20.00	0.19	0.95	trace	f >> t	15
1961	19.27	0.17	0.88	trace	f >> t	30
1962	18.74	0.11	0.59	none	f = t	45
1963	35.29	0.29	0.82	trace	f < t	45
1964	21.78	0.33	1.52	none	f > t	25
1965	21.05	0.35	1.66	trace	f << t	30
1966	13.13	mixed with 1968	mixed with 1968	trace	f < t	55

Sample No.	Sample Weight (gm)	Coarse (>38μ) Weight (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
1967	24.41	0.41	1.68	trace	f >> t	30
1968	23.48	mixed with 1966	mixed with 1966	none	f >> t	1
1969	18.74	0.51	2.72	trace	f >> t	1
1970	19.51	0.69	3.54	trace	f >> t	1
1971	15.51	0.67	4.32	trace	f >> t	1
1972	35.62	1.85	5.19	trace	f >> t	1
1973	32.67	2.25	6.89	none	f >> t	0
1974	34.84	1.58	4.54	trace	f = t	5
1975	-	-	-	-	-	-
1976	18.70	0.45	2.41	trace	f >> t	1
1977	25.19	1.18	4.68	none	f > t	0
1978	32.57	1.30	3.99	trace	f >> t	5
1979	37.45	1.39	3.71	trace	f > t	1
1980	31.44	1.04	3.31	none	f >> t	1
1981	-	-	-	-	-	-
1982	25.16	1.63	6.48	trace	f >> t	3
1983	29.55	0.75	2.54	trace	f > t	5
1984	-	-	-	-	-	-
1985	38.72	0.31	0.80	none	f >> t	20
1986	16.91	0.11	0.65	none	f >> t	10
1987	13.37	0.15	1.12	none	f >> t	10
1988	12.92	0.23	1.78	none	f >> t	25
1989	14.16	0.25	1.77	none	f >>> t	15
1990	20.86	0.43	2.06	trace	f >> t	0
1991	20.56	0.35	1.70	trace	f >> t	0
1992	26.09	0.60	2.30	trace	f >> t	1
1993	18.22	0.43	2.36	trace	f > t	1
1994	17.93	0.37	2.06	trace	f < t	5
1995	21.63	0.63	2.91	trace	f <<< t	1
1996	18.02	0.32	1.78	trace	f > t	3
1997	22.54	0.30	1.33	trace	f = t	10
1998	25.56	0.70	2.74	none	f = t	15
1999	22.67	0.42	1.85	none	f < t	15

Sample No.	Sample Weight (gm)	Coarse (>38μ) Weight (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
2000	-	-	-	-	-	-
2001	19.82	0.51	2.57	none	f < t	5
2002	33.54	0.81	2.42	none	f = t	1
2003	-	-	-	-	-	-
2004	25.52	0.45	1.76	trace	f = t	1
2005	22.42	0.16	0.71	trace	f > t	10
2006	16.25	0.11	0.68	none	f > t	10
2007	35.59	0.33	0.93	trace	f <<< t	15
2008	-	-	-	-	-	-
2009	18.67	0.03	0.16	trace	f < t	95
2010	32.44	0.07	0.22	none	f > t	80
2011	40.45	0.18	0.44	none	f >>> t	75
2012	-	-	-	-	-	-
2013	-	-	-	-	-	-
2014	-	-	-	-	-	-
2015	-	-	-	-	-	-
2016	-	-	-	-	-	-
2017	18.31	0.21	1.15	trace	f >>> t	35
2018	29.02	0.65	2.24	none	f >>> t	35
2019	25.48	0.30	1.18	none	f >> t	3
2020	40.96	0.42	1.03	trace	f >>> t	5
2021	30.35	1.20	3.95	none	f >> t	5
2022	29.91	0.93	3.11	trace	f << t	3
2023	-	-	-	-	-	-
2024	-	-	-	-	-	-
2025	-	-	-	-	-	-
2026	-	-	-	-	-	-
2027	-	-	-	-	-	-
2028	-	-	-	-	-	-
2029	-	-	-	-	-	-
2030	-	-	-	-	-	-
2031	-	-	-	-	-	-
2032	-	-	-	-	-	-

Sample No.	Sample Weight (gm)	Coarse Weight (>38μ) (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
2033	38.75	0.54	1.39	trace	f >>> t	10
2034	24.28	0.23	0.95	none	f = t	20
2035	41.03	0.47	1.15	none	f > t	15
2036	29.11	0.92	3.16	none	f >> t	1
2037	20.60	0.70	3.40	none	f >>> t	0
2038	11.09	0.63	5.68	trace	f >>> t	0
2039	-	-	-	-	-	-
2040	-	-	-	-	-	-
2041	-	-	-	-	-	-
2042	-	-	-	-	-	-
2043	-	-	-	-	-	-
2044	-	-	-	-	-	-
2045	-	-	-	-	-	-
2046	-	-	-	-	-	-
2047	-	-	-	-	-	-
2048	-	-	-	-	-	-
2049	21.52	0.39	1.81	trace	f >> t	5
2050	25.64	0.43	1.68	trace	f >> t	5
2051	33.07	1.00	3.02	trace	f >> t	10
2052	32.82	0.78	2.38	trace	f >> t	5
2053	22.58	0.43	1.90	trace	f >> t	5
2054	39.07	1.01	2.59	trace	f > t	0
2055	10.31	0.48	4.66	trace	f > t	10
2056	43.44	0.93	2.14	trace	f > t	1
2057	26.97	0.51	1.89	trace	f >> t	5
2058	23.44	0.63	2.69	trace	f >> t	15
2059	31.43	1.13	3.60	trace	f >>> t	5
2060	33.20	1.01	3.04	trace	f > t	1
2061	25.99	0.53	2.04	trace	f = t	1
2062	28.12	0.33	1.17	none	f >>> t	5
2063	27.22	1.01	3.71	trace	f >>> t	0
2064	44.48	1.08	2.43	trace	f >>> t	1
2065	14.67	0.46	3.14	none	f = t	1

Sample No.	Sample Weight (gm)	Coarse (>38 μ) Weight (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
2066	25.24	0.80	3.17	none	f > t	1
2067	37.87	1.17	3.09	none	f >> t	1
2068	-	-	-	-	-	-
2069	22.05	0.44	2.00	trace	f >> t	0
2070	23.13	0.73	3.16	none	f >> t	1
2071	43.67	0.90	2.06	none	f > t	0
2072	32.98	0.41	1.24	trace	f < t	5
2073	33.95	0.54	1.59	none	f >> t	15
2074	27.75	1.07	3.86	trace	f >> t	0
2075	23.82	0.94	3.95	trace	f >> t	1
2076	-	-	-	-	-	-
2077	-	-	-	-	-	-
2078	-	-	-	-	-	-
2079	-	-	-	-	-	-
2080	-	-	-	-	-	-
2081	29.81	0.81	2.72	trace	f >> t	1
2082	21.84	1.14	5.22	trace	f = t	50
2083	25.94	0.81	3.12	trace	f >> t	1
2084	37.02	0.88	2.38	trace	f = t	1
2085	23.75	0.24	1.01	none	f << t	1
2086	38.29	0.55	1.44	trace	f << t	5
2087	30.15	0.25	0.83	trace	f > t	10
2088	-	-	-	-	-	-
2089	30.46	0.27	0.89	trace	f > t	5
2090	22.55	0.66	2.93	trace	f = t	30
2091	15.94	0.11	0.69	trace	f > t	20
2092	-	-	-	-	-	-
2093	-	-	-	-	-	-
2094	-	-	-	-	-	-
2095	-	-	-	-	-	-
2096	-	-	-	-	-	-
2097	32.11	0.47	1.46	trace	f = t	15
2098	12.95	0.10	0.77	trace	f > t	25

Sample No.	Sample Weight (gm)	Coarse (>38 μ) Weight (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
2099	23.85	0.25	1.05	trace	f >> t	10
2100	22.90	0.20	0.87	none	f << t	5
2101	26.55	0.44	1.66	trace	f = t	10
2102	29.97	0.48	1.60	trace	f << t	20
2103	33.68	0.38	1.13	trace	f < t	10
2104	17.74	0.22	1.24	trace	f = t	10
2105	14.67	0.21	1.43	none	f <<< t	5
2106	35.06	0.44	1.25	none	f <<< t	5
2107	39.16	0.41	1.05	trace	f <<< t	5
2108	23.23	0.22	0.95	trace	f <<< t	25
2109	30.18	0.46	1.52	trace	f <<< t	10
2110	-	-	-	-	-	-
2111	-	-	-	-	-	-
2112	37.13	0.10	0.27	trace	f = t	20
2113	34.23	0.30	0.88	trace	f <<< t	1
2114	26.36	0.14	0.53	trace	f < t	60
2115						
2116	22.35	0.04	0.18	trace	f < t	40
2117						
2118						
2119	17.84	0.05	0.28	none	f << t	60
2120						
2121	34.15	0.08	0.23	none	f = t	20
2122	37.85	0.27	0.71	trace	f < t	10
2123	33.82	0.23	0.68	none	f = t	20
2124	27.87	0.64	2.30	trace	f > t	60
2125	30.59	0.56	1.83	none	f < t	50
2126	22.63	0.06	0.27	none	f = t	30
2127	-	-	-	-	-	-
2128	38.39	0.18	0.47	trace	f >> t	40
2129	14.72	0.11	0.75	trace	f >> t	25
2130	19.78	0.16	0.81	trace	f <<< t	10
2131	42.79	0.83	1.94	trace	f << t	5

Sample No.	Sample Weight (gm)	Coarse (>38 μ) Weight (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
2132	33.10	0.46	1.39	none	f << t	5
2133	40.22	0.12	0.30	trace	f < t	20
2134	50.13	0.22	0.44	trace	f << t	10
2135	24.11	0.12	0.50	trace	f << t	15
2136	28.23	0.13	0.46	trace	f = t	20
2137	38.72	0.22	0.57	trace	f > t	30
2138	31.30	0.92	2.94	trace	f >>> t	5
2139	28.22	0.78	2.76	trace	f >> t	10
2140	24.92	0.63	2.53	none	f >> t	0
2141	18.18	0.47	2.59	trace	f >> t	5
2142	39.10	0.98	2.51	trace	f >> t	5
2143	21.20	1.76	8.30	none	f >>> t	0
2144	41.82	1.91	4.57	none	f >>> t	0
2145	30.78	0.52	1.69	trace	f << t	10
2146	26.79	0.30	1.12	none	f < t	5
2147	27.80	0.26	0.94	trace	f >> t	30
2148	39.20	0.31	0.79	trace	f >>> t	15
2149	25.40	0.42	1.65	trace	f >> t	10
2150	24.04	0.35	1.46	trace	f >> t	30
2151	28.75	0.24	0.83	trace	f >> t	10
2152	28.81	0.39	1.35	none	f > t	20
2153	-	-	-	-	-	-
2154	18.29	0.16	0.87	trace	f >>> t	35
2155	12.57	0.10	0.80	trace	f >> t	35
2156	-	-	-	-	-	-
2157	-	-	-	-	-	-
2158	-	-	-	-	-	-
2159	-	-	-	-	-	-
2160	-	-	-	-	-	-
2161	28.34	0.32	1.13	trace	f >>> t	5
2162	49.52	0.99	2.00	trace	f >>> t	15
2163	28.80	0.81	2.81	none	f >>> t	5
2164	-	-	-	-	-	-

Sample No.	Sample Weight (gm)	Coarse (>38 μ) Weight (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
2165	20.19	0.30	1.49	trace	f >> t	5
2166	22.85	0.52	2.28	trace	f >>> t	5
2167	26.49	0.64	2.42	trace	f >> t	5
2168	19.59	0.47	2.40	trace	f >> t	10
2169	28.52	1.43	5.01	trace	f <<< t	25
2170	-	-	-	-	-	-
2171	30.18	0.29	0.96	none	f >> t	15
2172	19.29	0.29	1.50	trace	f = t	10
2173	28.51	0.45	1.58	trace	f < t	10
2174	30.86	0.60	1.94	trace	f < t	5
2175	39.62	0.70	1.77	trace	f << t	3
2176	19.14	0.71	3.71	trace	f < t	1
2177	42.69	0.52	1.22	none	f < t	10
2178	25.82	0.42	1.63	rare	f < t	3
2179	42.45	0.64	1.51	trace	f << t	1
2180	32.11	0.14	0.44	none	f << t	15
2181	34.46	0.12	0.35	trace	f <<< t	50
2182	-	-	-	-	-	-
2183	-	-	-	-	-	-
2184	-	-	-	-	-	-
2185	-	-	-	-	-	-
2186	-	-	-	-	-	-
2187	-	-	-	-	-	-
2188	-	-	-	-	-	-
2189	-	-	-	-	-	-
2190	-	-	-	-	-	-
2191	-	-	-	-	-	-
2192	-	-	-	-	-	-
2193	10.98	0.03	0.27	trace	f <<< t	50
2194	25.54	0.32	1.25	none	f <<< t	80
2195	39.23	0.04	0.10	trace	f <<< t	90
2196	23.07	0.06	0.26	none	f < t	99
2197	24.41	0.05	0.20	none	f <<< t	5

Sample No.	Sample Weight (gm)	Coarse (>38 μ) Weight (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
2198	20.03	0.03	0.15	none	f <<< t	75
2199	34.24	0.41	1.20	trace	f <<< t	10
2200	23.36	0.02	0.09	none	f <<< t	90
2201	19.20	0.02	0.10	none	f <<< t	97
2202	27.21	0.06	0.22	none	f <<< t	40
2203	31.66	0.06	0.19	trace	f <<< t	30
2204	-	-	-	-	-	-
2205	33.41	0.04	0.12	none	f <<< t	50
2206	23.64	0.15	0.63	trace	f <<< t	10
2207	-	-	-	-	-	-
2208	-	-	-	-	-	-
2209	24.60	0.03	0.12	trace	f <<< t	70
2210	35.54	0.31	0.87	trace	f <<< t	60
2211	35.89	0.01	0.03	trace	f <<< t	20
2212	18.46	0.01	0.05	trace	f <<< t	50
2213	51.16	0.08	0.16	none	f <<< t	90
2214	32.19	0.09	0.28	trace	f <<< t	90
2215	39.84	0.03	0.08	none	f <<< t	45
2216	34.02	0.09	0.26	none	f <<< t	15
2217	35.40	0.07	0.20	none	f <<< t	85
2218	-	-	-	-	-	-
2219	-	-	-	-	-	-
2220	-	-	-	-	-	-
2221	-	-	-	-	-	-
2222	-	-	-	-	-	-
2223	-	-	-	-	-	-
2224	-	-	-	-	-	-
2225	20.63	0.16	0.78	trace	f <<< t	5
2226	20.54	0.21	1.02	none	f <<< t	90
2227	34.88	0.16	0.46	none	f <<< t	5
2228	33.27	0.17	0.51	none	f <<< t	15
2229	47.13	0.13	0.28	none	f <<< t	10
2230	23.14	0.13	0.56	trace	f <<< t	10

Sample No.	Sample Weight (gm)	Coarse Weight (>38 μ) (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
2231	34.03	0.16	0.47	trace	f <<< t	10
2232	28.33	0.10	0.35	none	f <<< t	20
2233	38.31	0.28	0.73	trace	f <<< t	10
2234	-	-	-	-	-	-
2235	-	-	-	-	-	-
2236	-	-	-	-	-	-
2237	-	-	-	-	-	-
2238	-	-	-	-	-	-
2239	-	-	-	-	-	-
2240	-	-	-	-	-	-
2241	20.12	0.21	1.04	none	f <<< t	10
2242	19.20	0.20	1.04	trace	f <<< t	15
2243	14.27	0.18	1.26	trace	f <<< t	15
2244	12.84	0.04	0.31	trace	f << t	60
2245	26.58	0.16	0.60	trace	f <<< t	25
2246	-	-	-	-	-	-
2247	21.80	0.25	1.15	trace	f <<< t	15
2248	-	-	-	-	-	-
2249	26.80	0.13	0.49	none	f <<< t	10
2250	29.44	0.31	1.05	none	f <<< t	5
2251	27.86	0.35	1.26	none	f <<< t	5
2252	23.04	0.07	0.30	none	f < t	15
2253	32.57	0.05	0.15	none	f = t	3
2254	29.81	0.04	0.13	trace	f = t	1
2255	-	-	-	-	-	-
2256	-	-	-	-	-	-
2257	38.42	0.24	0.62	trace	f << t	10
2258	13.81	0.05	0.36	trace	f << t	25
2259	36.42	0.20	0.55	trace	f <<< t	30
2260	21.22	0.09	0.42	trace	f = t	45
2261	24.12	0.09	0.37	trace	f << t	35
2262	16.45	0.07	0.43	none	f << t	20
2263	34.89	0.23	0.66	trace	f << t	5

Sample No.	Sample Weight (gm)	Coarse Weight (>38μ) (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
2264	24.88	0.24	0.96	trace	f << t	5
2265	30.61	0.17	0.56	trace	f = t	15
2266	40.57	0.34	0.84	none	f > t	40
2267	-	-	-	-	-	-
2268	-	-	-	-	-	-
2269	-	-	-	-	-	-
2270	29.70	0.30	1.01	trace	f >> t	3
2271	42.32	0.35	0.83	trace	f >>> t	0
2272	32.00	0.24	0.75	trace	f >> t	20
2273	38.19	0.10	0.26	trace	f >> t	80
2274	27.36	0.06	0.22	trace	f >> t	75
2275	35.82	0.17	0.47	trace	f >> t	75
2276	26.21	0.15	0.57	none	f >> t	85
2277	31.82	0.29	0.91	none	f >>> t	5
2278	-	-	-	-	-	-
2279	25.03	0.32	1.28	trace	f >>> t	0
2280	24.22	0.49	2.02	trace	f >>> t	1
2281	43.72	0.51	1.17	none	f >> t	1
2282	25.82	0.34	1.32	trace	f >> t	3
2283	32.85	0.39	1.19	trace	f >>> t	5
2284	-	-	-	-	-	-
2285	-	-	-	-	-	-
2286	-	-	-	-	-	-
2287	-	-	-	-	-	-
2288	-	-	-	-	-	-
2289	24.51	0.30	1.22	trace	f >> t	3
2290	-	-	-	-	-	-
2291	-	-	-	-	-	-
2292	-	-	-	-	-	-
2293	30.76	0.19	0.62	none	f > t	5
2294	27.72	0.28	1.01	trace	f > t	7
2295	14.74	0.12	0.81	trace	f = t	10
2296	48.97	1.33	2.72	none	f > t	15

Sample No.	Sample Weight (gm)	Coarse (>38 μ) Weight (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
2297	36.91	0.41	1.11	trace	f <<< t	1
2298	47.20	0.47	1.00	trace	f >> t	1
2299	-	-	-	-	-	-
2300	-	-	-	-	-	-
2301	-	-	-	-	-	-
2302	-	-	-	-	-	-
2303	-	-	-	-	-	-
2304	-	-	-	-	-	-
2305	27.21	0.50	1.84	none	f = t	5
2306	46.87	0.90	1.92	trace	f > t	1
2307	30.02	0.18	0.60	none	f >> t	10
2308	29.56	0.21	0.71	none	f > t	10
2309	22.09	0.30	1.36	trace	f < t	5
2310	25.54	0.46	1.80	trace	f << t	2
2311	32.81	0.26	0.79	trace	f >> t	40
2312	32.08	0.21	0.65	none	f >>> t	30
2313	16.56	0.11	0.66	none	f >>> t	45
2314	44.82	0.74	1.65	none	f >> t	20
2315	25.16	0.14	0.56	none	f >>> t	1
2316	23.56	0.18	0.76	none	f >> t	5
2317	41.33	0.40	0.97	trace	f > t	5
2318	30.75	0.25	0.81	none	f >> t	10
2319	-	-	-	-	-	-
2320	-	-	-	-	-	-
2321	29.21	0.75	2.57	trace	f > t	5
2322	40.91	0.36	0.88	trace	f >>> t	25
2323	31.65	0.22	0.70	trace	f = t	5
2324	19.21	0.08	0.42	trace	f > t	40
2325	26.48	0.19	0.72	trace	f << t	10
2326	27.36	0.21	0.77	trace	f > t	40
2327	29.13	0.32	1.10	none	f > t	50
2328	17.49	0.19	1.09	trace	f << t	5
2329	-	-	-	-	-	-

Sample No.	Sample Weight (gm)	Coarse Weight (>38 μ) (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
2330	-	-	-	-	-	-
2331	-	-	-	-	-	-
2332	-	-	-	-	-	-
2333	-	-	-	-	-	-
2334	-	-	-	-	-	-
2335	-	-	-	-	-	-
2336	-	-	-	-	-	-
2337	30.03	0.39	1.30	none	f < t	25
2338	37.90	0.53	1.40	none	f = t	5
2339	45.00	0.39	0.87	none	f > t	30
2340	43.39	0.60	1.38	trace	f > t	5
2341	42.31	0.43	1.02	trace	f >> t	10
2342	36.36	0.55	1.51	trace	f >> t	2
2343	30.50	0.56	1.84	none	f >> t	0
2344	21.17	0.40	1.89	trace	f > t	1
2345	26.03	0.36	1.38	trace	f < t	3
2346	22.58	0.22	0.97	trace	f = t	3
2347	19.24	0.49	2.55	none	f > t	1
2348	8.26	0.29	3.51	none	f > t	1
2349	-	-	-	-	-	-
2350	-	-	-	-	-	-
2351	-	-	-	-	-	-
2352	-	-	-	-	-	-
2353	24.32	1.29	5.30	trace	f >> t	0
2354	25.56	1.47	5.75	trace	f >> t	1
2355	25.95	0.72	2.77	trace	f = t	0
2356	46.46	2.03	4.37	trace	f < t	0
2357	36.20	2.23	6.16	trace	f < t	0
2358	46.27	0.66	1.43	trace	f > t	3
2359	42.72	0.95	2.22	none	f >> t	5
2360	40.80	1.49	3.65	trace	f > t	2
2361	46.28	1.95	4.21	trace	f > t	0
2362	44.90	1.15	2.56	trace	f = t	0

Sample No.	Sample Weight (gm)	Coarse Weight (>38 μ) (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
2363	62.20	1.62	2.60	trace	f < t	1
2364	42.27	0.49	1.16	trace	f >> t	5
2365	22.84	0.33	1.44	trace	f >> t	10
2366	47.64	0.80	1.68	none	f > t	3
2367	41.26	0.65	1.58	trace	f >> t	1
2368	18.95	0.34	1.79	trace	f >>> t	1
2369	30.17	0.88	2.92	trace	f = t	3
2370	29.53	0.70	2.37	none	f << t	1
2371	30.79	0.40	1.30	none	f < t	1
2372	38.67	0.37	0.96	none	f > t	10
2373	24.18	0.71	2.94	none	f << t	1
2374	27.25	0.47	1.72	none	f < t	2
2375	31.80	0.87	2.74	trace	f << t	1
2376	22.85	0.52	2.28	none	f << t	0
2377	26.16	0.56	2.14	trace	f >> t	1
2378	22.11	0.54	2.44	none	f > t	0
2379	23.96	0.39	1.63	none	f < t	1
2380	31.44	0.53	1.69	none	f << t	5
2381	33.79	0.80	2.37	none	f << t	1
2382	34.44	0.59	1.71	trace	f < t	5
2383	18.24	0.30	1.64	none	f > t	1
2384	29.97	0.77	2.57	trace	f > t	0
2385	16.11	0.81	5.03	none	f >> t	0
2386	24.38	1.49	6.11	trace	f >> t	0
2387	26.23	1.36	5.18	none	f > t	5
2388	27.58	1.92	6.96	none	f >> t	0
2389	19.96	2.08	10.42	none	f >> t	1
2390	56.55	5.55	9.81	none	f >>>> t	0
2391	50.31	0.74	1.47	trace	f > t	50
2392	42.36	0.46	1.09	trace	f = t	75
2393	29.79	0.35	1.17	trace	f >> t	50
2394	36.20	0.39	1.08	none	f < t	20
2395	36.05	0.46	1.28	trace	f > t	90

Sample No.	Sample Weight (gm)	Coarse (>38 μ) Weight (gm)	Coarse Fraction (%)	Amount of Ash	Biogenic (f) to Terrigenous (t)	Amount of Opaques (%)
2396	43.46	0.41	0.94	none	f >> t	25
2397	-	-	-	-	-	-
2398	-	-	-	-	-	-
2399	-	-	-	-	-	-
2400	-	-	-	-	-	-

APPENDIX C

Electron-microprobe data for samples 1543, 1564, 1640, 1640 (2), 1856, and 2178

SAMPLE: T151-1 E67-113 1543

PT	BEAM	NA	9	MG	8	AL	3	SI	7	K	2	CA	6	TI	5	MW	1	FE	4
COUNTS	COUNTS	SD	COUNTS	SD	COUNTS	SD	COUNTS	SD	COUNTS	SD	COUNTS	SD	COUNTS	SD	COUNTS	SD	COUNTS	SD	COUNTS
1	27946	751	27	819	29	2105	46	19073	138	7624	87	629	25	16	4	57	8	113	11
2	27946	921	120	925	75	2219	80	18190	624	9197	888	634	4	28	8	46	8	134	15
3	27941	749	99	420	266	1812	210	21059	888	7721	881	469	94	27	7	66	10	111	13

LINES DELETED:

AVE. BEAM CURRENT/SEC = 1397

DATA REDUCED USING 9B-AL:

9B-AL

ON SPECIMEN: T151-1 E67-113 1543

9B-AL VERSION 1.0

OXIDE	WEIGHTZ	STD.DEV.	WMO.	FORMULA	K-RATIO	UNKN	PEAK	UNKN	BGD	COUNTING	STD	PEAK	STD	BGD	COUNTING	STANDARD
FORM.	(OXIDE)	(Z)	INDEX			(COUNTS)	(COUNTS)	(COUNTS)	(COUNTS)	TIME(SEC)	(COUNTS)	(COUNTS)	(COUNTS)	(COUNTS)	TIME(SEC)	FILENAME
MA20	2.133	4.60	3.476	0.000	0.54198	807.0	31.0	20.00	1462.4	20.00	3090.1	146.4	20.00	3090.1	20.00	ZRGSC
MG0	0.735	5.47	9.918	0.000	0.19543	721.1	145.8	20.00	3090.1	20.00	3090.1	146.4	20.00	3090.1	20.00	ZRGSC
AL203	14.915	3.24	4.644	0.000	1.13274	2045.2	5.3	20.00	1806.2	20.00	1806.2	5.3	20.00	1806.2	20.00	Z5831
SiO2	64.655	0.98	10.539	0.000	0.86458	19440.3	47.8	20.00	22479.3	20.00	22479.3	49.3	20.00	22479.3	20.00	Z5831
K2O	4.028	1.65	9.745	0.000	1.10430	8180.9	142.6	20.00	7424.1	20.00	7424.1	158.2	20.00	7424.1	20.00	ZRGSC
CaO	0.243	8.59	3.908	0.000	0.04791	576.9	240.7	20.00	7284.8	20.00	7284.8	267.8	20.00	7284.8	20.00	ZRGSC
TiO2	0.026	134.71	1.364	0.000	0.00024	23.5	18.7	20.00	20337.3	26.7	20337.3	26.7	20.00	20337.3	20.00	ZT102
MW0	0.008	294.88	1.331	0.000	0.00008	56.0	52.4	20.00	43977.8	109.3	43977.8	109.3	20.00	43977.8	20.00	ZMW20
FeO	0.075	39.43	1.158	0.000	0.01163	119.7	83.5	20.00	3208.3	96.3	3208.3	96.3	20.00	3208.3	20.00	ZRGSC
TOTAL	86.817			MG. OXYGENS = 0		MG. ITERS. = 2										Ave. ATOMIC NO. = 10.68

SAMPLE: T151-7 E67-113 1640

PT	BEAM	HA	9	NO	8	AL	3	SI	7	K	2	CA	6	TI	5	HM	1	FE	4
COUNTS	COUNTS	SD	COUNTS	SD	COUNTS	SD	COUNTS	SD	COUNTS	SD	COUNTS	SD	COUNTS	SD	COUNTS	SD	COUNTS	SD	COUNTS
1	27814	648	25	422	21	1823	43	20953	145	5639	75	1136	34	14	4	66	8	676	26
2	27827	809	114	315	76	1428	279	19593	962	1617	888	1654	366	25	8	56	7	363	221
3	27856	820	97	710	205	2091	333	20546	698	6072	888	1135	300	18	6	44	11	148	265
4	27872	686	87	344	181	1886	277	22356	888	6781	888	521	464	16	5	69	11	186	241
5	27882	1165	204	875	247	2156	286	20114	888	8292	888	800	425	24	5	61	10	112	233
6	27886	612	202	1174	343	2250	298	16976	888	6874	888	1088	381	49	13	68	9	197	212
7	27889	553	205	374	329	1865	274	22270	888	6505	888	557	395	23	12	44	11	201	196
8	27873	1071	220	1123	356	2420	307	18643	888	8014	888	810	371	14	11	67	10	136	187
9	27868	23	330	147	375	9	720	33338	888	155	888	264	418	11	11	53	10	106	182
10	27868	1176	344	782	358	2204	693	20528	888	6750	888	1061	398	14	11	44	10	181	172
11	27870	906	330	785	343	2088	662	19883	888	6589	888	732	381	16	11	38	11	121	167
12	27864	99	369	156	356	70	812	32512	888	290	888	243	408	25	10	60	11	106	163
13	27872	1144	373	368	347	1883	779	21673	888	6344	888	785	391	18	10	55	11	301	158
14	27872	726	358	416	336	1781	749	21512	888	6147	888	977	378	53	13	74	11	180	152
15	27878	189	374	457	325	1940	723	22107	888	1343	888	4239	950	18	12	37	12	185	146
16	27879	724	361	305	321	1913	700	22258	888	5415	888	763	922	15	12	62	12	199	142
17	27867	399	358	459	311	1831	678	21398	888	4046	888	1523	901	20	12	55	11	195	137
18	27880	601	348	470	302	2005	661	22345	888	6137	888	672	879	17	11	50	11	91	136
19	27879	1080	350	484	294	1914	643	21879	888	7984	888	512	863	20	11	48	11	134	133
20	27881	883	343	591	287	2089	630	21056	888	7140	888	800	841	21	11	60	11	177	130

LINES DELETED: 9 12 15 & 2

AVE. BEAM CURRENT/SEC = 1394

DATA REDUCED USING 98-AL:

68L9H

ON SPECIMEN: T151-7 E67-113 1640

98-AL VERSION 1.0

OXIDE FORM.	WEIGHTZ (OXIDE)	STD. DEV. (%)	WMO. INDEX	FORMULA	K-RATIO	UNKWN (COUNTS)	PEAK (COUNTS)	UNKWN (COUNTS)	BIKED (COUNTS)	COUNTING TIME(SEC)	STD (COUNTS)	PEAK (COUNTS)	STD (COUNTS)	BIKED (COUNTS)	COUNTING TIME(SEC)	STANDARD FILENAME		
HA2O	2.200	4.54	8.506	0.000	0.56420	838.8	30.9	20.00	1462.4	30.5	20.00	ZRSCC		20.00	ZRSCC			
HMO	0.535	6.63	9.951	0.000	0.14310	567.1	145.9	20.00	3090.1	146.4	20.00	ZRSCC		20.00	ZRSCC			
AL2O3	14.474	3.26	3.941	0.000	1.10573	1996.6	5.3	20.00	1806.2	5.3	20.00	ZS831		20.00	ZS831			
SiO2	70.011	0.96	7.377	0.000	0.94128	21161.0	48.1	20.00	22479.3	49.3	20.00	ZS831		20.00	ZS831			
K2O	3.204	1.75	13.506	0.000	0.87805	4523.8	144.0	20.00	7424.1	158.2	20.00	ZRSCC		20.00	ZRSCC			
CaO	0.439	5.60	9.463	0.000	0.08425	848.2	243.0	20.00	7284.8	267.8	20.00	ZRSCC		20.00	ZRSCC			
TiO2	0.007	485.43	2.136	0.000	0.00006	20.1	18.8	20.00	20337.3	26.7	20.00	XTI02		20.00	XTI02			
HMO	0.006	416.43	1.451	0.000	0.00006	55.6	53.1	20.00	43977.8	109.3	20.00	ZMW20		20.00	ZMW20			
FE0	0.243	14.49	9.853	0.000	0.03788	202.5	84.6	20.00	3208.3	96.3	20.00	ZRSCC		20.00	ZRSCC			
TOTAL	91.119																	
															MO. ITEMS. = 2		AVE. ATOMIC NO. = 10.77	

MO. OXYGENS = 0 MO. ITERS. = 2 AVE. ATOMIC NO. = 10.77

APPENDIX D

This appendix consists of tephra data from core E67-113 compared with tephra data from the database at the U. S. Geological Survey, Menlo Park, California. The database contains tephra from most North American and many Central and Latin American volcanic eruptions.

The best 50 matches are calculated using four combinations of major elements for each sample - I. 1543, II. 1564, III. 1640, IV. 1640 (2), V. 1856, and VI. 2178. The combinations of elements are:

Na, Si, Al, and Ca
Na, Si, Al, K, and Ca
Na, Si, Al, K, Ca, and Fe
Na, Si, Al, K, Ca, and Mg

The first correlation on each page is the sample used in the comparison against itself.

Similarity coefficients are in the last column for each comparison.

I. Listing of 50 closest matches for COMP. NO. 1898 for elements: Na, Al, Si, Ca													
C.No	Sample Number	Date	SiO2	Al2O3	Fe2O3	MgO	MnO	CaO	TiO2	Na2O	K2O	Total R	Sim. Co
1	1898 E67-113 1543 T151-1	11/10/87	74.47	17.18	0.10	0.85	0.01	0.24	0.03	2.46	4.64	100.02	1.0000
2	2165 WCR-88-C (LO FE) T177-15	12/7/88	76.95	11.79	1.09	0.05	0.07	0.26	0.12	2.45	7.23	100.01	0.8946
3	2161 WCR-88-A (LO FE) T177-13	12/7/88	75.83	12.80	1.22	0.05	0.10	0.30	0.10	2.24	7.38	100.02	0.8928
4	1367 BO-107-1 T104-6	8/26/85	76.82	12.65	0.88	0.03	0.06	0.28	0.12	2.96	6.20	100.00	0.8842
5	1449 126-1176 t115-11	1/28/85	78.18	12.32	0.96	0.04	0.10	0.30	0.12	2.18	5.80	100.00	0.8723
6	1900 E67-113 1640 (2) T151-2	11/10/87	76.81	15.88	0.30	0.59	0.01	0.48	0.01	2.41	3.52	100.01	0.8642
7	1834 FLV-9-CS T145-12	8/24/87	77.36	12.31	0.56	0.05	0.10	0.32	0.06	2.77	6.47	100.00	0.8606
8	1899 E67-13 1640 T151-2	11/10/87	75.86	16.37	0.23	0.69	0.02	0.46	0.00	2.78	3.59	100.00	0.8570
9	1836 FLV-11-CS T145-14	8/25/87	77.08	12.69	0.57	0.05	0.09	0.34	0.07	2.75	6.38	100.02	0.8557
10	932 DR-42		76.15	12.32	1.37	0.07	0.10	0.33	0.24	2.81	6.61	100.00	0.8547
11	1902 E67-113 1856 T151-11	11/10/87	77.21	15.64	0.23	0.49	0.00	0.51	0.00	2.49	3.43	100.00	0.8530
12	1835 FLV-10-CS T145-13	8/24/87	77.11	12.62	0.57	0.05	0.08	0.34	0.07	2.78	6.37	99.99	0.8522
13	1452 126-1303 t115-14	1/28/86	77.67	12.53	0.89	0.04	0.08	0.39	0.11	2.44	5.84	99.99	0.8495
14	935 DR-46V		76.23	11.84	2.02	0.00	0.04	0.21	0.13	2.41	7.12	100.00	0.8489
15	1903 E67-113 1564 T151-3	11/10/87	75.20	16.70	0.21	0.71	0.01	0.47	0.00	2.04	4.66	100.00	0.8468
16	2139 FL86C-5.41 B 1 sh		77.20	12.21	1.16	0.06	0.06	0.38	0.08	2.39	6.45	99.99	0.8459
17	1867 FLV-39-WW T147-13	9/30/87	77.61	12.59	0.53	0.06	0.09	0.35	0.10	2.77	5.92	100.02	0.8451
18	2213 KRL-880828-N DK GLS T181A-4	12/22/88	77.74	12.50	0.42	0.02	0.03	0.33	0.07	2.94	5.95	100.00	0.8427
19	1575 CHA 86 BT-3	8/18/86	77.75	12.39	0.64	0.02	0.09	0.29	0.06	3.53	5.23	100.00	0.8354
20	1837 FLV-12-CS T145-15	8/25/87	77.15	12.80	0.60	0.04	0.09	0.33	0.05	3.16	5.78	100.00	0.8343
21	822 GS-66		76.42	12.02	1.98	0.01	0.05	0.19	0.11	2.50	6.71	99.99	0.8342
22	870 LM-29		76.88	12.81	0.89	0.03	0.07	0.32	0.08	3.30	5.61	99.99	0.8337
23	1907 OT-2 T149-5	11/11/87	78.22	12.23	0.58	0.05	0.08	0.39	0.08	2.33	6.05	100.01	0.8323
24	1815 TTC-20 T144-6	7/21/87	77.70	12.58	0.58	0.05	0.06	0.31	0.05	3.38	5.29	100.00	0.8304
25	1921 86LP-38 T154-7	2/24/88	77.15	12.70	0.58	0.05	0.08	0.42	0.09	2.59	6.33	99.99	0.8302
26	115 GV-76-8, T16-12		78.03	12.88	0.46	0.03	0.03	0.45	0.11	2.48	5.53	100.00	0.8296
27	2358 FLV-1208-TC T196-8	8/7/89	77.74	12.72	0.72	0.05	0.07	0.33	0.12	3.22	5.03	100.00	0.8277
28	2357 FLV-120A-TC T196-7	8/7/89	77.90	12.70	0.72	0.05	0.08	0.34	0.09	3.11	5.02	100.01	0.8274
29	1520 JP 85 TPS-7 T120-2	4/29/86	76.33	12.86	0.78	0.06	0.07	0.40	0.11	2.78	6.61	100.00	0.8273
30	1816 TTC-21 T144-7	7/21/87	77.68	12.57	0.60	0.05	0.07	0.32	0.06	3.33	5.32	100.00	0.8260
31	1857 FLV-28-WW T147-4	9/30/87	77.46	12.55	0.53	0.06	0.08	0.39	0.09	2.17	6.67	100.00	0.8230
32	1780 QD-W6 T141-5	5/22/87	76.58	11.51	1.92	0.02	0.05	0.21	0.13	2.74	6.84	100.00	0.8226
33	1451 126-1265 t115-13	1/28/86	77.58	12.59	0.89	0.07	0.08	0.44	0.12	2.36	5.87	100.00	0.8221
34	1869 FLV-41-WW T147-15	9/30/87	77.68	12.65	0.55	0.04	0.11	0.31	0.09	3.58	4.99	100.00	0.8213
35	1872 FLV-44-WW T148-3	10/27/87	77.79	12.63	0.64	0.04	0.10	0.29	0.05	3.93	4.54	100.01	0.8210
36	1850 FLV-29-WW T146-13	8/25/87	76.85	12.65	0.55	0.06	0.08	0.41	0.06	2.20	7.13	99.99	0.8206
37	1901 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	0.8182
38	2371 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	0.8182
39	1873 FLV-45-WW T148-4	10/27/87	77.97	12.33	0.67	0.02	0.10	0.29	0.07	3.88	4.67	100.00	0.8181
40	1820 TTC-25 T144-11	7/21/87	77.93	12.47	0.56	0.03	0.06	0.31	0.06	3.58	4.99	99.99	0.8180
41	1664 PICO 163Q T132-5	10/21/86	76.93	13.52	0.60	0.04	0.10	0.32	0.07	3.86	4.56	100.00	0.8168
42	2203 FLV-128-TC T183-2	1/25/89	77.40	13.02	0.76	0.04	0.06	0.36	0.11	3.20	5.05	100.00	0.8166
43	994 RC-17		72.86	13.35	3.41	0.02	0.11	0.32	0.20	3.91	5.82	100.00	0.8149
44	405 W2A, T5-14		77.35	12.48	0.60	0.03	0.08	0.34	0.08	3.30	5.74	100.00	0.8145
45	1818 TTC-23 T144-9	7/21/87	77.58	12.62	0.71	0.03	0.03	0.32	0.03	3.58	5.10	100.00	0.8142
46	1461 FABY 37 T115-2	1/27/86	77.50	13.01	1.32	0.07	0.04	0.49	0.12	2.37	5.08	100.00	0.8133
47	2370 PR-80 T197-8	9/14/89	76.94	12.48	0.96	0.05	0.06	0.39	0.08	2.93	6.11	100.00	0.8130
48	1874 FLV-46-WW T148-5	10/27/87	77.91	12.40	0.68	0.02	0.08	0.30	0.07	3.84	4.69	99.99	0.8129
49	266 PICO-7(1), T39-8		76.83	12.88	0.76	0.03	0.05	0.31	0.05	3.94	5.14	99.99	0.8116
50	447 65W130, T31-3		76.64	12.49	1.45	0.00	0.06	0.28	0.06	4.49	4.52	99.99	0.8116

Listing of 50 closest matches for COMP. NO. 1898 for elements: Na, Al, Si, K, Ca														
C.No	Sample Number	Date	SiO2	Al2O3	Fe2O3	MgO	MnO	CaO	TiO2	Na2O	K2O	Total R	Sim	Co
1	1898 E67-113 1543 T151-1	11/10/87	74.47	17.18	0.10	0.85	0.01	0.28	0.03	2.46	4.64	100.02	1	0.0000
2	1903 E67-113 1564 T151-3	11/10/87	75.20	16.70	0.21	0.71	0.01	0.47	0.00	2.04	4.66	100.00	0	0.8766
3	1449 126-1176 T115-11	1/28/85	78.18	12.32	0.96	0.04	0.10	0.30	0.12	2.18	5.80	100.00	0	0.8578
4	1367 80-107-1 T104-6	8/26/85	76.82	12.65	0.88	0.03	0.06	0.28	0.12	2.96	6.20	100.00	0	0.8570
5	1873 FLV-45-WW T148-4	10/27/87	77.97	12.33	0.67	0.02	0.10	0.29	0.07	3.88	4.67	100.00	0	0.8532
6	1872 FLV-44-WW T148-3	10/27/87	77.79	12.63	0.64	0.04	0.10	0.29	0.05	3.93	4.54	100.01	0	0.8525
7	1664 PICO 1630 T132-5	10/21/86	76.93	13.52	0.60	0.04	0.10	0.32	0.07	3.86	4.56	100.00	0	0.8500
8	1874 FLV-46-WW T148-5	10/27/87	77.91	12.40	0.68	0.02	0.08	0.30	0.07	3.84	4.69	99.99	0	0.8482
9	2357 FLV-120A-TC T196-7	8/7/89	77.90	12.70	0.72	0.05	0.08	0.34	0.09	3.11	5.02	100.01	0	0.8468
10	2358 FLV-120B-TC T196-8	8/7/89	77.74	12.72	0.72	0.05	0.07	0.33	0.12	3.22	5.03	100.00	0	0.8467
11	1575 CHA 86 BT-3	8/18/86	77.75	12.39	0.64	0.02	0.09	0.29	0.06	3.53	5.23	100.00	0	0.8457
12	447 65W130, T31-3		76.64	12.49	1.45	0.00	0.06	0.28	0.06	4.49	4.52	99.99	0	0.8441
13	2165 WCR-88-C (LO FE) T177-15	12/7/88	76.95	11.79	1.09	0.05	0.07	0.26	0.12	2.45	7.23	100.01	0	0.8441
14	1900 E67-113 1640 (2) T151-2	11/10/87	76.81	15.88	0.30	0.59	0.01	0.48	0.01	2.41	3.52	100.01	0	0.8431
15	1869 FLV-41-WW T147-15	9/30/87	77.68	12.65	0.55	0.04	0.11	0.31	0.09	3.58	4.99	100.00	0	0.8430
16	1875 FLV-47-WW T148-6	10/27/87	77.99	12.30	0.72	0.03	0.07	0.31	0.04	3.82	4.71	99.99	0	0.8406
17	1899 E67-113 1640 T151-2	11/10/87	75.86	16.37	0.23	0.69	0.02	0.46	0.00	2.78	3.59	100.00	0	0.8404
18	1820 TTC-25 T144-11	7/21/87	77.93	12.47	0.56	0.03	0.06	0.31	0.06	3.58	4.99	99.99	0	0.8403
19	2161 WCR-88-A (LO FE) T177-13	12/7/88	75.83	12.80	1.22	0.05	0.10	0.30	0.10	2.24	7.38	100.02	0	0.8390
20	1815 TTC-20 T144-6	7/21/87	77.70	12.58	0.58	0.05	0.06	0.31	0.05	3.38	5.29	100.00	0	0.8388
21	1719 TTC-17 T138-12	4/23/87	77.76	12.71	0.55	0.05	0.10	0.33	0.07	3.74	4.69	100.00	0	0.8386
22	1452 126-1303 T115-14	1/28/86	77.67	12.53	0.89	0.04	0.08	0.39	0.11	2.44	5.84	99.99	0	0.8385
23	1882 FLV-38-WW T147-12	9/30/87	79.16	12.71	0.54	0.05	0.08	0.42	0.10	2.15	4.79	100.00	0	0.8380
24	1851 FLV-48-WW T146-14	8/25/87	77.41	12.76	0.71	0.04	0.06	0.32	0.06	3.81	4.83	100.00	0	0.8372
25	2203 FLV-128-TC T183-2	1/25/89	77.40	13.02	0.76	0.04	0.06	0.36	0.11	3.20	5.05	100.00	0	0.8371
26	1816 TTC-21 T145-7	7/21/87	77.68	12.57	0.60	0.05	0.07	0.32	0.06	3.33	5.32	100.00	0	0.8353
27	1833 FLV-8-CS T145-11	8/24/87	77.81	12.36	0.58	0.05	0.11	0.31	0.06	3.80	4.91	99.99	0	0.8344
28	1838 FLV-13-CS T146-1	8/25/87	77.48	12.82	0.60	0.04	0.08	0.33	0.04	3.85	4.75	99.99	0	0.8343
29	1768 TTC-6 T139-4	5/28/87	77.20	12.93	0.58	0.05	0.09	0.33	0.09	4.08	4.64	99.99	0	0.8337
30	15 BCF-1, T7-13, pd		77.17	13.12	0.75	0.15	0.04	0.37	0.19	3.59	4.63	100.01	0	0.8337
31	1818 TTC-23 T144-9	7/21/87	77.58	12.62	0.71	0.03	0.03	0.32	0.03	3.58	5.10	100.00	0	0.8333
32	1461 FAY 37 T115-2	1/27/86	77.50	13.01	1.32	0.07	0.04	0.49	0.12	2.37	5.08	100.00	0	0.8333
33	1712 TTC-9A T138-5	4/23/87	77.51	12.83	0.59	0.05	0.10	0.34	0.07	3.87	4.65	100.01	0	0.8329
34	1867 FLV-39-WW T147-13	9/30/87	77.61	12.59	0.53	0.06	0.09	0.35	0.10	2.77	5.92	100.02	0	0.8329
35	870 LM-29		76.88	12.81	0.89	0.03	0.07	0.32	0.08	3.30	5.61	99.99	0	0.8324
36	2088 CRAW-88-30 T173-2	10/6/88	77.54	12.82	0.67	0.02	0.06	0.32	0.06	4.02	4.49	100.00	0	0.8322
37	1834 FLV-9-CS T145-12	8/24/87	77.36	12.31	0.56	0.05	0.10	0.32	0.06	2.77	6.47	100.00	0	0.8319
38	115 GV-76-8, T16-12		78.03	12.88	0.46	0.03	0.03	0.45	0.11	2.48	5.53	100.00	0	0.8315
39	1871 FLV-43-WW T148-2	10/27/87	78.00	12.32	0.56	0.03	0.08	0.32	0.06	3.79	4.84	100.00	0	0.8309
40	1860 FLV-31-WW T147-4	10/30/87	77.47	12.02	2.01	0.02	0.05	0.35	0.15	3.42	4.51	100.00	0	0.8304
41	1902 E67-113 1856 T151-11	11/10/87	77.21	15.64	0.23	0.49	0.00	0.51	0.00	2.49	3.43	100.00	0	0.8302
42	2213 KRL-88028-N DK GLS T181A-4	12/22/88	77.74	12.50	0.42	0.02	0.03	0.33	0.07	2.94	5.95	100.00	0	0.8301
43	1836 FLV-11-CS T145-14	8/25/87	77.08	12.69	0.57	0.05	0.09	0.34	0.07	2.75	6.38	100.02	0	0.8300
44	1718 TTC-16 T138-11	4/23/87	77.76	12.62	0.59	0.04	0.11	0.34	0.06	3.73	4.76	100.01	0	0.8300
45	266 PICO-7(1), T39-8		76.83	12.88	0.76	0.03	0.05	0.31	0.05	3.94	5.14	99.99	0	0.8299
46	1710 TTC-8 T138-3	4/23/87	77.50	12.51	0.58	0.05	0.11	0.34	0.05	3.69	4.88	100.01	0	0.8295
47	446 65W129(2), T30-3		76.81	12.18	1.60	0.01	0.05	0.28	0.05	4.66	4.36	100.00	0	0.8292
48	1043 REW 7-28-83, T78-3	07/18/84	77.39	12.67	0.57	0.04	0.08	0.32	0.06	4.11	4.77	100.01	0	0.8292
49	1868 FLV-40-WW T147-14	9/30/87	77.97	12.55	0.55	0.04	0.10	0.34	0.09	3.78	4.57	99.99	0	0.8290
50	1817 TTC-22 T144-8	7/21/87	77.81	12.60	0.59	0.04	0.05	0.34	0.06	3.73	4.78	100.00	0	0.8288

Listing of 50 closest matches for COMP. NO. 1898 for elements: Na, Al, Si, K, Ca, Fe										Date of Update: 2/12/90			
C.No	Sample Number	Date	SiO2	Al2O3	Fe2O3	MgO	MnO	CaO	TiO2	Na2O	K2O	Total, R	Sim. Co
1	1898 E67-113 1543 T151-1	11/10/87	74.47	17.18	0.10	0.85	0.01	0.28	0.03	2.46	4.64	100.02	1.0000
2	68 DSDP-1, T9-3, low total		75.79	14.88	0.11	0.49	0.01	0.96	0.01	2.43	5.32	100.00	0.8182
3	1903 E67-113 1564 T151-3	11/10/87	75.20	16.70	0.21	0.71	0.01	0.47	0.00	2.04	4.66	100.00	0.8099
4	1899 E67-113 1640 T151-2	11/10/87	75.86	16.37	0.23	0.69	0.02	0.51	0.00	2.78	3.59	100.00	0.7728
5	1902 E67-113 1856 T151-11	11/10/87	77.21	15.64	0.23	0.49	0.00	0.48	0.01	2.41	3.43	100.00	0.7643
6	1900 E67-113 1640 (2) T151-2	11/10/87	76.81	15.88	0.30	0.59	0.01	0.48	0.01	2.41	3.52	100.01	0.7581
7	1872 FLV-44-WW T148-3	10/27/87	77.79	12.63	0.64	0.04	0.10	0.29	0.05	3.93	4.54	100.01	0.7364
8	1664 PICO 1630 T132-5	10/21/86	76.93	13.52	0.60	0.04	0.10	0.32	0.07	3.86	4.56	100.00	0.7361
9	1873 FLV-45-WW T148-4	10/27/87	77.97	12.33	0.67	0.02	0.10	0.29	0.07	3.88	4.67	100.00	0.7359
10	1367 BO-107-1 T104-6	8/26/85	76.82	12.65	0.88	0.03	0.06	0.28	0.12	2.96	6.20	100.00	0.7331
11	1869 FLV-41-WW T147-15	9/30/87	77.68	12.65	0.55	0.04	0.11	0.31	0.09	3.58	4.99	100.00	0.7328
12	1449 126-1176 t115-11	1/28/85	78.18	12.32	0.96	0.04	0.10	0.30	0.12	2.18	5.80	100.00	0.7322
13	2213 K&L-880828-N DK GLS T181A-4	12/22/88	77.74	12.50	0.42	0.02	0.03	0.33	0.07	2.94	5.95	100.00	0.7313
14	1874 FLV-46-WW T148-5	10/27/87	77.91	12.40	0.68	0.02	0.08	0.30	0.07	3.84	4.69	99.99	0.7308
15	1575 CHA 86 BT-3	8/18/86	77.75	12.39	0.64	0.02	0.09	0.29	0.06	3.53	5.23	100.00	0.7308
16	1820 TTC-25 T144-11	7/21/87	77.93	12.47	0.56	0.03	0.06	0.31	0.06	3.58	4.99	99.99	0.7300
17	1882 FLV-38-WW T147-12	9/30/87	79.16	12.71	0.54	0.05	0.08	0.42	0.10	2.15	4.79	100.00	0.7292
18	1719 TTC-17 T138-12	4/23/87	77.76	12.71	0.55	0.05	0.10	0.33	0.07	3.74	4.69	100.00	0.7292
19	115 GV-76-8, T16-12		78.03	12.88	0.46	0.03	0.08	0.45	0.11	2.48	5.53	100.00	0.7291
20	2357 FLV-120A-TC T196-7	8/7/89	77.90	12.70	0.72	0.05	0.08	0.34	0.09	3.11	5.02	100.01	0.7288
21	2358 FLV-120B-TC T196-8	8/7/89	77.74	12.72	0.72	0.05	0.07	0.33	0.12	3.22	5.03	100.00	0.7287
22	1815 TTC-20 T144-6	7/21/87	77.61	12.58	0.58	0.06	0.06	0.31	0.05	3.38	5.29	100.00	0.7285
23	1867 FLV-39-WW T147-13	9/30/87	77.51	12.59	0.53	0.06	0.09	0.35	0.10	2.77	5.92	100.02	0.7255
24	1833 FLV-8-CS T145-11	8/24/87	77.81	12.36	0.58	0.05	0.11	0.31	0.06	3.80	4.91	99.99	0.7241
25	1816 TTC-21 T144-7	7/21/87	77.68	12.57	0.60	0.05	0.07	0.32	0.06	3.33	5.32	100.00	0.7238
26	1875 FLV-47-WW T148-6	10/27/87	77.99	12.30	0.72	0.03	0.07	0.31	0.04	3.82	4.71	99.99	0.7237
27	1768 TTC-6 T139-4	5/28/87	77.20	12.93	0.58	0.05	0.09	0.33	0.09	4.08	4.64	99.99	0.7235
28	1838 FLV-13-CS T146-1	8/25/87	77.48	12.82	0.60	0.04	0.08	0.33	0.04	3.85	4.75	99.99	0.7231
29	1834 FLV-9-CS T145-12	8/24/87	77.36	12.31	0.56	0.05	0.10	0.32	0.06	2.77	6.47	100.00	0.7230
30	1712 TTC-9A T138-5	4/23/87	77.51	12.83	0.59	0.05	0.10	0.34	0.07	3.87	4.65	100.01	0.7224
31	1871 FLV-43-WW T148-2	10/27/87	78.00	12.32	0.56	0.03	0.08	0.32	0.06	3.79	4.84	100.00	0.7222
32	1851 FLV-48-WW T146-14	8/25/87	77.41	12.76	0.71	0.04	0.06	0.32	0.06	3.81	4.83	100.00	0.7212
33	1868 FLV-40-WW T147-14	9/30/87	77.97	12.55	0.55	0.04	0.10	0.34	0.09	3.78	4.57	99.99	0.7211
34	1836 FLV-11-CS T145-14	8/25/87	77.08	12.69	0.57	0.05	0.09	0.34	0.07	2.75	6.38	100.02	0.7209
35	1043 REW 7-28-83, T78-3	07/18/84	77.39	12.67	0.57	0.04	0.08	0.32	0.06	4.11	4.77	100.01	0.7202
36	1710 TTC-8 T138-3	4/23/87	77.50	12.81	0.58	0.05	0.11	0.34	0.05	3.69	4.88	100.01	0.7200
37	1718 TTC-16 T138-11	4/23/87	77.76	12.62	0.59	0.04	0.11	0.34	0.06	3.73	4.76	100.01	0.7199
38	2203 FLV-128-TC T183-2	1/25/89	77.40	13.02	0.76	0.04	0.06	0.36	0.11	3.20	5.05	100.00	0.7195
39	1672 84° NV 14-2	10/21/86	77.72	12.49	0.58	0.05	0.10	0.33	0.07	4.03	4.63	100.00	0.7191
40	1817 TTC-22 T144-8	7/21/87	77.81	12.60	0.59	0.04	0.05	0.34	0.06	3.73	4.78	100.00	0.7190
41	1835 FLV-10-CS T145-13	8/24/87	77.11	12.62	0.57	0.05	0.08	0.34	0.07	2.78	6.37	99.99	0.7188
42	2165 WCR-88-C (LO FE) T177-15	12/7/88	76.95	11.79	1.09	0.05	0.07	0.26	0.12	2.45	7.23	100.01	0.7187
43	2088 CHAW-88-3G T173-2	10/6/88	77.54	12.82	0.67	0.02	0.06	0.32	0.06	4.02	4.49	100.00	0.7184
44	1711 TTC-9 T138-4	4/23/87	77.64	12.65	0.58	0.04	0.10	0.34	0.07	3.69	4.88	99.99	0.7182
45	1818 TTC-23 T144-9	7/21/87	77.58	12.62	0.71	0.03	0.03	0.32	0.03	3.58	5.10	100.00	0.7179
46	1837 FLV-12-CS T145-15	8/25/87	77.15	12.80	0.60	0.04	0.09	0.33	0.05	3.16	5.78	100.00	0.7178
47	1452 126-1303 t115-14	1/28/86	77.67	12.53	0.89	0.04	0.08	0.39	0.11	2.44	5.84	99.99	0.7175
48	15 BCF-1, T7-13, pd		77.17	13.12	0.75	0.15	0.04	0.35	0.19	3.59	4.63	100.01	0.7170
49	1813 TTC-19 (1) T144-5	7/21/87	77.41	12.61	0.59	0.05	0.07	0.32	0.06	3.85	5.04	100.00	0.7167
50	1592 P-1690 T130-1	9/19/86	77.59	12.55	0.58	0.04	0.10	0.33	0.06	3.67	4.87	99.99	0.7166

Listing of 50 closest matches for COMP. NO. 1898 for elements: Na, Mg, Al, Si, K, Ca													
C.No	Sample Number	Date	SiO2	Al2O3	Fe2O3	MgO	MnO	CaO	TiO2	Na2O	K2O	Total, R	Sim. Co.
1	1898 E67-113 1543 T151-1	11/10/87	74.47	17.18	0.10	0.85	0.01	0.28	0.03	2.46	4.64	100.02	1.0000
2	1903 E67-113 1564 T151-3	11/10/87	75.20	16.70	0.21	0.71	0.01	0.47	0.00	2.04	4.66	100.00	0.8697
3	1899 E67-113 1640 T151-2	11/10/87	75.86	16.37	0.23	0.69	0.02	0.46	0.00	2.78	3.59	100.00	0.8356
4	1900 E67-113 1640 (2) T151-2	11/10/87	76.81	15.88	0.30	0.59	0.01	0.48	0.01	2.41	3.52	100.01	0.8183
5	1902 E67-113 1856 T151-11	11/10/87	77.21	15.64	0.23	0.49	0.00	0.51	0.00	2.49	3.43	100.00	0.7879
6	1901 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	0.7693
7	2371 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	0.7693
8	68 DSDP-1, T9-3, low total		75.79	14.88	0.11	0.49	0.01	0.96	0.01	2.43	5.32	100.00	0.7628
9	15 BCF-1, T7-13, pd		77.17	13.12	0.75	0.15	0.04	0.37	0.19	3.59	4.63	100.01	0.7242
10	1449 126-1176 t115-11	1/28/85	78.18	12.32	0.96	0.04	0.10	0.30	0.12	2.18	5.80	100.00	0.7222
11	1367 BO-107-1 T104-6	8/26/85	76.82	12.65	0.88	0.03	0.06	0.28	0.12	2.96	6.20	100.00	0.7201
12	1872 FLV-44-W T148-3	10/27/87	77.79	12.63	0.64	0.04	0.10	0.29	0.05	3.93	4.54	100.01	0.7182
13	1664 PICO 1630 T132-5	10/21/86	76.93	13.52	0.60	0.04	0.10	0.32	0.07	3.86	4.56	100.00	0.7162
14	2357 FLV-120A-TC T196-7	8/7/89	77.90	12.70	0.72	0.05	0.08	0.34	0.09	3.11	5.02	100.01	0.7155
15	2358 FLV-120B-TC T196-8	8/7/89	77.74	12.72	0.72	0.05	0.07	0.33	0.12	3.22	5.03	100.00	0.7153
16	1873 FLV-45-W T148-4	10/27/87	77.97	12.33	0.67	0.02	0.10	0.29	0.07	3.88	4.67	100.00	0.7149
17	2165 WCR-88-C (LO FE) T177-15	12/7/88	76.95	11.79	1.09	0.05	0.07	0.26	0.12	2.45	7.23	100.01	0.7132
18	653 GROB8A, T66-1	10/25/83	69.98	15.75	2.74	0.77	0.05	2.82	0.52	3.82	3.54	99.99	0.7114
19	1874 FLV-46-W T148-5	10/27/87	77.91	12.40	0.68	0.02	0.08	0.30	0.07	3.84	4.69	99.99	0.7107
20	1869 FLV-41-W T147-15	9/30/87	77.68	12.65	0.55	0.04	0.11	0.31	0.09	3.58	4.99	100.00	0.7104
21	2161 WCR-88-A (LO FE) T177-13	12/7/88	75.83	12.80	1.22	0.05	0.10	0.30	0.10	2.24	7.38	100.02	0.7098
22	1815 TTC-20 T144-6	7/21/87	77.70	12.58	0.58	0.05	0.06	0.31	0.05	3.38	5.29	100.00	0.7096
23	1575 CHA 86 BT-3	8/18/86	77.75	12.39	0.64	0.02	0.09	0.29	0.06	3.53	5.23	100.00	0.7087
24	1719 TTC-17 T138-12	4/23/87	77.76	12.71	0.55	0.05	0.10	0.33	0.07	3.74	4.69	100.00	0.7087
25	1461 FAY 37 T115-2	1/27/86	77.50	13.01	1.32	0.07	0.04	0.49	0.12	2.37	5.08	100.00	0.7081
26	1882 FLV-38-W T147-12	9/30/87	79.16	12.71	0.54	0.05	0.08	0.42	0.10	2.15	4.79	100.00	0.7081
27	1452 126-1303 t115-14	1/28/86	77.67	12.53	0.89	0.04	0.08	0.39	0.11	2.44	5.84	99.99	0.7066
28	1875 FLV-47-W T148-6	10/27/87	77.99	12.30	0.72	0.03	0.07	0.31	0.04	3.62	4.71	99.99	0.7064
29	1820 TTC-25 T144-11	7/21/87	77.93	12.47	0.56	0.03	0.06	0.31	0.06	3.58	4.99	99.99	0.7062
30	1816 TTC-21 T144-7	7/21/87	77.68	12.57	0.60	0.05	0.07	0.32	0.06	3.33	5.32	100.00	0.7058
31	1867 FLV-39-W T147-13	9/30/87	77.61	12.59	0.53	0.06	0.09	0.35	0.10	2.77	5.92	100.02	0.7058
32	1851 FLV-48-W T146-14	8/25/87	77.41	12.76	0.71	0.04	0.06	0.32	0.06	3.81	4.83	100.00	0.7055
33	2203 FLV-128-TC T183-2	1/25/89	77.40	13.02	0.76	0.04	0.06	0.36	0.11	3.20	5.05	100.00	0.7054
34	1833 FLV-8-CS T145-11	8/24/87	77.81	12.36	0.58	0.05	0.11	0.31	0.06	3.80	4.91	99.99	0.7052
35	1768 TTC-6 T139-4	5/28/87	77.20	12.93	0.58	0.05	0.09	0.33	0.09	4.08	4.64	99.99	0.7046
36	1712 TTC-9A T138-5	4/23/87	77.51	12.83	0.59	0.05	0.10	0.34	0.07	3.87	4.65	100.01	0.7039
37	447 65W130, T31-3		76.64	12.49	1.45	0.00	0.06	0.28	0.06	4.49	4.52	99.99	0.7035
38	1838 FLV-13-CS T146-1	88/25/87	77.48	12.82	0.60	0.04	0.08	0.33	0.04	3.85	4.75	99.99	0.7031
39	1834 FLV-9-CS T145-12	8/24/87	77.36	12.31	0.56	0.05	0.10	0.32	0.06	2.77	6.47	100.00	0.7030
40	824 GS-70		70.64	14.97	3.96	0.83	0.05	2.40	0.81	3.52	2.81	99.99	0.7029
41	1836 FLV-11-CS T145-14	8/25/87	77.08	12.69	0.57	0.05	0.09	0.34	0.07	2.75	6.38	100.02	0.7015
42	86 DSDP-19, T10-3		67.58	16.11	2.88	0.69	0.10	1.74	0.78	4.85	5.26	99.99	0.7012
43	1710 TTC-8 T138-3	4/23/87	77.50	12.81	0.58	0.05	0.11	0.34	0.05	3.69	4.88	100.01	0.7011
44	932 DR-42		76.15	12.32	1.37	0.07	0.10	0.33	0.24	2.81	6.61	100.00	0.7006
45	2262 T189-1 912-M	5/9/89	72.22	14.03	2.75	0.54	0.03	1.64	0.54	3.79	4.46	100.00	0.7005
46	1818 TTC-23 T144-9	7/21/87	77.58	12.62	0.71	0.03	0.03	0.32	0.03	3.58	5.10	100.00	0.7003
47	1672 84 NV 14-2	10/21/86	77.72	12.49	0.58	0.05	0.10	0.33	0.07	4.03	4.63	100.00	0.7001
48	1718 TTC-16 T138-11	4/23/87	77.76	12.62	0.59	0.04	0.11	0.34	0.06	3.73	4.76	100.01	0.6995
49	870 LM-29		76.88	12.81	0.89	0.03	0.07	0.32	0.08	3.30	5.61	99.99	0.6995
50	1026 KRL-71082N-3 (591) T50-2	6/22/84	67.94	16.62	2.48	0.77	0.00	2.90	0.48	4.99	3.81	99.99	0.6994

Listing of 50 closest matches for COMP. NO. 1903 for elements: Na, Al, Si, K, Ca													
C.No	Sample Number	Date	SiO2	Al2O3	Fe2O3	MgO	MnO	CaO	TiO2	Na2O	K2O	Total, R	Sim. Co
1	1903 E67-113 1564 T151-3	11/10/87	75.20	16.70	0.21	0.71	0.01	0.47	0.00	2.04	4.66	100.00	1.0000
2	1882 FLV-38-WW T147-12	9/30/87	79.16	12.71	0.54	0.05	0.08	0.42	0.10	2.15	4.79	100.00	0.9053
3	1900 E67-113 1640 (2) T151-2	11/10/87	76.81	15.88	0.30	0.59	0.01	0.48	0.01	2.41	3.52	100.01	0.9022
4	1461 FAY 37 T115-2	1/27/86	77.50	13.01	1.32	0.07	0.04	0.49	0.12	2.37	5.08	100.00	0.8973
5	1899 E67-13 1640 T151-2	11/10/87	75.86	16.37	0.23	0.69	0.02	0.46	0.00	2.78	3.59	100.00	0.8909
6	1902 E67-113 1856 T151-11	11/10/87	77.21	15.64	0.23	0.49	0.00	0.51	0.00	2.49	3.43	100.00	0.8775
7	1898 E67-113 1543 T151-1	11/10/87	74.47	17.18	0.10	0.85	0.01	0.28	0.03	2.46	4.64	100.02	0.8766
8	115 GV-76-B, T16-12		78.03	12.88	0.46	0.03	0.03	0.45	0.11	2.48	5.53	100.00	0.8715
9	2073 CCP-C T172-2	9/28/88	77.06	12.19	1.53	0.05	0.02	0.50	0.14	2.09	6.42	100.00	0.8695
10	1451 126-1265 T115-13	1/28/86	77.58	12.59	0.89	0.07	0.08	0.44	0.12	2.36	5.87	100.00	0.8635
11	129 GV-78-23, T16-2		75.69	12.92	1.84	0.01	0.05	0.47	0.14	1.79	7.09	100.00	0.8604
12	1450 126-1254 T115-12	1/28/85	77.26	12.70	0.91	0.08	0.08	0.48	0.14	2.67	5.68	100.00	0.8595
13	104 FRIANT-2, T18-6		77.53	12.86	0.68	0.03	0.03	0.47	0.06	3.40	4.94	100.00	0.8567
14	2224 FUP-1 T184-4	2/28/89	76.57	12.72	1.65	0.02	0.05	0.47	0.14	3.36	5.01	99.99	0.8562
15	270 PICO-21, T2-8		77.06	13.00	0.79	0.03	0.04	0.47	0.05	3.88	4.67	99.99	0.8556
16	2225 FBP2-1 T184-5	2/28/89	76.64	12.65	1.66	0.03	0.05	0.47	0.14	3.35	5.02	100.01	0.8552
17	2078 CRAW-88-1A T172-7	9/28/88	77.72	12.63	0.70	0.03	0.04	0.47	0.04	3.71	4.65	99.99	0.8543
18	452 B18051, T35-5		76.52	12.77	0.74	0.04	0.02	0.46	0.07	3.67	4.72	99.01	0.8539
19	2080 CRAW-88-2D2 T172-9	9/28/88	77.61	12.69	0.70	0.03	0.04	0.47	0.08	3.64	4.76	100.02	0.8537
20	1890 JT-NOVA-1600 T150-7	11/9/87	77.18	12.98	0.81	0.04	0.08	0.48	0.06	3.42	4.96	100.01	0.8534
21	1889 JT-NOVA-1 T150-6	11/9/87	77.01	13.15	0.75	0.04	0.08	0.48	0.05	3.31	5.14	100.01	0.8532
22	2120 N-6 T175-10	10/28/88	77.13	13.06	0.92	0.05	0.07	0.52	0.09	2.76	5.39	99.99	0.8529
23	2221 KRL-880828-N T181B-7	1/23/89	77.35	12.96	0.71	0.03	0.03	0.46	0.07	3.48	4.90	99.99	0.8528
24	1442 03068506A SILICIC FR.	T114-1	77.71	12.67	0.74	0.04	0.08	0.49	0.07	3.04	5.15	99.99	0.8523
25	1433 ASW 62285-2 (2) T114-1	12/12/85	77.78	12.55	0.78	0.04	0.06	0.46	0.08	3.40	4.85	100.00	0.8516
26	2220 KRL-880828-Q T181B-6	1/23/89	77.26	12.97	0.72	0.03	0.03	0.48	0.07	3.53	4.91	100.00	0.8512
27	984 RC-2		77.41	12.72	0.58	0.06	0.05	0.57	0.10	2.10	6.41	100.00	0.8511
28	381 TECO-26, T18-11	2/28/89	77.61	12.73	0.72	0.03	0.03	0.48	0.06	3.70	4.63	99.99	0.8510
29	2223 FBP-1 T184-3		76.61	12.71	1.62	0.03	0.05	0.46	0.12	3.32	5.07	99.99	0.8510
30	439 9-153, T45-6	1/24/89	77.09	12.37	1.27	0.08	0.01	0.47	0.18	2.89	5.63	100.00	0.8500
31	2199 FLV-115-WW T182-6	10/5/88	77.54	12.73	0.73	0.03	0.03	0.48	0.06	3.56	4.83	99.99	0.8498
32	103 FRIANT-1, T18-5		77.66	12.62	0.76	0.03	0.04	0.46	0.05	3.70	4.69	100.01	0.8495
33	2081 CRAW-88-2D3 T172-10	10/5/88	76.22	13.26	0.85	0.03	0.00	0.48	0.09	2.70	6.37	100.00	0.8494
34	131 GV-78-29, T16-4	08/25/83	76.54	13.06	1.06	0.06	0.05	0.48	0.09	3.93	4.74	100.01	0.8492
35	623 TULELAKE-296(200-325), T62-5	3/1/85	76.40	13.00	1.25	0.03	0.06	0.46	0.07	4.06	4.66	99.99	0.8488
36	1206 TULELAKE 2038 LAP (53.67M) T9	8/30/85	78.16	12.18	0.67	0.05	0.04	0.47	0.09	3.61	4.72	99.99	0.8488
37	1357 29068503 T107-3		77.28	12.92	0.73	0.05	0.10	0.44	0.11	2.86	5.50	99.99	0.8487
38	114 GV-76-6, T16-11	11/9/97	77.34	12.89	0.76	0.03	0.07	0.46	0.06	3.81	4.59	100.01	0.8487
39	1885 JT-6387-1 T150-3	9/11/87	77.56	12.72	0.76	0.03	0.07	0.46	0.06	3.81	4.59	100.01	0.8487
40	1886 JT-41186-1 T150-4		77.56	12.72	0.76	0.03	0.03	0.47	0.05	3.83	4.56	100.01	0.8485
41	20 BHA-1, T18-10	8/24/87	77.61	12.81	0.72	0.05	0.09	0.47	0.06	3.73	4.47	100.01	0.8484
42	1827 FLV-2-CS T145-5	8/24/87	77.61	12.81	0.72	0.05	0.09	0.47	0.06	3.73	4.47	100.01	0.8484
43	1828 FLV-3-CS T145-6	8/24/87	77.68	12.69	0.73	0.05	0.09	0.48	0.05	3.68	4.56	100.01	0.8480
44	2049 CAES91 857 T171-3	9/5/88	77.75	12.54	0.72	0.03	0.07	0.46	0.04	3.63	4.75	99.99	0.8480
45	130 GV-78-27, T16-3		76.55	13.38	1.26	0.04	0.00	0.56	0.11	2.72	5.38	100.00	0.8478
46	122 GV-77-30A, T19-15		77.31	13.00	0.91	0.05	0.03	0.65	0.06	2.10	5.88	99.99	0.8476
47	985 RC-3	xx/xx/xx	77.17	12.94	0.63	0.07	0.05	0.60	0.11	2.11	6.32	100.00	0.8474
48	668 CAPIS-1, T54-1		78.43	12.27	1.29	0.08	0.04	0.48	0.18	3.05	4.17	99.99	0.8473
49	2367 PR-77 T197-5	9/14/89	76.95	12.59	0.87	0.04	0.07	0.47	0.09	2.71	6.20	99.99	0.8471
50	264 PICO-5(1), T2-7		77.30	12.93	0.77	0.03	0.04	0.48	0.06	3.83	4.55	99.99	0.8471

Listing of 50 closest matches for COMP. NO. 1903 for elements: Na, Al, Si, K, Ca, Fe Date of Update: 2/12/90												
C.No	Sample Number	Date	SiO2	Al2O3	Fe2O3	MgO	MnO	CaO	TiO2	Na2O	K2O	Total, R Sim. Co
1	1903 E67-113 1564 T151-3	11/10/87	75.20	16.70	0.21	0.71	0.01	0.47	0.00	2.04	4.66	100.00
2	1899 E67-13 1640 T151-2	11/10/87	75.86	16.37	0.23	0.69	0.02	0.46	0.00	2.78	3.59	100.00
3	1902 E67-113 1856 T151-11	11/10/87	77.21	15.64	0.23	0.49	0.00	0.51	0.00	2.49	3.43	100.00
4	1900 E67-113 1640 (2) T151-2	11/10/87	76.81	15.88	0.30	0.59	0.01	0.48	0.01	2.41	3.52	100.01
5	1882 FLV-38-WW T147-12	9/30/87	79.16	12.71	0.54	0.05	0.08	0.42	0.10	2.15	4.79	100.00
6	1898 E67-113 1543 T151-1	11/10/87	74.47	17.18	0.10	0.85	0.01	0.28	0.03	2.46	4.64	100.02
7	115 GV-76-8, T16-12		78.03	12.88	0.46	0.03	0.03	0.45	0.11	2.48	5.53	100.00
8	2376 FLV-148-CS T201-4	10/12/89	77.47	13.76	0.43	0.11	0.00	0.51	0.05	3.51	4.17	100.01
9	1461 FABY 37 T115-2	1/27/86	77.50	13.01	1.32	0.07	0.04	0.49	0.12	2.37	5.08	100.00
10	984 RC-2		77.41	12.72	0.58	0.06	0.05	0.57	0.10	2.10	6.41	100.00
11	68 DSDP-1, T9-3, low total		75.79	14.88	0.11	0.49	0.01	0.96	0.01	2.43	5.32	100.00
12	104 FRIANT-2, T18-6		77.53	12.86	0.68	0.03	0.03	0.47	0.06	3.40	4.94	100.00
13	1857 FLV-28-WW T147-4	9/30/87	77.46	12.55	0.53	0.06	0.08	0.39	0.09	2.17	6.67	100.00
14	1864 FLV-35-WW T147-9	9/30/87	77.58	12.69	0.60	0.06	0.07	0.49	0.10	3.76	4.65	100.00
15	2078 CRAW-88-1A T172-7	9/28/88	77.72	12.63	0.70	0.03	0.04	0.47	0.04	3.71	4.65	99.99
16	1850 FLV-29-WW T146-13	8/25/87	76.85	12.65	0.55	0.06	0.08	0.41	0.06	2.20	7.13	99.99
17	985 RC-3		77.17	12.94	0.63	0.07	0.05	0.60	0.11	2.11	6.32	100.00
18	2080 CRAW-88-2D2 T172-9	9/28/88	77.61	12.69	0.70	0.03	0.04	0.46	0.08	3.64	4.76	100.02
19	1671 84 NV 14-1	10/21/86	77.45	12.68	0.58	0.05	0.06	0.46	0.07	3.75	4.89	99.99
20	1989 WL-5-22 (85.15m) T165-2	5/22/88	77.93	12.32	0.60	0.05	0.06	0.46	0.11	3.77	4.71	100.01
21	2001 WL-5-12 (61.28m) 10 Ca fract.	5/22/88	77.54	12.80	0.61	0.01	0.06	0.45	0.05	3.85	4.63	100.00
22	1252 TLN-4 T96-11	5/29/85	77.26	12.83	0.58	0.04	0.08	0.48	0.08	3.95	4.74	100.01
23	2221 KRL-880828-N T181B-7	1/23/89	77.35	12.96	0.71	0.03	0.03	0.46	0.07	3.48	4.90	99.99
24	1357 29068503 T107-3	8/30/85	78.16	12.18	0.67	0.05	0.04	0.47	0.09	3.61	4.72	99.99
25	1901 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00
26	2371 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00
27	1451 126-1265 T115-13	1/28/86	77.58	12.59	0.89	0.07	0.08	0.44	0.12	2.36	5.87	100.00
28	452 818051, T35-5		76.52	12.77	0.74	0.04	0.02	0.46	0.07	3.67	4.72	99.01
29	1865 FLV-36-WW T147-10	9/30/87	77.47	12.83	0.58	0.05	0.09	0.43	0.11	3.66	4.76	99.98
30	1595 MOD-9 T130-5	9/19/86	78.25	12.13	0.67	0.03	0.06	0.47	0.06	3.41	4.91	99.99
31	2220 KRL-880828-Q T181B-6	1/23/89	77.26	12.97	0.72	0.03	0.03	0.48	0.07	3.53	4.91	100.00
32	381 TECO-26, T18-11	5/29/85	77.61	12.73	0.72	0.03	0.03	0.48	0.06	3.70	4.63	99.99
33	1251 TLN-3 T96-10	5/29/85	77.20	12.87	0.54	0.04	0.09	0.43	0.09	4.03	4.70	99.99
34	1889 JT-NOVA-1 T150-6	11/9/87	77.01	13.15	0.75	0.04	0.08	0.48	0.05	3.31	5.14	100.01
35	1442 0308506A SILICIC FR. T114-1	12/12/85	77.71	12.67	0.74	0.04	0.04	0.49	0.07	3.04	5.15	99.99
36	270 PICO-21, T2-8	5/29/85	77.06	13.00	0.79	0.03	0.04	0.47	0.05	3.88	4.67	99.99
37	1249 TLN-1 T96-8		77.28	12.76	0.56	0.04	0.08	0.44	0.08	4.09	4.69	100.02
38	128 GV-78-22, T16-1		77.07	12.94	0.67	0.05	0.06	0.48	0.10	3.22	5.41	100.00
39	103 FRIANT-1, T18-5		77.54	12.73	0.73	0.03	0.03	0.48	0.06	3.56	4.83	99.99
40	1827 FLV-2-CS T145-5	8/24/87	77.61	12.81	0.72	0.05	0.09	0.47	0.06	3.73	4.47	100.01
41	1441 0808502 SILICIC FR.	12/12/85	77.58	12.68	0.67	0.05	0.08	0.45	0.10	3.28	5.11	100.00
42	2049 CAES#1 857 T171-3	9/5/88	77.75	12.54	0.72	0.03	0.07	0.46	0.04	3.63	4.75	99.99
43	1907 OT-2 T149-5	11/11/87	78.22	12.23	0.58	0.05	0.08	0.39	0.08	2.33	6.05	100.01
44	114 GV-76-6, T16-11		77.28	12.92	0.73	0.05	0.10	0.44	0.11	2.86	5.50	99.99
45	1450 126-1254 T115-12	1/28/85	77.26	12.70	0.91	0.08	0.08	0.48	0.14	2.67	5.68	100.00
46	1828 FLV-3-CS T145-6	8/24/87	77.68	12.69	0.73	0.05	0.09	0.48	0.05	3.68	4.56	100.01
47	1433 ASW 62285-2 (2) T114-1	12/12/85	77.78	12.55	0.78	0.04	0.06	0.46	0.08	3.40	4.85	100.00
48	1683 MRSN-1 T134-4	11/25/86	77.63	12.49	0.61	0.07	0.07	0.49	0.09	3.21	5.35	100.01
49	1890 JT-NOVA-1600 T150-7	11/9/87	77.18	12.98	0.61	0.04	0.08	0.48	0.06	3.42	4.96	100.01
50	2081 CRAW-88-2D3 T172-10	10/5/88	77.66	12.62	0.76	0.03	0.04	0.46	0.05	3.70	4.69	100.01

Listing of 50 closest matches for COMP. NO. 1903 for elements: Na, Mg, Al, Si, K, Ca Date of Update: 2/12/90													
C.No	Sample Number	Date	SiO2	Al2O3	Fe2O3	MgO	MnO	CaO	TiO2	Na2O	K2O	Total, R	Sim. Co
1	1903 E67-113 1564 T151-3	11/10/87	75.20	16.70	0.21	0.71	0.01	0.47	0.00	2.04	4.66	100.00	1.0000
2	1899 E67-13 1640 T151-2	11/10/87	75.86	16.37	0.23	0.69	0.02	0.46	0.00	2.78	3.59	100.00	0.9044
3	1900 E67-113 1640 (2) T151-2	11/10/87	76.81	15.88	0.30	0.59	0.01	0.48	0.01	2.41	3.52	100.01	0.8903
4	1898 E67-113 1543 T151-1	11/10/87	74.47	17.18	0.10	0.85	0.01	0.28	0.00	2.46	4.64	100.02	0.8697
5	1902 E67-113 1856 T151-11	11/10/87	77.21	15.64	0.23	0.49	0.00	0.51	0.00	2.49	3.43	100.00	0.8463
6	1901 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	0.8152
7	2371 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	0.8152
8	68 DSDP-1, T9-3, low total		75.79	14.88	0.11	0.49	0.01	0.96	0.01	2.43	5.32	100.00	0.7964
9	1882 FLV-38-WW T147-12	9/30/87	79.16	12.71	0.54	0.05	0.08	0.42	0.10	2.15	4.79	100.00	0.7666
10	1461 FBY 37 T115-2	1/27/86	77.50	13.01	1.32	0.07	0.04	0.49	0.12	2.37	5.08	100.00	0.7644
11	2133 CCPC-5.36 C 10 Na lah		77.67	13.78	1.54	0.21	0.09	0.61	0.20	1.36	4.53	99.99	0.7497
12	1338 BE-91 T105-15	8/29/85	68.46	16.75	2.96	0.53	0.08	1.61	0.55	1.83	7.24	100.01	0.7477
13	2073 CCP-C T172-2	9/28/88	77.06	12.19	1.53	0.05	0.02	0.50	0.14	2.09	6.42	100.00	0.7364
14	1451 126-1265 T115-13	1/28/86	77.58	12.59	0.89	0.07	0.08	0.44	0.12	2.36	5.87	100.00	0.7360
15	86 DSDP-19, T10-3		67.58	16.11	2.88	0.69	0.10	1.74	0.78	4.85	5.26	99.99	0.7353
16	1450 126-1254 T115-12	1/28/85	77.26	12.70	0.91	0.08	0.08	0.48	0.14	2.67	5.68	100.00	0.7350
17	115 GV-76-8, T16-12		78.03	12.88	0.46	0.03	0.03	0.45	0.11	2.48	5.53	100.00	0.7333
18	2229 FLV-76-WW T185-2	2/28/89	77.93	12.16	0.86	0.11	0.02	0.46	0.18	3.20	5.09	100.01	0.7300
19	2199 FLV-115-WW T182-6	1/24/89	77.09	12.37	1.27	0.08	0.01	0.47	0.19	2.89	5.63	100.00	0.7271
20	1926 1-JWB-1-CM-3 T154-2	2/24/88	72.87	14.90	1.29	0.12	0.12	0.48	0.20	5.10	4.92	100.00	0.7261
21	751 HC-11		77.33	12.22	1.32	0.09	0.04	0.49	0.20	2.90	5.41	100.00	0.7258
22	439 9-153, T45-6		76.68	12.45	1.63	0.07	0.02	0.47	0.18	3.79	4.71	100.00	0.7254
23	2321 MAP-1L T193-2	6/1/89	78.32	12.39	0.73	0.10	0.05	0.53	0.09	3.20	4.59	100.00	0.7254
24	668 CAPIS-1, T54-1	xx/xx/xx	78.43	12.27	1.29	0.08	0.04	0.48	0.18	3.05	4.17	99.99	0.7248
25	2376 FLV-148-CS T201-4	10/12/89	77.47	13.76	0.43	0.11	0.00	0.51	0.05	3.51	4.17	100.01	0.7245
26	673 TULELAKE-715 (wh pum), T59-A1	xx/xx/xx	70.87	15.50	2.67	0.68	0.06	1.99	0.42	4.14	3.68	100.01	0.7245
27	1618 MOD-8 T130-4 LO FE FR.	9/19/86	70.17	15.09	2.84	0.55	0.05	1.62	0.54	4.37	4.78	100.01	0.7239
28	2262 T189-1 912-M	5/9/89	72.22	14.03	2.75	0.54	0.03	1.64	0.54	3.79	4.46	100.00	0.7238
29	1908 OT-3 T149-6	11/11/87	77.97	12.29	0.94	0.15	0.06	0.71	0.17	2.21	5.51	100.01	0.7237
30	2356 FLV-110-WW T196-4	8/7/89	77.16	12.22	1.28	0.08	0.03	0.48	0.18	2.74	5.84	100.01	0.7234
31	984 RC-2		77.41	12.72	0.58	0.06	0.05	0.57	0.10	2.10	6.41	100.00	0.7234
32	985 RC-3		77.17	12.94	0.63	0.07	0.05	0.60	0.11	2.11	6.32	100.00	0.7226
33	1428 ASW-6985-3 T103-3	08/26/85	70.60	15.08	2.68	0.69	0.07	2.17	0.42	4.38	3.91	100.00	0.7225
34	2120 N-6 T175-10	10/28/88	77.13	13.06	0.92	0.05	0.07	0.52	0.09	2.76	5.39	99.99	0.7225
35	2114 JI-SH-62888-1 T175-3	10/27/88	77.20	12.17	1.90	0.10	0.03	0.69	0.30	2.13	5.49	100.01	0.7219
36	623 TULELAKE-296(200-325), T62-5	08/25/83	76.54	13.06	1.06	0.06	0.05	0.48	0.09	3.93	4.74	100.01	0.7217
37	17 BF-4, T28-7		78.05	14.34	0.65	0.13	0.08	0.52	0.04	4.04	4.15	100.00	0.7217
38	452 B18051, T35-5		76.52	12.77	0.74	0.04	0.02	0.46	0.07	3.67	4.72	99.01	0.7209
39	104 FRIANT-2, T18-6		77.53	12.86	0.68	0.03	0.03	0.47	0.06	3.40	4.94	100.00	0.7209
40	1840 FLV-16-WW T146-4	8/25/87	77.22	12.84	0.75	0.07	0.05	0.49	0.10	3.09	5.39	100.00	0.7209
41	7 ASH CREEK-1, T28-1		75.93	14.35	0.63	0.12	0.10	0.54	0.05	3.98	4.30	100.00	0.7207
42	1925 1-JWB-1-CM-2 T154-1	2/24/88	72.82	14.97	1.30	0.12	0.11	0.50	0.20	5.06	4.92	100.00	0.7207
43	2200 FLV-116-WW T182-7	1/24/89	76.89	12.40	1.31	0.09	0.02	0.49	0.21	2.96	5.63	100.00	0.7206
44	1890 JT-NOVA-1600 T150-7	11/9/87	77.18	12.98	0.81	0.04	0.08	0.48	0.06	3.42	4.96	100.01	0.7205
45	1889 JT-NOVA-1 T150-6		77.01	13.15	0.75	0.04	0.08	0.48	0.05	3.31	5.14	100.01	0.7204
46	15 BCF-1, T7-13, pd		77.17	13.12	0.75	0.15	0.04	0.37	0.19	3.59	4.63	100.01	0.7201
47	270 PICO-21, T2-8		77.06	13.00	0.79	0.03	0.04	0.47	0.05	3.88	4.67	99.99	0.7200
48	2225 FBP2-1 T184-5	2/28/89	76.64	12.65	1.66	0.03	0.05	0.47	0.14	3.35	5.02	100.01	0.7197
49	1442 03068506A SILICIC FR.		77.71	12.67	0.74	0.04	0.08	0.49	0.07	3.04	5.15	99.99	0.7196
50	129 GV-78-23, T16-2	T114-1 12/12/85	75.69	12.92	1.84	0.01	0.05	0.47	0.14	1.79	7.09	100.00	0.7193

III. Listing of 50 closest matches for COMP. NO. 1899 for elements: Na, Al, Si, Ca Date of Update: 2/12/90

C.No	Sample Number	Date	SiO2	Al2O3	Fe2O3	MgO	CaO	TiO2	Na2O	K2O	Total	R	Sim. C.
1	1899 E67-13 1640 T151-2	11/10/87	75.86	16.37	0.23	0.69	0.02	0.46	0.00	2.78	3.59	100.00	1.0000
2	1900 E67-113 1640 (2) T151-2	11/10/87	76.81	15.84	0.30	0.59	0.01	0.48	0.01	2.41	3.52	100.01	0.9457
3	1902 E67-113 1856 T151-11	11/10/87	77.21	15.64	0.23	0.49	0.00	0.51	0.00	2.49	3.43	100.00	0.9339
4	2141 EPDA-11.06 A 2 sh		76.10	12.95	1.15	0.05	0.03	0.47	0.13	2.87	6.24	99.99	0.9338
5	131 GV-78-29, T16-4		76.22	13.26	0.85	0.03	0.00	0.48	0.09	2.70	6.37	100.00	0.9337
6	2230 FLV-111-W T185-3	2/28/89	76.95	12.50	0.82	0.02	0.08	0.46	0.06	2.87	6.23	99.99	0.9295
7	1497 AMAR-1 T100-1	7/20/84	76.72	12.93	0.77	0.06	0.07	0.49	0.08	2.80	6.08	100.00	0.9276
8	2367 PR-77 T197-5	9/14/89	76.95	12.59	0.87	0.04	0.07	0.47	0.09	2.71	6.20	99.99	0.9271
9	2276 T191-6 FLV-77-HT	5/10/89	76.97	12.56	0.73	0.05	0.04	0.46	0.11	2.64	6.44	100.00	0.9256
10	114 GV-76-6, T16-11		77.28	12.92	0.73	0.05	0.10	0.44	0.11	2.86	5.96	99.99	0.9249
11	2231 FLV-112-W LIGHT T185-4	2/28/89	76.98	12.66	0.80	0.03	0.07	0.46	0.06	2.99	5.50	100.01	0.9221
12	1903 E67-113 1564 T151-3	11/10/87	75.20	16.70	0.21	0.71	0.01	0.47	0.00	2.04	4.66	100.00	0.9210
13	2199 FLV-115-W T182-6	7/24/89	77.09	12.37	1.27	0.08	0.01	0.47	0.19	2.89	5.63	100.00	0.9201
14	1450 126-1254 T115-12	1/28/85	77.26	12.70	0.91	0.08	0.08	0.48	0.14	2.67	5.68	100.00	0.9191
15	2356 FLV-110-W T196-4	8/7/89	77.16	12.22	1.28	0.08	0.03	0.48	0.18	2.74	5.84	100.01	0.9184
16	1344 BE-15-A1 T106-6	8/29/85	77.12	12.52	0.82	0.06	0.07	0.48	0.14	2.68	6.11	100.00	0.9177
17	1901 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	0.9177
18	2371 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	0.9177
19	2197 FLV-111B-W T182-4	1/24/89	76.75	12.95	0.80	0.02	0.02	0.47	0.07	3.06	5.85	99.99	0.9167
20	2120 N-6 T175-10	10/28/88	77.13	13.06	0.92	0.05	0.07	0.52	0.09	2.76	5.39	99.99	0.9147
21	1520 JP 85 TPS-7 T120-2	4/29/86	76.33	12.86	0.78	0.06	0.07	0.40	0.11	2.78	6.61	100.00	0.9122
22	2107 KRL-82982-A T174-10	10/28/88	75.33	13.33	1.32	0.09	0.02	0.43	0.31	3.12	6.05	100.00	0.9083
23	115 GV-76-8, T16-12		78.03	12.88	0.46	0.03	0.03	0.45	0.11	2.48	5.53	100.00	0.9073
24	751 HC-11		77.33	12.22	1.32	0.09	0.04	0.49	0.20	2.90	5.41	100.00	0.9062
25	2200 FLV-116-W T182-7	1/24/89	76.89	12.40	1.31	0.09	0.02	0.49	0.21	2.96	5.63	100.00	0.9055
26	851 LM-4		76.91	12.63	1.19	0.02	0.03	0.49	0.10	3.05	5.62	100.00	0.9051
27	856 LM-10		76.85	12.61	0.97	0.05	0.05	0.51	0.15	2.90	5.90	99.99	0.9045
28	130 GV-78-27, T16-3		76.55	13.38	1.26	0.04	0.00	0.56	0.11	2.72	5.38	100.00	0.9030
29	1856 FLV-27-W T147-3	9/30/87	77.81	12.35	0.54	0.05	0.08	0.43	0.10	2.95	5.69	100.00	0.9016
30	1887 JT-6387-1 T150-3	9/11/87	77.50	12.56	0.75	0.03	0.02	0.44	0.06	3.08	5.55	99.99	0.9013
31	1840 FLV-16-W T146-4	8/25/87	77.22	12.84	0.75	0.07	0.05	0.49	0.10	3.09	5.39	100.00	0.9013
32	2223 F8B-1 T184-3	2/28/89	76.61	12.71	1.62	0.03	0.05	0.46	0.12	3.32	5.07	99.99	0.9010
33	1921 86LP-38 T154-7	2/24/88	77.15	12.70	0.58	0.05	0.08	0.42	0.09	2.59	6.33	99.99	0.9009
34	1442 Q3068506A SILICIC FR. T114-1	12/12/85	77.71	12.67	0.74	0.04	0.04	0.49	0.07	3.04	5.15	99.99	0.9009
35	235 MW-1, T39-2		76.39	13.20	0.99	0.05	0.06	0.50	0.05	3.15	5.60	99.99	0.9005
36	392 TECO-30G, T17-14		76.75	12.66	1.72	0.03	0.03	0.55	0.13	2.78	5.36	100.01	0.8995
37	232 FLV-112-W DARK T185-5	2/28/89	77.20	12.47	0.81	0.04	0.04	0.49	0.08	3.04	5.82	99.99	0.8994
38	128 GV-78-22, T16-1		77.07	12.94	0.67	0.05	0.06	0.48	0.10	3.22	5.41	100.00	0.8991
39	875 LM-41		76.58	13.01	0.70	0.05	0.06	0.49	0.09	3.20	5.81	99.99	0.8982
40	134 GV-78-34A, T16-7		77.10	12.88	0.92	0.04	0.05	0.51	0.08	3.04	5.38	100.00	0.8968
41	668 CAPIS-1, T54-1	xx/xx/xx	78.43	12.27	1.29	0.08	0.04	0.48	0.18	3.35	4.17	99.99	0.8966
42	1889 JT-NOVA-1 T150-6	11/9/87	77.01	13.15	0.75	0.04	0.08	0.48	0.05	3.01	5.14	100.01	0.8966
43	2229 FLV-76-W T185-2	7/28/89	77.93	12.16	0.86	0.11	0.02	0.46	0.18	3.20	5.09	100.01	0.8963
44	2352 FLV-75-FC T196-6	8/7/89	77.35	12.69	0.84	0.05	0.03	0.50	0.08	3.06	5.40	100.00	0.8961
45	2192 RFIP-1 (HIFE) AV24SHARDS T179-	12/21/88	77.08	12.15	1.46	0.03	0.04	0.48	0.14	3.38	5.53	100.00	0.8961
46	1441 Q808502 SILICIC FR.	12/12/85	77.58	12.68	0.67	0.05	0.08	0.45	0.10	3.28	5.11	100.00	0.8946
47	300 PRL, T25-2		76.32	12.84	1.22	0.04	0.04	0.47	0.09	3.40	5.58	100.00	0.8937
48	2224 FPUP-1 T184-4	2/28/89	76.57	12.72	1.65	0.02	0.05	0.47	0.14	3.36	5.01	99.99	0.8935
49	2117 RFIP-1 (-100+200) T175-6	10/28/88	76.68	12.71	1.55	0.06	0.04	0.49	0.15	3.14	5.46	100.01	0.8933
50	120 GV-77-3, T15-11		77.13	12.78	0.91	0.06	0.07	0.52	0.08	3.01	5.44	100.00	0.8931

Listing of 50 closest matches for COMP. NO. 1899 for elements: Na, Al, Si, K, Ca									
C.No Sample Number									
Date	SiO2	Al2O3	Fe2O3	MgO	MnO	CaO	TiO2	Na2O	Total, R Sim. Co.
11/10/87	75.86	16.37	0.23	0.69	0.02	0.46	0.00	2.78	3.59
11/10/87	76.81	15.88	0.30	0.59	0.01	0.48	0.01	2.41	3.52
11/10/87	77.21	15.64	0.23	0.49	0.00	0.51	0.00	2.49	3.43
11/10/87	77.57	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12
11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12
11/10/87	75.20	16.70	0.21	0.71	0.01	0.47	0.00	2.04	4.66
11/10/87	78.43	12.27	1.29	0.08	0.04	0.48	0.18	3.05	4.17
xx/xx/xx	76.93	14.04	1.46	0.03	0.01	0.52	0.10	3.62	3.29
10/12/89	77.55	12.98	0.76	0.04	0.05	0.46	0.07	4.48	3.60
10/12/89	77.47	13.76	0.43	0.11	0.00	0.51	0.05	3.51	4.17
5/15/88	77.94	12.89	0.81	0.04	0.03	0.45	0.05	3.82	3.97
4/22/87	77.56	13.10	0.75	0.04	0.09	0.47	0.08	4.40	3.51
4/22/87	77.25	13.45	1.26	0.15	0.08	0.56	0.21	3.59	3.47
4/22/87	76.85	12.90	0.73	0.03	0.03	0.47	0.05	3.93	4.02
4/22/87	77.28	12.92	0.73	0.05	0.10	0.44	0.11	2.86	5.50
4/22/87	77.78	12.86	0.75	0.03	0.05	0.45	0.06	4.27	3.75
4/22/87	76.02	14.41	0.69	0.13	0.08	0.53	0.05	4.19	3.90
10/28/88	77.13	13.06	0.92	0.05	0.07	0.52	0.09	2.76	5.39
01/27/86	78.73	12.90	0.57	0.09	0.07	0.63	0.08	2.97	3.97
01/27/86	77.64	12.88	0.74	0.03	0.02	0.46	0.07	3.72	4.43
8/25/87	77.94	12.65	0.76	0.02	0.03	0.48	0.05	4.47	3.61
8/25/87	77.31	13.24	0.72	0.04	0.08	0.48	0.06	3.76	4.31
1/27/86	78.72	12.90	0.57	0.09	0.07	0.63	0.08	2.97	3.98
1/24/89	77.09	12.37	1.27	0.08	0.01	0.47	0.19	2.89	5.63
2/28/89	75.91	14.43	0.65	0.13	0.11	0.53	0.05	4.25	3.94
2/28/89	76.61	12.71	1.62	0.03	0.05	0.46	0.12	3.32	5.07
2/28/89	76.05	14.34	1.65	0.13	0.08	0.52	0.04	4.04	4.15
1/28/85	76.10	12.95	1.15	0.05	0.03	0.47	0.13	2.87	6.24
5/5/86	77.26	12.70	0.91	0.08	0.08	0.48	0.14	2.67	5.68
1/23/89	77.30	13.14	0.67	0.06	0.04	0.71	0.08	2.78	3.22
7/20/84	77.35	12.96	0.71	0.03	0.03	0.46	0.07	3.48	4.90
12/12/85	76.72	12.93	0.77	0.06	0.07	0.49	0.08	2.80	6.08
12/12/85	77.71	12.67	0.74	0.04	0.08	0.49	0.07	3.04	5.15
12/12/85	77.78	12.55	0.78	0.04	0.06	0.46	0.08	3.40	4.85
12/12/85	76.22	13.26	0.85	0.03	0.00	0.48	0.09	2.70	6.37
12/12/85	77.84	12.72	0.69	0.03	0.01	0.48	0.07	4.41	3.75
12/12/85	77.32	12.99	0.75	0.04	0.05	0.46	0.05	3.90	4.44
2/28/89	76.95	12.50	0.82	0.02	0.08	0.46	0.06	2.87	6.23
4/22/87	77.75	12.34	1.25	0.04	0.05	0.47	0.11	3.75	4.25
2/28/89	78.26	12.59	1.01	0.08	0.07	0.55	0.04	3.70	4.25
2/28/89	76.98	12.66	0.80	0.03	0.07	0.46	0.06	2.99	5.96
2/28/89	76.57	12.72	1.65	0.02	0.05	0.47	0.14	3.36	5.01
2/28/89	77.93	12.16	0.86	0.11	0.02	0.46	0.18	3.20	5.09
2/28/89	76.52	12.77	0.74	0.04	0.02	0.46	0.07	3.67	4.72
2/28/89	77.33	12.22	1.32	0.09	0.04	0.49	0.20	2.90	5.41
8/7/89	77.16	12.22	1.28	0.08	0.03	0.48	0.18	2.74	5.84
12/5/88	78.19	12.38	0.75	0.04	0.04	0.44	0.07	3.17	4.93
9/14/89	76.95	12.59	0.87	0.04	0.07	0.47	0.09	2.71	6.20
8/24/87	76.04	14.25	0.64	0.13	0.09	0.54	0.06	4.43	3.82
8/24/87	77.61	12.81	0.72	0.05	0.09	0.47	0.06	3.73	4.47

Listing of 50 closest matches for COMP. NO. 1899 for elements: Na, Al, Si, K, Ca, Fe										Date of Update: 2/12/90			
C.No	Sample Number	Date	SiO2	Al2O3	Fe2O3	MgO	MnO	CaO	TiO2	Na2O	K2O	Total.R	Sim. Co
1	1899 E67-13 1640 T151-2	11/10/87	75.86	16.37	0.23	0.69	0.02	0.46	0.00	2.78	3.59	100.00	1.0000
2	1902 E67-113 1856 T151-11	11/10/87	77.21	15.64	0.23	0.49	0.00	0.51	0.00	2.49	3.43	100.00	0.9485
3	1900 E67-113 1640 (2) T151-2	11/10/87	76.81	15.88	0.30	0.59	0.01	0.48	0.01	2.41	3.52	100.01	0.9517
4	1903 E67-113 1564 T151-3	11/10/87	75.20	16.70	0.21	0.71	0.01	0.47	0.00	2.04	4.66	100.00	0.9446
5	1901 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	0.9418
6	2371 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	0.9418
7	2376 FLV-148-CS T201-4	10/12/89	77.47	13.76	0.43	0.11	0.00	0.51	0.05	3.51	4.17	100.01	0.9183
8	115 GV-76-8, T16-12		78.03	12.88	0.46	0.03	0.03	0.45	0.11	2.48	5.53	100.00	0.7464
9	1454 RABEK Y8 T115-6	01/27/86	78.73	12.90	0.57	0.09	0.07	0.63	0.08	2.97	3.97	100.01	0.7876
10	1470 RABEK Y8 T115-6 CORR K	1/27/86	78.72	12.90	0.57	0.09	0.07	0.63	0.08	2.97	3.98	100.01	0.7872
11	337 SALTON-2, T2-14		77.55	12.98	0.76	0.04	0.05	0.46	0.07	4.48	3.60	99.99	0.7819
12	598 SH-ASH-34, T56-7	07/01/83	77.08	13.59	0.54	0.10	0.06	0.54	0.08	3.95	4.07	100.01	0.7797
13	1453 LOS CHOCAYOS SC-7 T116-3	01/28/86	78.24	12.84	0.44	0.11	0.09	0.65	0.10	3.36	4.16	99.99	0.7791
14	1936 NH-5 T155-8	5/15/88	77.56	13.10	0.73	0.04	0.09	0.47	0.08	4.40	3.51	100.00	0.7789
15	277 PICO-43, T36-3		76.85	12.90	0.73	0.03	0.03	0.47	0.05	3.93	4.02	99.01	0.7782
16	218 MILLVILLE-5, T28-3		75.91	14.43	0.65	0.13	0.11	0.53	0.05	4.25	3.94	100.00	0.7780
17	114 GV-76-6, T16-11	7/19/88	77.28	12.92	0.73	0.05	0.10	0.44	0.11	2.86	5.50	99.99	0.7779
18	2013 SAF2-2 T167-5		77.75	12.93	0.60	0.05	0.06	0.42	0.12	4.35	3.72	100.00	0.7777
19	17 BF-4, T28-7		76.05	14.34	0.65	0.13	0.08	0.52	0.04	4.04	4.15	100.00	0.7775
20	436 4-252A, T40-7	9/30/87	76.02	14.41	0.69	0.13	0.08	0.53	0.05	4.19	3.90	100.00	0.7772
21	1856 FLV-27-W T147-3		77.81	12.35	0.77	0.04	0.05	0.43	0.10	2.95	5.69	100.00	0.7772
22	275 PICO-40A, T8-7	5/5/86	77.94	12.89	0.81	0.04	0.03	0.45	0.05	3.97	100.00	0.7758	
23	254 P-100, T22-4		77.78	12.86	0.75	0.03	0.05	0.45	0.06	4.27	3.75	100.00	0.7757
24	1538 PICO 82 T124-9		79.30	13.14	0.67	0.06	0.04	0.71	0.08	2.78	3.22	100.00	0.7746
25	239 OAK RUN-2, T27-6		76.04	14.25	0.64	0.13	0.09	0.54	0.06	4.43	3.82	100.00	0.7744
26	2147 SAF2-5, T167-8, lo Ca 10ah	8/25/87	77.15	13.53	0.55	0.05	0.09	0.58	0.08	4.35	3.64	100.02	0.7744
27	1844 FLV-19-W T146-7	11/10/87	77.31	13.24	0.72	0.04	0.08	0.48	0.06	3.76	4.31	100.00	0.7734
28	1898 E67-113 1543 T151-1		74.47	17.18	0.10	0.85	0.01	0.28	0.03	2.46	4.64	100.02	0.7728
29	444 63CJ-26(3), T1, N-ASH-2, P		77.64	12.88	0.74	0.03	0.02	0.46	0.07	3.72	4.43	99.99	0.7721
30	338 SALTON-2A, T20-4		77.84	12.72	0.69	0.03	0.01	0.48	0.07	4.41	3.75	100.00	0.7718
31	2221 KRL-880828-N T181B-7	1/23/89	77.35	12.96	0.71	0.03	0.03	0.46	0.07	3.48	4.90	99.99	0.7713
32	1671 84 NV 14-1	10/21/86	77.45	12.68	0.58	0.05	0.06	0.46	0.07	3.75	4.89	99.99	0.7710
33	7 ASH CREEK-1, T28-1	xx/xx/xx	75.93	14.35	0.63	0.12	0.10	0.54	0.05	3.98	4.30	100.00	0.7710
34	668 CAPIS-1, T54-1		78.43	12.27	1.29	0.08	0.04	0.48	0.18	3.05	4.17	99.99	0.7710
35	104 FRIANT-2, T18-6	12/12/85	77.53	12.86	0.68	0.03	0.03	0.47	0.06	3.40	4.94	100.00	0.7709
36	1441 0808502 SILICIC FR.		77.58	12.68	0.67	0.05	0.08	0.45	0.10	3.28	5.11	100.00	0.7707
37	336 SALTON-1, T20-3		77.94	12.65	0.76	0.02	0.03	0.48	0.05	4.47	3.61	100.01	0.7706
38	2001 WL-5-12 (61.28M) lo Ca fract.	5/22/88	77.54	12.80	0.61	0.01	0.06	0.45	0.05	3.85	4.63	100.00	0.7688
39	1442 0308506A SILICIC FR. T114-1	12/12/85	77.71	12.67	0.74	0.04	0.08	0.49	0.07	3.04	5.15	99.99	0.7686
40	1989 WL-3-22 (85.15m) T165-2	5/22/88	77.93	12.32	0.60	0.05	0.06	0.43	0.11	3.77	4.71	100.01	0.7682
41	1865 FLV-36-W T147-10	9/30/87	77.47	12.83	0.58	0.05	0.09	0.46	0.11	3.66	4.76	99.98	0.7680
42	1827 FLV-2-CS T145-5	8/24/87	77.61	12.81	0.72	0.05	0.09	0.47	0.06	3.73	4.47	100.01	0.7678
43	128 GV-78-22, T16-1		77.07	12.94	0.67	0.05	0.06	0.48	0.10	3.22	5.41	100.00	0.7672
44	273 PICO-39A(1), T8-6	5/29/85	77.32	12.99	0.75	0.04	0.05	0.46	0.05	3.90	4.44	100.00	0.7671
45	1252 TLN-4 T96-11		77.26	12.83	0.58	0.04	0.08	0.45	0.08	3.95	4.74	100.01	0.7669
46	452 81B051, T35-5	3/1/85	76.52	12.77	0.74	0.04	0.02	0.46	0.07	3.67	4.72	99.01	0.7667
47	1174 ALT-4 t89-1		77.64	12.84	0.64	0.08	0.05	0.50	0.10	3.86	4.28	99.99	0.7666
48	1497 AMAR-1 T80-1	9/30/84	76.72	12.93	0.77	0.06	0.07	0.49	0.08	2.80	6.08	100.00	0.7666
49	1882 FLV-38-W T147-12	7/30/87	79.16	12.71	0.54	0.05	0.08	0.42	0.10	2.15	4.79	100.00	0.7661
50	2150 JT-DV458B-1 T177-3	12/5/88	78.19	12.38	0.75	0.04	0.04	0.44	0.07	3.17	4.93	100.01	0.7658

Listing of 50 closest matches for COMP. NO. 1099 for elements: Na, Mg, Al, Si, K, Ca Date of Update: 2/12/90													
C.No	Sample Number	Date	SiO2	Al2O3	Fe2O3	MgO	MnO	CaO	TiO2	Na2O	K2O	Total, R	Sim. Co
1	1899 E67-13 1640 T151-2	11/10/87	75.86	16.37	0.23	0.69	0.02	0.46	0.00	2.78	3.59	100.00	1.0000
2	1900 E67-113 1640 (2) T151-2	11/10/87	76.81	15.88	0.30	0.59	0.01	0.48	0.01	2.41	3.52	100.01	0.9364
3	1903 E67-113 1564 T151-3	11/10/87	75.20	16.70	0.21	0.71	0.01	0.47	0.00	2.04	4.66	100.00	0.9044
4	1902 E67-113 1856 T151-11	11/10/87	77.21	15.64	0.23	0.49	0.00	0.51	0.00	2.49	3.43	100.00	0.9002
5	1901 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	0.8943
6	2371 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	0.8943
7	1898 E67-113 1543 T151-1	11/10/87	74.47	17.18	0.10	0.85	0.01	0.28	0.03	2.46	4.64	100.02	0.8356
8	673 TULELAKE-715 (wh pum), T59-A1	xx/xx/xx	70.87	15.50	2.67	0.68	0.06	1.99	0.42	4.14	3.68	100.01	0.7908
9	653 GROUND, T66-1	10/25/83	69.98	15.75	2.74	0.77	0.05	2.82	0.52	3.82	3.54	99.99	0.7763
10	68 DSDP-1, T9-3, low total	xx/xx/xx	75.79	14.88	0.11	0.49	0.01	0.96	0.01	2.43	5.32	100.00	0.7744
11	654 FVH(1), T55-3 (not orig oxide)	8/25/87	71.59	15.64	2.90	0.71	0.07	2.45	0.44	3.45	2.75	100.00	0.7718
12	1842 FLV-17-WW T146-5	xx/xx/xx	71.88	15.85	2.30	0.60	0.05	2.15	0.29	3.72	3.15	99.99	0.7707
13	1428 ASW-6985-3 T103-3	08/26/85	70.60	15.08	2.68	0.69	0.07	2.17	0.42	4.38	3.91	100.00	0.7695
14	671 TULELAKE-715 (tan pum), T59-A2	xx/xx/xx	70.79	15.00	2.65	0.66	0.08	1.98	0.44	4.79	3.62	100.01	0.7684
15	674 TULELAKE-715 (int pum), T59-A3	xx/xx/xx	70.65	15.15	2.89	0.65	0.07	1.97	0.46	4.69	3.68	100.01	0.7668
16	638 TULELAKE-712, T67-3	11/18/83	70.65	15.19	2.70	0.64	0.07	1.97	0.45	4.64	3.69	100.00	0.7654
17	1740 BRICE-2 T-136-7	4/22/87	77.25	13.45	1.26	0.15	0.08	0.56	0.21	3.59	3.47	100.02	0.7639
18	1124 T-693 T83-12	10/12/84	71.02	14.62	2.67	0.67	0.06	2.00	0.45	4.83	3.68	100.00	0.7636
19	639 TULELAKE-712(200-325), T67-4	11/18/83	70.25	15.31	2.82	0.77	0.06	2.20	0.46	4.53	3.60	100.00	0.7629
20	1154 15-IV-84-9A T86-8	12/4/84	71.75	14.69	2.57	0.63	0.06	2.17	0.46	4.26	3.41	100.00	0.7618
21	668 CAPIS-1, T54-1	xx/xx/xx	78.43	12.27	1.29	0.08	0.04	0.48	0.18	3.05	4.17	99.99	0.7606
22	1676 RUSH CR-1 T133-2	10/21/86	71.66	14.65	2.76	0.62	0.08	1.71	0.64	4.57	3.31	100.00	0.7562
23	2376 FLV-148-CS T201-4	10/12/89	77.47	13.76	0.43	0.11	0.00	0.51	0.05	3.51	4.17	100.01	0.7557
24	1366 B7-1/2-TM1-22 T104-2	8/26/85	72.51	13.42	3.12	0.59	0.03	1.96	0.71	3.67	4.00	100.01	0.7534
25	436 4-252A, T40-7	xx/xx/xx	76.02	14.41	0.69	0.13	0.08	0.53	0.05	4.19	3.90	100.00	0.7531
26	218 MILVILLE-5, T28-3	xx/xx/xx	75.91	14.43	0.65	0.13	0.11	0.53	0.05	4.25	3.94	100.00	0.7504
27	869 LM-25	xx/xx/xx	73.87	15.54	2.03	0.36	0.07	1.73	0.28	3.01	3.11	100.00	0.7501
28	17 BF-4, T28-7	xx/xx/xx	76.05	14.34	0.65	0.13	0.08	0.52	0.04	4.04	4.15	100.00	0.7499
29	1125 T-704 T83-13	10/12/84	70.51	14.66	2.78	0.76	0.08	2.18	0.49	4.92	3.63	100.01	0.7497
30	2374 PU-17 T201-2	10/12/89	77.09	13.55	1.31	0.19	0.04	0.84	0.25	3.20	3.53	100.00	0.7478
31	239 OAK RUN-2, T27-6	xx/xx/xx	76.04	14.25	0.64	0.13	0.09	0.54	0.06	4.43	3.82	100.00	0.7460
32	1095 61384-24 ASW T81-12	9/4/84	70.95	14.70	3.20	0.56	0.10	1.82	0.55	3.94	4.16	99.98	0.7444
33	1316 ASW-6985-4C T103-6	8/26/85	69.82	15.16	3.25	0.68	0.10	1.92	0.63	5.30	3.12	99.98	0.7442
34	1314 ASW-6985-1 T103-1	8/26/85	69.68	15.16	3.27	0.71	0.10	1.98	0.67	5.25	3.18	100.00	0.7440
35	1426 ASW-6985-1 T103-1 Bel	08/26/85	69.68	15.16	3.27	0.71	0.10	1.98	0.67	5.25	3.18	100.00	0.7440
36	890 CB-25	xx/xx/xx	77.97	11.42	1.78	0.13	0.03	0.44	0.51	3.71	4.01	100.00	0.7433
37	488 758-354H, T16-15, low total	xx/xx/xx	76.93	14.04	1.46	0.03	0.01	0.52	0.10	3.62	3.29	100.00	0.7427
38	1427 ASW-6985-2 T103-2 Bel	08/26/85	71.17	15.46	2.49	0.53	0.07	1.69	0.42	4.77	3.40	100.00	0.7421
39	1454 RABEK Y8 T115-6	01/27/86	78.73	12.90	0.57	0.09	0.07	0.63	0.08	2.97	3.97	100.01	0.7421
40	1470 RABEK Y8 T115-6 CORR K	1/27/86	78.72	12.90	0.57	0.09	0.07	0.63	0.08	2.97	3.97	100.01	0.7421
41	2229 FLV-76-WW T185-2	2/28/89	77.93	12.16	0.86	0.11	0.02	0.46	0.18	3.20	5.09	100.01	0.7417
42	1011 TULE LAKE 715 (682) T74-8	5/30/84	71.49	14.92	2.41	0.55	0.05	1.64	0.41	4.60	3.93	100.00	0.7416
43	337 SALTON-2, T2-14	xx/xx/xx	77.55	12.98	0.76	0.04	0.05	0.46	0.07	4.48	3.60	99.99	0.7411
44	824 GS-70	xx/xx/xx	70.64	14.97	3.36	0.83	0.05	2.40	0.81	3.52	2.81	99.99	0.7402
45	96 DSDP-173-1-4(1), T42-5	xx/xx/xx	70.75	14.72	3.13	0.67	0.06	2.14	0.72	4.78	3.01	99.98	0.7396
46	7 ASH CREEK-1, T28-1	xx/xx/xx	75.93	14.35	0.63	0.12	0.10	0.54	0.05	3.98	4.30	100.00	0.7391
47	1026 KRL-71082N-3 (591) T58-2	6/22/84	67.94	16.62	2.48	0.77	0.00	2.90	0.48	4.99	3.81	99.99	0.7391
48	2199 FLV-115-WW T182-6	1/24/89	77.09	12.37	1.27	0.08	0.01	0.47	0.19	2.89	5.63	100.00	0.7390
49	95 DSDP-173-1-3(2), T42-1	xx/xx/xx	70.43	15.03	3.14	0.68	0.08	2.25	0.66	4.80	2.93	100.00	0.7386
50	1315 ASW-6985-4B T103-5	8/26/85	69.83	15.17	3.27	0.66	0.10	1.88	0.66	5.33	3.09	99.99	0.7385

IV. Listing of 50 closest matches for COMP. NO. 1900 for elements: Na, Al, Si, Ca Date of Update: 2/12/90										K20 Total, R Sim. Co			
C.No	Sample Number	Date	SiO2	Al2O3	Fe2O3	MgO	MnO	CaO	TiO2	Na2O			
1	1900 E67-113 1640 (2) T151-2	11/10/87	76.81	15.88	0.30	0.59	0.01	0.48	0.01	2.41	3.52	100.01	1.0000
2	1902 E67-113 1856 T151-11	11/10/87	77.21	15.64	0.23	0.49	0.00	0.51	0.00	2.49	3.43	100.00	0.9722
3	1899 E67-113 1640 T151-2	11/10/87	75.86	16.37	0.23	0.69	0.02	0.46	0.00	2.78	3.59	100.00	0.9457
4	1461 EABY 37 T115-2	1/27/86	77.50	13.01	1.32	0.07	0.04	0.49	0.12	2.37	5.08	100.00	0.9433
5	1903 E67-113 1564 T151-3	11/10/87	75.20	16.70	0.21	0.71	0.01	0.47	0.00	2.04	4.66	100.00	0.9389
6	131 GV-78-8, T16-4		76.22	13.26	0.85	0.03	0.00	0.48	0.09	2.70	6.37	100.00	0.9300
7	115 GV-78-8, T16-12		78.03	12.88	0.46	0.03	0.03	0.45	0.11	2.48	5.53	100.00	0.9262
8	1450 126-1254 T115-12	1/28/85	77.26	12.70	0.91	0.08	0.08	0.48	0.14	2.67	5.68	100.00	0.9241
9	1344 BE-15-A1 T106-6	8/29/85	77.12	12.52	0.82	0.06	0.07	0.48	0.14	2.68	6.11	100.00	0.9209
10	1451 126-1265 T115-13	1/28/86	77.58	12.59	0.89	0.07	0.08	0.44	0.12	2.36	5.87	100.00	0.9197
11	2276 T191-6 FLV-77-HT	5/10/89	76.97	12.56	0.73	0.05	0.04	0.46	0.11	2.64	6.44	100.00	0.9150
12	2367 PR-77 T197-5	9/14/89	76.95	12.59	0.87	0.04	0.07	0.47	0.09	2.71	6.20	99.99	0.9149
13	1497 AMAR-1 T80-1	7/20/84	76.72	12.93	0.77	0.06	0.07	0.49	0.08	2.80	6.08	100.00	0.9133
14	2356 FLV-110-WW T196-4	8/7/89	77.16	12.22	1.28	0.08	0.03	0.48	0.18	2.74	5.84	100.01	0.9111
15	1927 86LP39, T157-1	03/14/88	76.57	12.90	0.57	0.04	0.08	0.56	0.07	2.47	6.75	100.01	0.9105
16	2141 HPDA-11.06 A 2 sh		76.10	12.95	1.15	0.05	0.03	0.47	0.13	2.87	6.24	99.99	0.9063
17	2120 N-6 T175-10	10/28/88	77.13	13.06	0.92	0.05	0.07	0.52	0.09	2.76	5.39	99.99	0.9036
18	1921 86LP-38 T154-7	2/24/88	77.15	12.70	0.58	0.05	0.08	0.42	0.09	2.59	6.33	99.99	0.9002
19	2073 CCP-C T172-2	9/28/88	77.06	12.19	1.53	0.05	0.02	0.50	0.14	2.09	6.42	100.00	0.8979
20	2199 FLV-115-WW T182-6	1/24/89	77.09	12.37	1.27	0.08	0.01	0.47	0.19	2.89	5.63	100.00	0.8971
21	2230 FLV-111-WW T185-3	2/28/89	76.95	12.50	0.82	0.02	0.08	0.46	0.06	2.87	6.23	99.99	0.8958
22	130 GV-78-27, T16-3		76.55	13.38	1.26	0.04	0.00	0.56	0.11	2.72	5.38	100.00	0.8956
23	2197 FLV-111B-WW T182-4	1/24/89	76.75	12.95	0.80	0.02	0.02	0.47	0.07	3.06	5.85	99.99	0.8954
24	1452 126-1303 T115-14	1/28/86	77.67	12.53	0.89	0.04	0.08	0.39	0.11	2.44	5.84	99.99	0.8945
25	851 LM-4		76.91	12.63	1.19	0.02	0.03	0.49	0.21	3.01	5.62	100.00	0.8936
26	2200 FLV-116-WW T182-7	1/24/89	76.89	12.40	1.31	0.09	0.02	0.49	0.21	2.96	5.63	100.00	0.8934
27	751 HC-11		77.33	12.22	1.32	0.09	0.04	0.49	0.20	2.90	5.41	100.00	0.8934
28	114 GV-76-6, T16-11		77.28	12.92	0.73	0.05	0.10	0.44	0.11	2.86	5.50	99.99	0.8917
29	856 LM-10		76.85	12.61	0.97	0.05	0.05	0.51	0.15	2.90	5.90	99.99	0.8914
30	1850 FLV-29-WW T146-13	8/25/87	76.85	12.65	0.55	0.06	0.08	0.41	0.06	2.20	7.13	99.99	0.8908
31	1840 FLV-16-WW T146-4	8/25/87	77.22	12.84	0.75	0.07	0.05	0.49	0.10	3.09	5.39	100.00	0.8907
32	2204 M86TH-106 T183-3	1/25/89	76.64	11.96	1.79	0.07	0.02	0.56	0.25	2.30	6.39	99.98	0.8906
33	128 GV-78-22, T16-1		77.07	12.94	0.67	0.05	0.06	0.48	0.10	3.22	5.41	100.00	0.8900
34	2231 FLV-112-WW LIGHT T185-4	2/28/89	76.98	12.66	0.80	0.03	0.07	0.46	0.06	2.99	5.96	100.01	0.8898
35	1442 03068506A SILICIC FR. T114-1	12/12/85	77.71	12.67	0.74	0.04	0.08	0.49	0.07	3.04	5.15	99.99	0.8897
36	1889 JT-NOVA-1 T150-6	11/9/87	77.01	13.15	0.75	0.04	0.08	0.48	0.05	3.31	5.14	100.01	0.8894
37	2232 FLV-112-WW DARK T185-5	2/28/89	77.20	12.47	0.81	0.04	0.04	0.49	0.08	3.04	5.82	99.99	0.8891
38	235 MV-1, T39-2		76.39	13.20	0.99	0.05	0.06	0.50	0.05	3.15	5.60	99.99	0.8877
39	875 LM-41		76.58	13.01	0.70	0.05	0.06	0.49	0.09	3.20	5.81	99.99	0.8872
40	2139 FL86C-5.41 B 1 sh		77.20	12.21	1.16	0.06	0.06	0.38	0.08	2.59	6.45	99.99	0.8868
41	1863 FLV-34-WW T147-8	9/30/87	76.85	12.93	0.62	0.08	0.06	0.62	0.10	2.52	100.00	0.8861	
42	668 CAPIS-1, T54-1	xx/xx/xx	78.43	12.27	1.29	0.08	0.04	0.48	0.18	3.05	4.17	99.99	0.8855
43	2192 RFIP-1 (HIFE) AV24SHARDS T179-	12/21/88	77.08	12.15	1.46	0.03	0.04	0.48	0.14	3.09	5.53	100.00	0.8854
44	134 GV-78-34A, T16-7		77.10	12.88	0.92	0.04	0.05	0.51	0.08	3.04	5.38	100.00	0.8853
45	2352 FLV-75-FC T196-6	8/7/89	77.35	12.69	0.84	0.05	0.03	0.50	0.08	3.06	5.40	100.00	0.8849
46	1882 FLV-38-WW T147-12	9/30/87	79.16	12.71	0.54	0.05	0.08	0.42	0.10	2.15	4.79	100.00	0.8845
47	392 TECO-306, T17-14		76.75	12.66	1.72	0.03	0.03	0.55	0.13	2.78	5.36	100.01	0.8840
48	1907 OT-2 T149-5	11/11/87	78.22	12.23	0.58	0.05	0.08	0.39	0.08	2.33	6.05	100.01	0.8829
49	2117 RFIP-1 (-100+200) T175-6	10/28/88	76.68	12.44	1.55	0.06	0.04	0.49	0.15	3.14	5.46	100.01	0.8822
50	1186 VW-CIMA (2) T89-14	2/28/85	76.59	11.91	1.88	0.06	0.04	0.54	0.17	2.70	6.12	100.01	0.8822

Listing of 50 closest matches for COMP. NO. 1900 for elements: Na, Al, Si, K, Ca														
C.No	Sample Number	Date	SiO2	Al2O3	Fe2O3	MgO	MnO	CaO	TiO2	Na2O	K2O	Total	R	Sim. Co
1	1900 E67-113 1640 (2) T151-2	11/10/87	76.81	15.88	0.30	0.59	0.01	0.48	0.01	2.41	3.52	100.01	1.0000	
2	1902 E67-113 1856 T151-11	11/10/87	77.21	15.64	0.23	0.49	0.00	0.51	0.00	2.49	3.43	100.00	0.9726	
3	1899 E67-113 1640 T151-2	11/10/87	75.86	16.37	0.23	0.69	0.02	0.46	0.00	2.78	3.59	100.00	0.9527	
4	1903 E67-113 1564 T151-3	11/10/87	75.20	16.70	0.21	0.71	0.01	0.47	0.00	2.04	4.66	100.00	0.9022	
5	1461 FAY 37 T115-2	1/27/86	77.50	13.01	1.32	0.07	0.04	0.49	0.12	2.37	5.08	100.00	0.8933	
6	1901 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	0.8817	
7	2371 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	0.8817	
8	488 758-354H, T16-15, low total		76.93	14.04	1.46	0.03	0.01	0.52	0.10	3.62	3.29	100.00	0.8812	
9	668 CAPIS-1, T54-1	xx/xx/xx	78.43	12.27	1.29	0.08	0.04	0.48	0.18	3.05	4.17	99.99	0.8773	
10	1740 BRICE-2, T-136-7	4/22/87	77.25	13.45	1.26	0.15	0.08	0.56	0.21	3.59	3.47	100.02	0.8711	
11	115 GV-76-8, T16-12		78.03	12.88	0.46	0.03	0.03	0.45	0.11	2.48	5.53	100.00	0.8683	
12	1936 NH-5 T155-8	5/15/88	77.56	13.10	0.75	0.04	0.09	0.47	0.08	4.40	3.51	100.00	0.8679	
13	2376 FLV-148-CS T201-4	10/12/89	77.47	13.76	0.43	0.11	0.00	0.51	0.05	3.51	4.17	100.01	0.8660	
14	1450 126-1254 t115-12	1/28/85	77.26	12.70	0.91	0.08	0.08	0.48	0.14	2.67	5.68	100.00	0.8633	
15	336 SALTON-1, T20-3		77.94	12.65	0.76	0.02	0.03	0.48	0.05	4.47	3.61	100.01	0.8593	
16	209 LOCK-4, T41-3		77.42	13.05	0.88	0.05	0.04	0.50	0.10	4.52	3.45	100.01	0.8574	
17	1844 FLV-19-WW T146-7	8/25/87	77.31	13.24	0.72	0.04	0.08	0.48	0.06	3.76	4.31	100.00	0.8570	
18	637 TULELAKE-542, T61-12(2)	08/26/83	77.31	13.35	0.87	0.09	0.05	0.55	0.08	4.17	3.53	100.00	0.8564	
19	337 SALTON-2, T2-14		77.55	12.98	0.76	0.04	0.05	0.46	0.07	4.48	3.60	99.99	0.8564	
20	436 4-252A, T40-7		76.02	14.41	0.69	0.13	0.08	0.53	0.05	4.19	3.90	100.00	0.8561	
21	277 PICO-43, T36-3		76.85	12.90	0.73	0.03	0.03	0.47	0.05	3.93	4.02	99.01	0.8560	
22	1451 126-1265 t115-13	1/28/86	77.58	12.59	0.89	0.07	0.08	0.44	0.12	2.36	5.87	100.00	0.8557	
23	338 SALTON-2A, T20-4	9/30/87	77.84	12.72	0.69	0.03	0.01	0.48	0.07	4.41	3.75	100.00	0.8546	
24	1882 FLV-38-WW T147-12		79.16	12.71	0.54	0.05	0.08	0.42	0.10	2.15	4.79	100.00	0.8545	
25	131 GV-78-29, T16-4		76.22	13.26	0.85	0.03	0.00	0.48	0.09	2.70	6.37	100.00	0.8545	
26	211 LOUIS-19, T35-8		75.84	13.05	2.12	0.09	0.02	0.66	0.27	2.63	4.32	99.00	0.8535	
27	2120 N-6 T175-10	10/28/88	77.13	13.06	0.92	0.05	0.07	0.52	0.09	2.76	5.39	99.99	0.8535	
28	218 HILLVILLE-5, T28-3		75.91	14.43	0.65	0.13	0.11	0.53	0.05	4.25	3.94	100.00	0.8526	
29	17 BF-4, T28-7		76.05	14.34	0.65	0.13	0.08	0.52	0.04	4.04	4.15	100.00	0.8522	
30	1344 BE-15-A1 T106-6	8/29/85	77.12	12.52	0.82	0.06	0.07	0.48	0.14	2.68	6.11	100.00	0.8520	
31	1538 PICO 82 T124-9	5/5/86	79.30	13.14	0.67	0.06	0.04	0.71	0.08	2.78	3.22	100.00	0.8508	
32	275 PICO-40A, T8-7		77.94	12.89	0.81	0.04	0.03	0.45	0.05	3.82	3.97	100.00	0.8505	
33	1454 RABEK Y8 T115-6	01/27/86	78.73	12.90	0.57	0.09	0.07	0.63	0.08	2.97	3.97	100.01	0.8496	
34	2356 FLV-110-WW T196-4	8/7/89	77.16	12.22	1.28	0.08	0.03	0.48	0.18	2.74	5.84	100.01	0.8495	
35	1470 RABEK Y8 T115-6 CORR K	1/27/86	78.72	12.90	0.57	0.09	0.07	0.63	0.08	2.97	3.98	100.01	0.8492	
36	2140 FL96C-5.41 C 2 sh		78.26	12.59	1.01	0.08	0.07	0.55	0.04	3.70	3.72	100.02	0.8489	
37	208 LOCK-3, T41-2		77.38	13.02	0.83	0.06	0.05	0.52	0.12	4.57	3.45	100.00	0.8486	
38	1442 03068506A SILICIC FR. T114-1	12/12/85	77.71	12.67	0.74	0.04	0.08	0.49	0.07	3.04	5.15	99.99	0.8484	
39	239 OAK RUN-2, T27-6		76.04	14.25	0.64	0.13	0.09	0.54	0.06	4.43	3.82	100.00	0.8483	
40	1889 JT-NOVA-1 T150-6	11/9/87	77.01	13.15	0.75	0.04	0.08	0.48	0.05	3.31	5.14	100.01	0.8477	
41	254 P-100, T22-4		77.78	12.86	0.75	0.03	0.05	0.45	0.06	4.27	3.75	100.00	0.8476	
42	130 GV-78-27, T16-3		76.55	13.38	1.26	0.04	0.00	0.56	0.11	2.72	5.38	100.00	0.8473	
43	1542 CHV-3 T124-13	5/5/86	77.65	12.33	1.58	0.03	0.03	0.53	0.13	4.12	3.60	100.00	0.8468	
44	1497 AMAR-1 T80-1	7/20/84	76.72	12.93	0.77	0.06	0.07	0.49	0.08	2.80	6.08	100.00	0.8465	
45	19 BHA-511, T18-8		77.38	12.94	0.74	0.04	0.02	0.48	0.03	4.23	4.12	99.98	0.8463	
46	2367 PR-77 T197-5	9/14/89	76.95	12.59	0.87	0.04	0.07	0.47	0.09	2.71	6.20	99.99	0.8454	
47	1890 JT-NOVA-1600 T150-7	11/9/87	77.18	12.98	0.81	0.04	0.08	0.48	0.06	3.42	4.96	100.01	0.8454	
48	207 LOCK-2, T-41-1		77.79	12.94	0.85	0.05	0.05	0.51	0.08	4.42	3.30	99.99	0.8452	
49	751 HC-11		77.33	12.22	1.32	0.09	0.04	0.49	0.20	2.90	5.41	100.00	0.8448	
50	339 SALTON-5, T2-10		77.38	12.82	0.76	0.04	0.05	0.47	0.05	4.58	3.84	99.99	0.8444	

Listing of 50 closest matches for COMP. NO. 1900 for elements: Na, Mg, Al, Si, K, Ca Date of Update: 2/12/90													
C.No	Sample Number	Date	SiO2	Al2O3	Fe2O3	MgO	MnO	CaO	TiO2	Na2O	K2O	Total, R	Sim. Co
1	1900 E67-113 1640 (2) T151-2	11/10/87	76.81	15.88	0.30	0.59	0.01	0.48	0.01	2.41	3.52	100.01	1.0000
2	1902 E67-113 1856 T151-11	11/10/87	77.21	15.64	0.23	0.49	0.00	0.51	0.00	2.49	3.43	100.00	0.9489
3	1899 E67-113 1640 T151-2	11/10/87	75.86	16.37	0.23	0.69	0.02	0.46	0.00	2.78	3.59	100.00	0.9364
4	1901 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	0.8958
5	2371 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	0.8958
6	1903 E67-113 1564 T151-3	11/10/87	75.20	16.70	0.21	0.71	0.01	0.47	0.00	2.04	4.66	100.00	0.8903
7	1898 E67-113 1543 T151-1	11/10/87	74.47	17.18	0.10	0.85	0.01	0.28	0.03	2.46	4.64	100.02	0.8183
8	68 DSDP-1, T9-3, low total		75.79	14.88	0.11	0.49	0.01	0.96	0.01	2.43	5.32	100.00	0.8179
9	1842 FLV-17-WW T146-5	8/25/87	71.88	15.85	2.30	0.60	0.05	2.15	0.29	3.72	3.15	99.99	0.7805
10	1740 BRICE-2 T-136-7	4/22/87	77.25	13.45	1.26	0.15	0.08	0.56	0.21	3.59	3.47	100.02	0.7683
11	1461 FABY 37 T115-2	1/27/86	77.50	13.01	1.32	0.07	0.04	0.49	0.12	2.37	5.08	100.00	0.7642
12	1366 B7-1/2-TM1-22 T104-2	8/26/85	72.51	13.42	3.12	0.59	0.03	1.96	0.71	3.67	4.00	100.01	0.7618
13	1676 RUSH CR-1 T133-2	10/21/86	71.66	14.65	2.76	0.62	0.08	1.71	0.64	4.57	3.31	100.00	0.7593
14	1427 ASW-6985-2 T103-2 8e1	08/26/85	71.17	15.46	2.49	0.53	0.07	1.69	0.42	4.77	3.40	100.00	0.7589
15	1154 15-IV-84-9A T86-8	12/4/84	71.75	14.69	2.57	0.63	0.06	2.17	0.46	4.26	3.41	100.00	0.7586
16	673 TULELAKE-715 (wh pum), T59-A1	xx/xx/xx	70.87	15.50	2.67	0.68	0.06	1.99	0.42	4.14	3.68	100.01	0.7577
17	668 CAPIS-1, T54-1	xx/xx/xx	78.43	12.27	1.29	0.08	0.04	0.48	0.18	3.05	4.17	99.99	0.7536
18	1095 61384-24 ASW T81-12	9/4/84	70.95	14.70	3.20	0.56	0.10	1.82	0.55	3.94	4.16	99.98	0.7534
19	1152 11-IV-84-0 T86-6	12/4/84	71.71	14.91	2.26	0.51	0.09	1.50	0.50	5.05	3.46	99.99	0.7529
20	2376 FLV-148-CS T201-4	10/12/89	77.47	13.76	0.43	0.11	0.00	0.51	0.05	3.51	4.17	100.01	0.7527
21	638 TULELAKE-712, T67-3	11/18/83	70.65	15.19	2.70	0.64	0.07	1.97	0.45	4.64	3.69	100.00	0.7525
22	1011 TULE LAKE 715 (682) T74-8	5/30/84	71.49	14.92	2.41	0.55	0.05	1.64	0.41	4.60	3.93	100.00	0.7525
23	869 LM-25		73.87	15.54	2.03	0.36	0.07	1.73	0.28	3.01	3.11	100.00	0.7520
24	436 4-252A, T40-7		76.02	14.41	0.69	0.13	0.08	0.53	0.05	4.19	3.90	100.00	0.7501
25	674 TULELAKE-715 (int pum), T59-A3	xx/xx/xx	70.65	15.15	2.69	0.65	0.07	1.97	0.46	4.69	3.68	100.01	0.7493
26	2374 PU-17 T201-2	10/12/89	77.09	13.55	1.31	0.19	0.04	0.84	0.25	3.20	3.53	100.00	0.7489
27	218 MILLVILLE-5, T28-3		75.91	14.43	0.65	0.13	0.11	0.53	0.05	4.25	3.94	100.00	0.7472
28	17 BF-4, T28-7		76.05	14.34	0.65	0.13	0.08	0.52	0.04	4.04	4.15	100.00	0.7469
29	2354 FLV-108-WW T196-2	8/7/89	72.25	14.56	2.54	0.54	0.07	1.68	0.53	4.66	3.18	100.01	0.7465
30	671 TULELAKE-715 (tan pum), T59-A2	xx/xx/xx	70.79	15.00	2.65	0.66	0.08	1.98	0.44	4.79	3.62	100.01	0.7463
31	653 GRODRA, T66-1	10/25/83	69.98	15.75	2.74	0.77	0.05	2.82	0.52	3.82	3.54	99.99	0.7441
32	239 OAK RUN-2, T27-6		76.04	14.25	0.64	0.13	0.09	0.54	0.06	4.43	3.82	100.00	0.7437
33	488 758-354H, T16-15, low total		76.93	14.04	1.46	0.03	0.01	0.52	0.10	3.62	3.29	100.00	0.7428
34	2262 T189-1 912-M	5/9/89	72.22	14.03	2.75	0.54	0.03	1.64	0.54	3.79	4.46	100.00	0.7428
35	889 CB-19		74.92	13.02	2.25	0.41	0.03	1.26	0.49	4.11	3.51	100.00	0.7424
36	1450 126-1254 t115-12	1/28/85	77.26	12.70	0.91	0.08	0.08	0.48	0.14	2.67	5.68	100.00	0.7420
37	1969 WL-4-32 (82.88M) T163-12	5/15/88	68.73	16.19	2.77	0.60	0.10	1.72	0.53	5.15	4.20	99.99	0.7407
38	637 TULELAKE-542, T61-12(2)	08/26/83	77.31	13.35	0.87	0.09	0.05	0.55	0.08	4.17	3.53	100.00	0.7391
39	1968 WL-4-31 (81.15M) T163-11	5/15/88	68.68	16.37	2.78	0.57	0.10	1.62	0.52	5.11	4.26	100.01	0.7374
40	654 57M(1), T55-3 (not orig oxide)	xx/xx/xx	71.59	15.64	2.90	0.71	0.07	2.45	0.44	3.45	2.75	100.00	0.7373
41	1124 T-693 T83-12	10/12/84	71.02	14.62	2.67	0.67	0.06	2.00	0.45	4.83	3.68	100.00	0.7369
42	1289 Tulelake 2382 T100-1	07/02/85	72.17	14.51	2.63	0.49	0.05	1.73	0.47	4.64	3.31	100.00	0.7368
43	211 LOUIS-19, T35-8		75.84	13.05	2.12	0.09	0.02	0.66	0.27	2.63	4.32	99.00	0.7367
44	955 DR-68M		72.31	15.24	2.48	0.57	0.06	1.94	0.47	4.31	2.61	99.99	0.7359
45	7 ASH CREEK-1, T28-1	5/15/88	75.93	14.35	0.63	0.12	0.10	0.54	0.05	3.98	4.30	100.00	0.7348
46	1936 NH-5 T155-8		77.56	13.10	0.75	0.04	0.09	0.47	0.08	4.40	3.51	100.00	0.7345
47	882 CB-8		72.63	14.47	2.41	0.51	0.05	1.80	0.49	4.52	3.11	99.99	0.7341
48	655 57M(2), T59-A4 (not org oxide)	xx/xx/xx	72.15	14.90	2.35	0.53	0.04	1.83	0.44	4.75	3.01	100.00	0.7335
49	1454 RABEK Y8 T115-6		78.73	12.90	0.57	0.09	0.07	0.63	0.08	2.97	3.97	100.01	0.7334
50	883 CB-9	01/27/86	72.30	14.54	2.46	0.52	0.05	1.80	0.50	4.71	3.11	99.99	0.7334

V. Listing of 50 closest matches for COMP. NO. 1902 for elements: Na, Al, Si, Ca										Date of Update: 2/12/90				K20 Total, R Sim. Cu			
C.No	Sample Number	Date	Si02	Al2O3	Fe2O3	MgO	MnO	CuO	TiO2	Na2O							
1	1902 E67-113 1856 T151-11	11/10/87	77.21	15.64	0.23	0.49	0.00	0.51	0.00	2.49	3.43	100.00	1.0000				
2	1900 E67-113 1640 (2) T151-2	11/10/87	76.81	15.88	0.30	0.59	0.01	0.48	0.01	2.41	3.52	100.01	0.9722				
3	1461 FABY 37 T115-2	1/27/86	77.50	13.01	1.32	0.07	0.04	0.49	0.12	2.37	5.08	100.00	0.9352				
4	1899 E67-13 1640 T151-2	11/10/87	75.86	16.37	0.23	0.69	0.02	0.46	0.00	2.78	3.59	100.00	0.9339				
5	1927 86LP39, T157-1	03/14/88	76.57	12.90	0.57	0.04	0.08	0.56	0.07	2.47	6.75	100.01	0.9298				
6	2120 N-6 T175-10	10/28/88	77.13	13.06	0.92	0.05	0.07	0.52	0.09	2.76	5.39	99.99	0.9292				
7	131 GV-78-29, T16-4		76.22	13.26	0.85	0.03	0.00	0.48	0.09	2.70	6.37	100.00	0.9246				
8	115 GV-76-8, T16-12		78.03	12.88	0.46	0.03	0.03	0.45	0.11	2.48	5.53	100.00	0.9228				
9	1450 126-1254 T115-12	1/28/85	77.26	12.70	0.91	0.08	0.08	0.56	0.14	2.67	5.38	100.00	0.9183				
10	130 GV-78-27, T16-3	7/20/84	76.55	13.38	1.26	0.04	0.00	0.56	0.11	2.72	5.38	100.00	0.9183				
11	1497 AMAR-1 T80-1	8/29/85	77.12	12.93	0.77	0.06	0.07	0.49	0.08	2.80	6.08	100.00	0.9176				
12	1344 BE-15-A1 T106-6		76.85	12.61	0.97	0.05	0.05	0.51	0.15	2.68	6.11	100.00	0.9174				
13	856 LM-10		75.20	12.52	0.82	0.06	0.07	0.48	0.14	2.68	6.11	100.00	0.9174				
14	1903 E67-113 1564 T151-3	11/10/87	76.85	12.61	0.97	0.05	0.05	0.51	0.15	2.68	6.11	100.00	0.9174				
15	2276 T191-6 FLV-77-HT	5/10/89	76.97	12.56	0.73	0.05	0.04	0.47	0.00	2.64	4.66	100.00	0.9151				
16	2367 PR-77 T197-5	9/14/89	76.95	12.59	0.87	0.04	0.07	0.47	0.09	2.71	6.20	99.99	0.9113				
17	134 GV-78-34A, T16-7		77.10	12.88	0.92	0.04	0.07	0.47	0.09	2.71	6.20	99.99	0.9105				
18	1863 FLV-34-WW T147-8	9/30/87	76.85	12.93	0.62	0.08	0.06	0.52	0.08	3.04	5.38	100.00	0.9103				
19	2356 FLV-110-WW T196-4	8/7/89	77.16	12.22	1.28	0.08	0.03	0.48	0.18	2.74	5.84	100.01	0.9077				
20	392 TECO-30G, T17-14		76.75	12.66	1.72	0.03	0.03	0.55	0.13	2.78	5.36	100.01	0.9066				
21	120 GV-77-3, T15-11		77.13	12.78	0.91	0.06	0.07	0.52	0.08	3.01	5.44	100.00	0.9066				
22	1186 VW-C1MA (2) T89-14	2/28/85	76.59	11.91	1.88	0.06	0.04	0.54	0.08	3.07	5.18	99.99	0.9046				
23	127 GV-78-21, T15-15		77.16	12.94	0.92	0.06	0.06	0.52	0.08	3.07	5.18	99.99	0.9046				
24	852 LM-5		77.56	12.31	0.76	0.05	0.04	0.56	0.12	2.70	5.90	100.00	0.9039				
25	1451 126-1265 T115-13	1/28/86	77.58	12.59	0.89	0.07	0.08	0.44	0.12	2.70	5.90	100.00	0.9039				
26	1168 VW-C1MA-1 T87-13	12/24/84	76.79	11.87	1.84	0.06	0.04	0.55	0.19	2.69	5.98	100.01	0.9016				
27	235 MV-1, T39-2		76.39	13.20	0.99	0.05	0.06	0.50	0.05	3.15	5.60	99.99	0.9011				
28	2352 FLV-75-FC T196-6	8/7/89	77.35	12.69	0.84	0.05	0.03	0.50	0.08	3.06	5.40	100.00	0.9009				
29	2141 HPDA-11.06 A 2 mh		76.10	12.95	1.15	0.05	0.03	0.47	0.13	2.87	6.24	99.99	0.9007				
30	751 HC-11		77.33	12.22	1.32	0.09	0.04	0.49	0.20	2.90	5.41	100.00	0.8998				
31	2073 CCP-C T172-2	9/28/88	77.06	12.19	1.53	0.05	0.02	0.50	0.14	2.09	6.42	100.00	0.8998				
32	1921 86LP-38 T154-7	2/24/88	77.15	12.70	0.58	0.05	0.08	0.42	0.09	2.59	6.33	99.99	0.8990				
33	2372 083089-A T201-1	10/12/89	76.95	12.15	1.84	0.05	0.03	0.59	0.21	2.60	5.58	100.00	0.8989				
34	2204 M86TH-106 T183-3	1/25/89	76.64	11.96	1.79	0.07	0.02	0.56	0.25	2.30	6.39	99.98	0.8979				
35	851 LM-4		76.91	12.63	1.19	0.02	0.03	0.49	0.10	3.01	5.62	100.00	0.8979				
36	2200 FLV-116-WW T182-7	1/24/89	76.89	12.40	1.31	0.09	0.02	0.49	0.21	2.96	5.63	100.00	0.8977				
37	849 LM-2		77.99	12.51	0.74	0.06	0.03	0.56	0.10	2.80	5.21	100.00	0.8975				
38	2281 T190-5 FLV-121-WW	5/10/89	76.61	12.95	0.65	0.04	0.06	0.57	0.07	2.85	6.20	100.00	0.8972				
39	2373 08309-A (2) T201-1	10/13/89	77.05	12.20	1.84	0.05	0.03	0.62	0.19	2.46	5.55	99.99	0.8971				
40	1840 FLV-16-WW T146-4	8/25/87	77.22	12.84	0.75	0.07	0.05	0.49	0.10	3.09	5.39	100.00	0.8969				
41	2376 FLV-148-CS T201-4	10/12/89	77.47	13.76	0.43	0.11	0.00	0.51	0.05	3.51	4.17	100.01	0.8965				
42	1442 03068506A SILICIC FR. T114-1	12/12/85	77.71	12.67	0.74	0.04	0.08	0.49	0.07	3.04	5.15	99.99	0.8959				
43	2232 FLV-112-WW DARK T185-5	2/28/89	77.20	12.47	0.81	0.04	0.04	0.49	0.08	3.04	5.82	99.99	0.8943				
44	2236 FLV-118-WW DARK T186-1	2/28/89	77.07	12.70	0.81	0.04	0.04	0.50	0.10	3.17	5.57	100.00	0.8940				
45	1439 2011854 T114-8	12/12/85	76.98	12.35	1.51	0.02	0.05	0.51	0.11	3.16	5.31	100.00	0.8937				
46	2199 FLV-115-WW T182-6	1/24/89	77.09	12.37	1.27	0.08	0.01	0.47	0.19	2.89	5.63	100.00	0.8931				
47	1862 FLV-33-WW T147-7	9/30/87	76.87	12.95	0.64	0.07	0.07	0.62	0.12	2.69	5.96	99.99	0.8930				
48	2230 FLV-111-WW T185-3	2/28/89	76.95	12.50	0.82	0.02	0.08	0.46	0.06	2.87	6.23	99.99	0.8914				
49	1443 03068506B SILICIC FR. T114-12	12/12/85	77.56	12.63	0.71	0.05	0.07	0.51	0.10	3.27	5.09	99.99	0.8911				
50	1854 FLV-25-WW T147-1	9/30/87	77.60	12.45	0.61	0.07	0.07	0.56	0.10	2.89	5.66	100.01	0.8908				

Listing of 50 closest matches for COMP. NO. 1902 for elements: Na, Al, Si, K, Ca														Date of Update: 2/12/90			
C.No	Sample Number	Date	SiO2	Al2O3	Fe2O3	MgO	MnO	CaO	TiO2	Na2O	K2O	Total R	Sim. Co.				
1	1902 E67-113 1856 T151-11	11/10/87	77.21	15.64	0.23	0.49	0.00	0.51	0.00	2.49	3.43	100.00	1.0000				
2	1900 E67-113 1640 (2) T151-2	11/10/87	76.81	15.88	0.30	0.59	0.01	0.48	0.01	2.41	3.52	100.01	0.9726				
3	1899 E67-113 1640 T151-2	11/10/87	75.86	16.37	0.23	0.69	0.02	0.46	0.00	2.78	3.59	100.00	0.9382				
4	488 758-354H, T16-15, low total		76.93	14.04	1.46	0.03	0.01	0.52	0.10	3.62	3.29	100.00	0.9044				
5	1740 BRICE-2 T-136-7	4/22/87	77.25	13.45	1.26	0.15	0.08	0.56	0.21	3.59	3.47	100.02	0.8904				
6	1461 FAVY 37 T115-2	1/27/86	77.50	13.01	1.32	0.07	0.04	0.49	0.12	2.37	5.08	100.00	0.8832				
7	2376 FLV-148-CS T201-4	10/12/89	77.47	13.76	0.43	0.11	0.00	0.51	0.05	3.51	4.17	100.01	0.8817				
8	1903 E67-113 1564 T151-3	11/10/87	75.20	16.70	0.21	0.71	0.01	0.47	0.00	2.04	4.66	100.00	0.8775				
9	1901 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	0.8765				
10	2371 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	0.8765				
11	1538 PICO 82 T124-9	5/5/86	79.30	13.14	0.67	0.06	0.04	0.71	0.08	2.78	3.22	100.00	0.8733				
12	209 LOCK-4, T41-3		77.42	13.05	0.88	0.05	0.04	0.50	0.10	4.52	3.45	100.01	0.8714				
13	2120 N-6 T175-10	10/28/88	77.13	13.06	0.92	0.05	0.07	0.52	0.09	2.76	5.39	99.99	0.8707				
14	208 LOCK-3, T41-2		77.38	13.02	0.83	0.06	0.05	0.52	0.12	4.57	3.45	100.00	0.8700				
15	668 CAPIS-1, T54-1	xx/xx/xx	78.43	12.27	1.29	0.08	0.04	0.48	0.18	3.05	4.17	99.99	0.8698				
16	637 TULELAKE-542, T61-12(2)	08/26/83	77.31	13.35	0.87	0.09	0.05	0.55	0.08	4.17	3.53	100.00	0.8697				
17	207 LOCK-2, T-41-1		77.79	12.94	0.85	0.05	0.05	0.51	0.08	4.42	3.30	99.99	0.8691				
18	436 4-252A, T40-7		76.02	14.41	0.69	0.13	0.08	0.53	0.05	4.19	3.90	100.00	0.8684				
19	211 LOUIS-19, T35-8		75.84	13.05	2.12	0.09	0.02	0.66	0.27	2.63	4.32	99.00	0.8660				
20	17 BF-4, T28-7		76.05	14.34	0.65	0.13	0.08	0.52	0.04	4.04	4.15	100.00	0.8651				
21	218 MILLVILLE-5, T28-3		75.91	14.43	0.65	0.13	0.11	0.43	0.05	4.25	3.94	100.00	0.8649				
22	1454 RABEK Y8 T115-6	01/27/86	78.73	12.90	0.57	0.09	0.07	0.63	0.08	2.97	3.97	100.01	0.8635				
23	1470 RABEK Y8 T115-6 CORR K	1/27/86	78.72	12.90	0.57	0.09	0.07	0.63	0.08	2.97	3.98	100.01	0.8631				
24	2140 FL860-5.41 C 2 sh		78.26	12.59	1.01	0.08	0.07	0.55	0.04	3.70	3.72	100.02	0.8628				
25	115 GV-76-8, T16-12		78.03	12.88	0.46	0.03	0.03	0.45	0.11	2.48	5.53	100.00	0.8623				
26	130 GV-78-27, T16-3		76.55	13.38	1.26	0.04	0.00	0.56	0.11	2.72	5.38	100.00	0.8621				
27	1542 CHV-3 T124-13	5/5/86	77.65	12.33	1.58	0.03	0.03	0.53	0.13	4.12	3.60	100.00	0.8604				
28	239 OAK RUN-2, T27-6		76.04	14.25	0.64	0.13	0.09	0.54	0.06	4.43	3.82	100.00	0.8601				
29	1936 NH-5 T155-8	5/15/88	77.56	13.10	0.75	0.04	0.09	0.47	0.08	4.40	3.51	100.00	0.8596				
30	1450 126-1254 T115-12	1/28/85	77.26	12.70	0.91	0.08	0.08	0.48	0.14	2.67	5.68	100.00	0.8578				
31	1106 61384-34 ASW T82-7	10/11/84	78.09	12.58	0.73	0.08	0.05	0.51	0.10	3.70	4.17	100.01	0.8577				
32	598 SM-ASH-34, T56-7	07/01/83	77.08	13.59	0.54	0.10	0.06	0.54	0.08	3.95	4.07	100.01	0.8570				
33	127 GV-78-21, T15-15		77.16	12.94	0.92	0.06	0.06	0.52	0.08	3.07	5.18	99.99	0.8570				
34	134 GV-78-34A, T16-7		77.10	12.88	0.92	0.04	0.05	0.51	0.08	3.04	5.38	100.00	0.8557				
35	2131 CCPC-5.36 A 1sh	4/22/87	78.14	12.58	1.01	0.06	0.06	0.56	0.09	3.62	3.87	99.99	0.8555				
36	1739 BRICE-1 T-136-6		77.88	12.55	1.05	0.07	0.06	0.53	0.09	3.73	4.04	100.00	0.8545				
37	7 ASH CREEK-1, T28-1		75.93	14.35	0.63	0.12	0.10	0.54	0.05	3.98	4.30	100.00	0.8537				
38	1118 61484-47 ASW T83-6	10/12/84	77.53	12.96	0.83	0.10	0.05	0.57	0.08	4.38	3.50	100.00	0.8535				
39	392 TECO-30G, T17-14	6/1/89	76.75	12.66	1.72	0.03	0.03	0.55	0.13	2.78	5.36	100.01	0.8533				
40	2321 NAP-1L T193-2	08/17/83	78.32	12.39	0.73	0.10	0.05	0.53	0.09	3.20	4.59	100.00	0.8531				
41	636 TULELAKE-542, T61-12(1)		77.08	13.15	0.90	0.10	0.06	0.56	0.06	4.56	3.55	100.02	0.8524				
42	2147 SAFZ-5, T167-8, lo Ca 10sh		77.15	13.53	0.55	0.05	0.09	0.58	0.08	4.35	3.64	100.02	0.8517				
43	120 GV-77-3, T15-11		77.13	12.78	0.91	0.06	0.07	0.52	0.08	3.01	5.44	100.00	0.8509				
44	1442 03068506A SILICIC FR. T114-1	12/12/85	77.71	12.67	0.74	0.04	0.08	0.49	0.07	3.04	5.15	99.99	0.8499				
45	1145 15-VI-84-7 T85-7 1t col. fra	12/4/84	77.41	12.97	0.86	0.10	0.06	0.58	0.09	4.40	3.51	99.98	0.8498				
46	1165 ALT 3 T87-2	12/24/84	77.77	12.68	0.63	0.09	0.05	0.51	0.10	3.87	4.28	99.98	0.8497				
47	849 LM-2		77.99	12.51	0.74	0.06	0.03	0.56	0.10	2.80	5.21	100.00	0.8496				
48	336 SALTON-1, T20-3		77.94	12.65	0.76	0.02	0.03	0.48	0.05	4.47	3.61	100.01	0.8496				
49	1844 FLV-19-WW T146-7	8/25/87	77.31	13.24	0.72	0.04	0.08	0.48	0.06	3.76	4.31	100.00	0.8489				
50	625 TULELAKE-315, T63-7	09/02/83	77.88	12.39	1.20	0.02	0.04	0.53	0.07	3.76	4.11	100.00	0.8485				

Listing of 50 closest matches for COMP. NO. 1902 for elements: Na, Al, Si, K, Ca, Fe										Date of Update: 2/12/90			
C.No	Sample Number	Date	SiO2	Al2O3	Fe2O3	MgO	MnO	CaO	TiO2	Na2O	K2O	Total.R	Sim. Co
1	1902 E67-113 1856 T151-11	11/10/87	77.21	15.64	0.23	0.49	0.00	0.51	0.00	2.49	3.43	100.00	1.0000
2	1899 E67-113 1640 T151-2	11/10/87	75.86	16.37	0.23	0.69	0.02	0.46	0.00	2.78	3.59	100.00	0.9485
3	1900 E67-113 1640 (2) T151-2	11/10/87	76.81	15.88	0.30	0.59	0.01	0.48	0.01	2.41	3.52	100.01	0.9383
4	1903 E67-113 1564 T151-3	11/10/87	75.20	16.70	0.21	0.71	0.00	0.47	0.00	2.04	4.66	100.00	0.8834
5	2376 FLV-148-CS T201-4	10/12/89	77.47	13.76	0.43	0.11	0.00	0.51	0.05	3.51	4.17	100.01	0.8239
6	1901 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	0.8156
7	2371 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	0.8156
8	115 GV-76-8, T16-12		78.03	12.88	0.46	0.03	0.03	0.45	0.11	2.48	5.53	100.00	0.8019
9	1454 RABEK YB T115-6	01/27/86	78.73	12.90	0.57	0.09	0.07	0.63	0.08	2.97	3.97	100.01	0.7868
10	1470 RABEK YB T115-6 CORR K	1/27/86	78.72	12.90	0.57	0.09	0.07	0.63	0.08	2.97	3.97	100.01	0.7868
11	598 SM-ASH-34, T56-7	07/01/83	77.08	13.59	0.54	0.10	0.06	0.54	0.08	3.95	4.07	100.01	0.7851
12	1538 PICO 82 T124-9	5/5/86	78.30	13.14	0.67	0.06	0.04	0.71	0.08	2.78	3.22	100.00	0.7850
13	1453 LOS CHOCOSOS SC-7 T116-3	01/28/86	78.24	12.84	0.44	0.11	0.09	0.65	0.10	3.36	4.16	99.99	0.7801
14	488 758-354H, T16-15, low total		76.93	14.04	1.46	0.03	0.01	0.52	0.10	3.62	3.29	100.00	0.7799
15	17 BF-4, T28-7		76.05	14.34	0.65	0.13	0.08	0.52	0.04	4.04	4.15	100.00	0.7799
16	218 MILLVILLE-5, T28-3		75.91	14.43	0.55	0.13	0.11	0.53	0.05	4.25	3.94	100.00	0.7797
17	2147 SAF2-5, T167-8, lo Ca 10sh		77.15	13.53	0.55	0.05	0.09	0.58	0.08	4.35	3.64	100.02	0.7792
18	436 4-252A, T40-7		76.02	14.41	0.59	0.13	0.08	0.53	0.05	4.19	3.90	100.00	0.7792
19	239 OAK RUN-2, T27-6	4/22/87	76.04	14.25	0.64	0.13	0.09	0.54	0.06	4.43	3.82	100.00	0.7766
20	1740 BRICE-2, T136-7		77.25	13.45	0.77	0.15	0.08	0.56	0.21	3.59	3.47	100.02	0.7723
21	7 ASH CREEK-1, T28-1		75.93	14.35	0.63	0.12	0.10	0.54	0.05	3.98	4.30	100.00	0.7723
22	1927 86LP39, T157-1	03/14/88	76.57	12.90	0.57	0.04	0.08	0.56	0.07	2.47	6.75	100.01	0.7718
23	208 LOCK-3, T41-2		77.38	13.02	0.83	0.06	0.05	0.52	0.12	4.57	3.45	100.00	0.7712
24	209 LOCK-4, T41-3		77.42	13.05	0.88	0.05	0.04	0.50	0.10	4.52	3.45	100.01	0.7698
25	1882 FLV-38-WW T147-12	9/30/87	79.16	12.71	0.54	0.05	0.08	0.42	0.10	2.15	4.79	100.00	0.7695
26	207 LOCK-2, T-41-1		77.79	12.94	0.85	0.05	0.05	0.51	0.08	4.42	3.30	99.99	0.7693
27	1165 ALT 3 T87-2	12/24/84	77.77	12.68	0.63	0.09	0.05	0.51	0.10	3.87	4.28	99.98	0.7689
28	637 TULELAKE-542, T61-12(2)	08/26/83	77.31	13.35	0.87	0.09	0.05	0.55	0.08	4.17	3.53	100.00	0.7688
29	2126 CRAW-88-3H T176-5	10/27/88	76.92	13.24	0.61	0.04	0.11	0.51	0.06	4.09	4.41	99.99	0.7677
30	1936 NH-5 T155-8	5/15/88	77.56	13.10	0.75	0.04	0.09	0.47	0.08	4.40	3.51	100.00	0.7674
31	1106 61384-34 ASW T82-7	10/11/84	78.09	12.58	0.73	0.08	0.05	0.51	0.10	3.70	4.17	100.01	0.7673
32	2120 N-6 T175-10	10/28/88	77.13	13.06	0.92	0.05	0.07	0.52	0.09	2.76	5.39	99.99	0.7672
33	1174 ALT-4 T89-1	3/1/85	77.64	12.84	0.64	0.08	0.05	0.50	0.10	3.86	4.28	99.99	0.7669
34	1461 FBY 37 T115-2	1/27/86	77.50	13.01	1.32	0.07	0.04	0.49	0.12	2.37	5.08	100.00	0.7650
35	1898 E67-113 1543 T151-1	11/10/87	77.47	17.18	0.10	0.85	0.01	0.28	0.03	2.46	4.64	100.02	0.7643
36	2321 NAP-1L T193-2	6/1/89	78.32	12.39	0.73	0.10	0.05	0.53	0.09	3.20	4.59	100.00	0.7635
37	1164 ALT 2A T87-1	12/24/84	77.89	12.55	0.65	0.08	0.05	0.50	0.10	3.91	4.27	100.00	0.7613
38	66 D77-278, T30-4		77.05	13.00	0.58	0.04	0.04	0.53	0.09	3.45	5.22	100.00	0.7611
39	1844 FLV-19-WW T146-7	8/25/87	77.31	13.24	0.72	0.04	0.08	0.48	0.06	3.76	4.31	100.00	0.7610
40	68 DSDP-1, T9-3, low total	12/12/85	75.79	14.88	0.11	0.49	0.01	0.96	0.01	2.43	5.32	100.00	0.7605
41	1443 03068506B SILICIC FR. T114-12		77.56	12.63	0.71	0.05	0.07	0.51	0.10	3.27	5.09	99.99	0.7604
42	1442 03068506A SILICIC FR. T114-1	12/12/85	77.71	12.67	0.74	0.04	0.08	0.49	0.07	3.04	5.15	99.99	0.7601
43	849 LM-2		77.99	12.51	0.74	0.06	0.03	0.56	0.10	2.80	5.21	100.00	0.7598
44	338 SALTON-2A, T20-4	9/30/87	76.85	12.93	0.62	0.08	0.06	0.62	0.10	2.52	6.22	100.00	0.7592
45	1863 FLV-34-WW T147-8		77.58	12.69	0.60	0.06	0.07	0.49	0.10	3.76	4.65	100.00	0.7584
46	1864 FLV-35-WW T147-9	9/30/87	77.94	12.65	0.76	0.02	0.03	0.48	0.05	4.47	3.61	100.01	0.7580
47	336 SALTON-1, T20-3		77.63	12.49	0.61	0.07	0.07	0.49	0.09	3.21	5.35	100.01	0.7580
48	1683 MRSN-1 T134-4	9/30/87	77.60	12.45	0.61	0.07	0.07	0.56	0.10	2.89	5.66	100.01	0.7577
49	1854 FLV-25-WW T147-1		77.53	12.96	0.83	0.10	0.05	0.57	0.08	4.38	3.50	100.00	0.7575
50	1118 61484-47 ASW T83-6	10/12/84	77.53	12.96	0.83	0.10	0.05	0.57	0.08	4.38	3.50	100.00	0.7575

Listing of 50 element matches for COMP. NO. 1902 for elements: Na, Mg, Al, Si, K, Ca Date of Update: 2/12/90										Total, R Sim. Co		
C. No	Sample Number	Date	SiO2	Al2O3	Fe2O3	MgO	MnO	CaO	TiO2	Na2O	K2O	
1	1902 E67-113 1856 T151-11	11/10/87	77.21	15.64	0.23	0.49	0.00	0.51	0.00	2.49	3.43	100.00
2	1900 E67-113 1640 (2) T151-2	11/10/87	76.81	15.88	0.30	0.59	0.01	0.48	0.01	2.41	3.52	100.01
3	1899 E67-113 1640 T151-2	11/10/87	75.86	16.37	0.23	0.69	0.01	0.46	0.00	2.78	3.59	100.00
4	1901 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.02	0.42	0.00	3.58	3.12	100.00
5	2371 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00
6	68 DSDP-1, T9-3, low total		75.79	14.88	0.11	0.49	0.01	0.96	0.01	2.43	5.32	100.00
7	1903 E67-113 1564 T151-3	11/10/87	75.20	16.70	0.21	0.71	0.01	0.47	0.01	2.04	4.66	100.00
8	1740 BRICE-2 T-136-7	4/22/87	77.25	13.45	1.26	0.15	0.08	0.56	0.21	3.59	3.47	100.02
9	1898 E67-113 1543 T151-1	11/10/87	74.47	17.18	0.10	0.85	0.01	0.28	0.03	2.46	4.64	100.02
10	869 LM-25		73.87	15.54	2.03	0.36	0.07	1.73	0.28	3.01	3.11	100.00
11	1152 11-1V-84-0 T86-6	12/4/84	71.71	14.91	2.26	0.51	0.09	1.50	0.50	5.05	3.46	99.99
12	1289 Tulelake 2382 T100-1	07/02/85	72.17	14.51	2.63	0.49	0.05	1.73	0.47	4.64	3.31	100.00
13	1427 ASW-6985-2 T103-2 8e1	08/26/85	71.17	15.46	2.49	0.53	0.07	1.69	0.42	4.77	3.40	100.00
14	2376 FLV-148-CS T201-4	10/12/89	77.47	13.76	0.43	0.11	0.00	0.51	0.05	3.51	4.17	100.01
15	889 CB-19		74.92	13.02	2.25	0.41	0.03	1.26	0.49	4.11	3.51	100.00
16	2374 PU-17 T201-2	10/12/89	77.09	13.55	1.31	0.19	0.04	0.84	0.25	3.20	3.53	100.00
17	436 4-252A, T40-7		76.02	14.41	0.69	0.13	0.08	0.53	0.05	4.19	3.90	100.00
18	1060 SW-C T76-8	7/28/84	72.85	14.66	1.98	0.42	0.07	1.61	0.41	4.56	3.43	99.99
19	17 BF-4, T28-7		76.05	14.34	0.65	0.13	0.08	0.52	0.04	4.04	4.15	100.00
20	1602 MOD-16 T130-12	9/19/86	72.88	13.84	2.42	0.50	0.08	1.52	0.54	4.97	3.24	99.99
21	218 MILLVILLE-5, T28-3		75.91	14.43	0.65	0.13	0.11	0.53	0.05	4.25	3.94	100.00
22	1598 MOD-12 T130-8	9/19/86	72.25	14.12	2.30	0.47	0.11	1.15	0.53	5.00	4.06	99.99
23	488 758-354H, T16-15, low total		76.93	14.04	1.46	0.03	0.01	0.52	0.10	3.62	3.29	100.00
24	1674 PAOH-3(A) T132-15	10/21/86	73.84	13.96	2.26	0.45	0.04	2.10	0.28	3.89	3.19	100.01
25	833 GS-78		70.05	15.05	3.43	0.50	0.07	1.68	0.49	5.42	3.31	100.00
26	881 CB-7		72.38	14.56	2.49	0.50	0.05	1.80	0.49	4.62	3.11	100.00
27	1413 MADRAS T112-4	10/22/85	73.18	15.21	2.63	0.44	0.07	1.87	0.37	3.55	2.69	100.01
28	813 GS-57		72.38	14.74	2.38	0.49	0.03	1.77	0.49	4.71	3.01	100.00
29	882 CB-8		72.63	14.47	2.41	0.51	0.05	1.80	0.49	4.52	3.11	99.99
30	239 OAK RUN-2, T27-6		76.04	14.25	0.64	0.13	0.09	0.54	0.06	4.43	3.82	100.00
31	887 CB-15		72.90	14.44	2.18	0.41	0.04	1.57	0.44	4.61	3.41	100.00
32	1563 WA 9-F T127-6	7/18/86	75.57	12.38	1.43	0.49	0.04	1.49	0.29	3.72	3.15	99.99
33	1842 FLV-17-WW T146-5	8/25/87	71.88	15.85	2.30	0.60	0.05	2.15	0.29	3.72	3.15	99.99
34	1461 FABY 37 T115-2	1/27/86	77.50	13.01	1.32	0.07	0.04	0.49	0.12	2.37	5.08	100.00
35	1222 CBL-9 T88-12	5/2/85	72.29	14.33	2.51	0.51	0.06	1.74	0.45	4.88	3.22	99.99
36	319 RBW-80-133C, MSH6-1		72.70	15.16	2.26	0.50	0.03	1.97	0.35	4.23	2.80	100.00
37	951 DR-63		74.27	13.93	2.16	0.48	0.04	1.87	0.43	4.01	2.81	100.00
38	862 LM-18		75.67	14.65	1.21	0.24	0.06	1.61	0.13	3.01	3.41	99.99
39	2033 PF-88-E T169-2	10/2/88	73.41	14.61	2.14	0.43	0.04	2.06	0.26	3.95	3.10	100.00
40	1554 SIMP-3 T126-10	7/17/86	77.19	13.50	1.59	0.17	0.04	0.85	0.20	3.19	3.26	99.99
41	2354 FLV-108-WW T196-2	8/7/89	72.25	14.56	2.54	0.54	0.07	1.68	0.53	4.66	3.18	100.01
42	834 GS-79		70.22	14.85	3.49	0.50	0.09	1.63	0.50	5.52	3.21	100.01
43	1374 B7-1/2-TM1-23 T104-3	8/26/85	74.24	13.05	2.41	0.43	0.02	1.51	0.64	3.43	4.29	100.02
44	1068 324-M-RT T76-2	7/28/84	71.86	14.99	2.43	0.49	0.10	1.96	0.44	4.77	2.96	100.00
45	765 GS-4		75.48	14.53	2.22	0.24	0.03	1.37	0.29	2.81	3.01	100.00
46	1376 ASW-61085-15 T108-2	9/23/85	77.68	12.49	0.98	0.30	0.03	0.96	0.14	3.75	3.68	100.01
47	637 TULELAKE-542, T61-12(2)	08/26/83	77.31	13.35	0.87	0.09	0.05	0.55	0.08	4.17	3.53	100.00
48	1536 M7810 T124-7	5/5/86	73.36	14.56	2.19	0.44	0.03	2.08	0.26	4.03	3.05	100.00
49	1515 MOD-4 (2) (373) T119-14	4/28/86	74.85	14.90	1.26	0.39	0.12	1.86	0.12	3.59	2.90	99.99
50	883 CB-9		72.30	14.54	2.46	0.52	0.05	1.80	0.50	4.71	3.11	99.99

VI. Listing of 50 closest matches for COMP. NO. 1901 for elements: Na, Al, Si, Ca Date of Update: 2/12/90

C.No	Sample Number	Date	SiO2	Al2O3	Fe2O3	MgO	MnO	CaO	TiO2	Na2O	K2O	Total R	Stm. Co
1	1901 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	1.0000
2	2371 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	1.0000
3	2251 T187-6 103-M	5/9/89	76.09	13.16	0.96	0.02	0.03	0.41	0.06	3.57	5.69	99.99	0.9469
4	201 LD-70, T3-4		77.22	12.91	0.79	0.04	0.04	0.43	0.07	3.58	4.93	100.01	0.9402
5	41 BT-1182, T13-13		77.17	13.13	0.76	0.02	0.04	0.42	0.05	3.73	4.66	99.98	0.9395
6	719 LD-70		77.20	12.92	0.79	0.04	0.04	0.43	0.07	3.60	4.91	100.00	0.9390
7	293 PICO-141, T39-7	11/9/87	77.29	12.84	0.73	0.03	0.02	0.42	0.07	3.68	4.91	99.99	0.9379
8	1897 XJC-4-87 T150-14		77.17	12.92	0.56	0.04	0.10	0.42	0.07	3.45	5.28	100.01	0.9373
9	2004 FLV-54-CS T166-4	19-JUL-8	77.24	12.73	0.77	0.03	0.05	0.41	0.07	3.58	5.12	100.00	0.9372
10	29 BT-1C, T13-5		77.84	12.73	0.77	0.03	0.05	0.42	0.06	3.52	4.57	99.99	0.9371
11	377 TECO-10, T17-1		76.77	13.09	0.78	0.04	0.03	0.42	0.08	3.78	5.01	100.00	0.9370
12	2006 FLV-56-CS T166-6	7/19/88	77.18	12.83	0.77	0.04	0.06	0.42	0.06	3.72	4.92	100.00	0.9355
13	375 TECO-7, T14-2		77.09	12.90	0.81	0.03	0.05	0.42	0.06	3.75	4.89	100.00	0.9349
14	2005 FLV-53-CS T166-5	7/19/88	77.07	12.89	0.73	0.03	0.07	0.41	0.07	3.66	5.07	100.00	0.9348
15	268 PICO-14, T1, N-ASW-64, P		77.15	12.67	0.83	0.04	0.10	0.43	0.07	3.55	5.16	100.00	0.9346
16	380 TECO-24, T17-3		76.58	13.07	0.76	0.03	0.03	0.44	0.07	3.65	5.37	100.00	0.9344
17	2375 FLV-136-WP T201-3	10/12/89	77.63	12.74	0.72	0.03	0.03	0.43	0.05	3.61	4.75	99.99	0.9342
18	1940 AV12.1-T3 T154-14	4/30/88	76.78	12.47	1.48	0.03	0.03	0.43	0.12	3.60	5.07	100.01	0.9334
19	38 BT-11C1, T13-10		77.71	12.59	0.72	0.04	0.04	0.42	0.06	3.67	4.76	100.00	0.9334
20	25 BROAD-1, T41-6		76.84	13.16	0.74	0.04	0.06	0.45	0.07	3.56	5.08	100.00	0.9331
21	1865 FLV-36-WW T147-10	9/30/87	77.47	12.83	0.58	0.05	0.09	0.43	0.11	3.66	4.76	99.98	0.9327
22	27 BT-1A, T13-3		77.53	12.65	0.74	0.03	0.04	0.42	0.06	3.71	4.81	99.99	0.9327
23	1772 IH051A T141-14	5/27/87	77.84	12.60	0.72	0.05	0.04	0.43	0.08	3.62	4.62	100.00	0.9307
24	1166 WEB-1 T87-11	12/24/84	77.26	12.68	0.76	0.04	0.05	0.41	0.06	3.67	5.09	100.02	0.9302
25	2194 FLV-65-MA T182-1	1/24/89	77.63	12.95	0.70	0.02	0.02	0.43	0.06	3.72	4.45	99.98	0.9301
26	288 PICO-108, T39-5		77.01	12.81	0.73	0.03	0.04	0.42	0.07	3.81	5.07	99.99	0.9301
27	663 BT-2, T62-15		77.64	12.67	0.74	0.03	0.03	0.43	0.07	3.66	4.73	100.00	0.9297
28	1167 WEB-3 T87-12	08/26/83	77.41	12.52	0.76	0.04	0.05	0.41	0.06	3.52	5.21	99.98	0.9292
29	2062 FLV-63-CS T170-8	12/24/84	76.87	12.94	0.58	0.04	0.09	0.43	0.06	3.77	5.23	100.01	0.9292
30	34 BT-11A1, T13-6	9/3/88	77.55	12.72	0.69	0.03	0.04	0.43	0.06	3.69	4.78	99.99	0.9288
31	1732 CHT-3 T137-13		77.55	12.62	0.75	0.05	0.05	0.41	0.06	3.67	4.86	100.02	0.9284
32	295 PICO-152, T39-1		76.98	12.97	0.79	0.03	0.06	0.42	0.05	3.89	4.80	99.99	0.9278
33	384 TECO-29, T17-6		76.68	13.12	0.81	0.04	0.04	0.43	0.07	3.85	4.96	100.00	0.9277
34	387 TECO-308-2, T17-9	4/21/87	76.88	13.08	0.74	0.03	0.04	0.44	0.07	3.75	4.98	100.01	0.9271
35	382 TECO-28A, T17-4		76.74	13.09	0.81	0.03	0.04	0.43	0.06	3.85	4.94	99.99	0.9270
36	953 DR-66		77.71	12.70	0.73	0.03	0.04	0.42	0.07	3.80	4.50	100.00	0.9267
37	294 PICO-143, T36-4		76.45	12.91	0.76	0.04	0.01	0.42	0.05	3.93	4.43	99.01	0.9262
38	374 TECO-6, T14-1		77.47	12.84	0.73	0.03	0.04	0.41	0.05	3.76	4.67	100.00	0.9262
39	383 TECO-28B, T17-5		77.00	12.89	0.75	0.04	0.03	0.43	0.06	3.80	5.00	100.00	0.9261
40	1730 WEB-2 T137-11	4/21/87	77.44	12.50	0.80	0.05	0.06	0.43	0.04	3.69	4.99	100.00	0.9257
41	2278 T191-8 FLV-80-HT	5/10/89	74.55	13.45	1.17	0.07	0.10	0.37	0.19	3.58	6.52	100.00	0.9253
42	271 PICO-23, T2-11		77.28	12.87	0.77	0.04	0.05	0.42	0.07	3.89	4.61	100.00	0.9253
43	40 BT-11D1, T13-12		77.47	12.75	0.74	0.03	0.04	0.41	0.04	3.76	4.76	100.00	0.9248
44	1304 CF-2 SILICIC FRACT. BULK T100	7/2/85	77.27	12.67	0.76	0.05	0.07	0.45	0.11	3.59	5.05	100.02	0.9248
45	662 BT-1C, T62-10	08/26/83	77.47	12.75	0.73	0.03	0.03	0.43	0.07	3.77	4.72	100.00	0.9243
46	442 63CJ-26(1), T1, N-ASW-2, P		77.37	12.69	0.73	0.04	0.05	0.45	0.08	3.60	4.99	100.00	0.9241
47	30 BT-2, T1, N-ASW-55, P		77.95	12.25	0.71	0.03	0.05	0.41	0.06	3.53	5.00	99.99	0.9240
48	1032 FRIANT 12A T74-6	6/22/84	77.31	12.55	0.67	0.04	0.00	0.44	0.06	3.65	5.29	100.01	0.9238
49	1894 XJC-1-87 T150-11	11/9/87	77.28	12.91	0.73	0.04	0.05	0.44	0.07	3.74	4.75	100.01	0.9238
50	2007 FLV-57-CS T166-7	7/19/88	77.34	12.71	0.69	0.02	0.04	0.44	0.07	3.69	4.98	99.98	0.9237

Listing of 50 closest matches for COMP. NO. 1901 for elements: Na, Al, Si, K, Ca										Date of Update: 2/12/90			
C.No	Sample Number	Date	SiO2	Al2O3	Fe2O3	MgO	MnO	CaO	TiO2	Na2O	K2O	Total, R	Sim. Co
1	1901 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.54	3.12	100.00	1.0000
2	2371 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	1.0000
3	480 F58-354H, T16-15, low total		76.93	14.04	1.46	0.03	0.01	0.52	0.10	3.62	3.29	100.00	0.9206
4	1899 E67-13 1640 T151-2	11/10/87	75.86	16.37	0.23	0.69	0.02	0.46	0.00	2.78	3.59	100.00	0.9080
5	1747 E87-74 T136-14	4/22/87	78.43	12.78	0.66	0.07	0.06	0.42	0.10	4.53	2.94	99.99	0.9987
6	1740 BRICE-2 T-136-7	4/22/87	77.25	13.45	1.26	0.15	0.08	0.56	0.21	3.59	3.47	100.02	0.8927
7	2013 SAFZ-2 T167-5	7/19/88	77.75	12.93	0.60	0.05	0.06	0.42	0.12	4.35	3.72	100.00	0.8881
8	281 PICO-76, T36-6		76.92	12.92	0.76	0.03	0.05	0.40	0.05	4.16	3.72	99.01	0.8880
9	280 PICO-74, T36-5		76.55	12.99	0.74	0.03	0.04	0.42	0.07	4.12	4.05	99.01	0.8874
10	29 BT-1C, T13-5		77.84	12.73	0.77	0.03	0.04	0.42	0.06	3.52	4.57	99.99	0.8862
11	275 PICO-40A, T8-7		77.94	12.89	0.81	0.04	0.03	0.45	0.05	3.82	3.97	100.00	0.8860
12	41 BT-11D2, T13-13		77.17	13.13	0.76	0.02	0.04	0.42	0.05	3.73	4.66	99.98	0.8855
13	2194 FLV-65-WA T182-1	1/24/89	77.63	12.95	0.70	0.02	0.02	0.43	0.06	3.72	4.45	99.98	0.8843
14	1744 J82-22-3 T-136-11	4/22/87	78.75	12.53	0.63	0.06	0.06	0.41	0.08	4.59	2.88	99.99	0.8841
15	294 PICO-143, T36-4		76.45	12.91	0.76	0.04	0.01	0.42	0.06	3.93	4.43	99.01	0.8818
16	1900 E67-113 1640 (2) T151-2	11/10/87	76.81	15.88	0.30	0.59	0.01	0.48	0.01	2.41	3.52	100.01	0.8817
17	284 PICO-78(3), T36-7		76.59	12.86	0.72	0.04	0.04	0.42	0.05	4.13	4.16	99.01	0.8812
18	2015 SAFZ-4 T167-7	7/19/88	78.08	12.91	0.57	0.05	0.08	0.37	0.09	4.66	3.19	100.00	0.8801
19	953 DR-66		77.71	12.70	0.73	0.03	0.04	0.42	0.07	3.80	4.50	100.00	0.8801
20	1772 IHOSIA T141-14	5/27/87	77.84	12.60	0.72	0.05	0.04	0.43	0.08	3.62	4.62	100.00	0.8796
21	201 LD-70, T3.4		77.22	12.91	0.79	0.04	0.04	0.43	0.07	3.58	4.93	100.01	0.8787
22	2375 FLV-136-WP T201-3	10/12/89	77.63	12.74	0.72	0.03	0.03	0.43	0.05	3.61	4.75	99.99	0.8787
23	719 LD-70		77.20	12.92	0.79	0.04	0.04	0.43	0.07	3.60	4.91	100.00	0.8783
24	38 BT-11C1, T13-10		77.71	12.59	0.72	0.03	0.04	0.42	0.06	3.67	4.76	100.00	0.8778
25	1936 NH-5 T155-8	5/15/88	77.56	13.10	0.75	0.04	0.09	0.47	0.08	4.40	3.51	100.00	0.8775
26	276 PICO-41A, T8-8		77.38	12.94	0.73	0.03	0.05	0.42	0.04	4.01	4.39	99.99	0.8775
27	293 PICO-141, T39-7		77.29	12.84	0.73	0.03	0.02	0.42	0.07	3.68	4.91	99.99	0.8774
28	1865 FLV-36-WW T147-10	9/30/87	77.47	12.83	0.58	0.05	0.09	0.43	0.11	3.66	4.76	99.98	0.8773
29	2376 FLV-148-CS T201-4	10/12/89	77.47	13.76	0.83	0.11	0.00	0.51	0.05	3.51	4.17	100.01	0.8773
30	2129 CERC-5.36 lo Fe av. 8		78.80	12.84	0.60	0.05	0.07	0.39	0.08	4.42	2.76	100.01	0.8766
31	1902 E67-113 1856 T151-11	11/10/87	77.21	15.64	0.23	0.49	0.00	0.51	0.00	2.49	3.43	100.00	0.8765
32	890 CB-25		77.97	11.42	1.78	0.13	0.03	0.44	0.51	3.71	4.01	100.00	0.8759
33	2320 IH9907A T193-1	6/1/89	78.35	12.32	0.75	0.04	0.02	0.43	0.05	4.37	3.67	100.00	0.8759
34	663 BT-2, T62-15	08/26/83	77.64	12.67	0.74	0.03	0.03	0.43	0.07	3.66	4.73	100.00	0.8757
35	271 PICO-23, T2-11		77.28	12.87	0.77	0.04	0.05	0.42	0.07	3.89	4.61	100.00	0.8756
36	375 TECO-7, T14-2		77.09	12.90	0.81	0.03	0.05	0.42	0.06	3.75	4.89	100.00	0.8756
37	254 P-100, T22-4		77.78	12.86	0.75	0.03	0.05	0.45	0.06	4.27	3.75	100.00	0.8755
38	27 BT-1A, T13-3		77.53	12.65	0.74	0.03	0.04	0.42	0.06	3.71	4.81	99.99	0.8755
39	2006 FLV-56-CS T166-6	7/19/88	77.18	12.83	0.77	0.04	0.06	0.42	0.06	3.72	4.92	100.00	0.8752
40	2136 FL86C-5.41 lo Fe lo Ca 3 sh		78.83	12.71	0.59	0.04	0.05	0.40	0.05	4.55	2.76	99.98	0.8751
41	2228 FLV-66-WA T185-1	2/28/89	77.74	12.66	0.75	0.02	0.04	0.43	0.07	3.79	4.51	100.01	0.8750
42	374 TECO-6, T14-1		77.47	12.84	0.73	0.03	0.04	0.41	0.05	3.76	4.67	100.00	0.8746
43	26 BT-1, T2-13		77.32	12.91	0.80	0.03	0.03	0.43	0.05	3.85	4.57	99.99	0.8744
44	2072 ARCH-88-1 T172-1	9/28/88	77.66	12.73	0.74	0.04	0.03	0.43	0.07	3.87	4.44	100.01	0.8743
45	377 TECO-10, T17-1		76.77	13.09	0.78	0.04	0.03	0.42	0.08	3.78	5.01	100.00	0.8743
46	277 PICO-43, T36-3		76.85	12.90	0.73	0.03	0.03	0.47	0.05	3.93	4.02	99.01	0.8738
47	34 BT-11A1, T13-6		77.55	12.72	0.69	0.03	0.04	0.43	0.06	3.69	4.78	99.99	0.8735
48	1745 J82-22-4 T-136-12	4/22/87	78.84	12.58	0.60	0.06	0.07	0.39	0.10	4.54	2.82	100.00	0.8728
49	2146 HPDA-11.06 loFe, Ca 4sh		78.27	12.98	0.58	0.04	0.07	0.36	0.08	4.63	2.99	100.00	0.8728
50	337 SALTON-2, T2-14		77.55	12.98	0.76	0.04	0.05	0.46	0.07	4.48	3.60	99.99	0.8726

Listing of 50 closest matches for COMP. NO. 1901 for elements: Na, Al, Si, K, Ca, Fe										Date of Update: 2/12/90			
C.No	Sample Number	Date	SiO2	Al2O3	Fe2O3	MgO	MnO	CaO	TiO2	Na2O	K2O	Total.R	Sim. Co
1	1901 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	1.0000
2	2371 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	1.0000
3	2376 FLV-148-CS T201-4	10/12/89	77.47	13.76	0.43	0.11	0.00	0.51	0.05	3.51	4.17	100.01	0.8903
4	2013 SAF2-2 T167-5	7/19/88	77.75	12.93	0.60	0.05	0.06	0.42	0.12	4.35	3.72	100.00	0.8651
5	2015 SAF2-4 T167-7	7/19/88	78.08	12.91	0.57	0.05	0.08	0.37	0.09	4.66	3.19	100.00	0.8650
6	1747 K87-74 T136-14	4/22/87	78.43	12.78	0.66	0.07	0.06	0.42	0.10	4.53	2.94	99.99	0.8625
7	1865 FLV-36-WW T147-10	9/30/87	77.47	12.83	0.58	0.05	0.09	0.43	0.11	3.66	4.76	99.98	0.8604
8	1251 TLN-3 T96-10	5/29/85	77.20	12.87	0.54	0.04	0.09	0.43	0.09	4.03	4.70	99.99	0.8573
9	1897 YJC-4-87 T150-14	11/9/87	77.17	12.92	0.56	0.04	0.10	0.42	0.07	3.45	5.28	100.01	0.8573
10	2146 HPDA-11.06 loFe, Ca 4sh		78.83	12.71	0.59	0.04	0.05	0.36	0.08	4.63	2.99	100.00	0.8566
11	2136 FL86C-5.41 lo Fe lo Ca 3 sh		78.75	12.53	0.63	0.06	0.06	0.41	0.05	4.55	2.76	99.98	0.8564
12	1744 J82-22-3 T-136-11	4/22/87	78.80	12.84	0.60	0.05	0.07	0.39	0.08	4.59	2.88	99.99	0.8558
13	2129 CCPC-5.36 lo Fe av. 8		78.84	12.58	0.60	0.06	0.07	0.39	0.10	4.54	2.76	100.01	0.8555
14	1745 J82-22-4 T-136-12	4/22/87	78.08	13.59	0.54	0.10	0.06	0.43	0.08	3.95	4.07	100.00	0.8524
15	598 SM-ASH-34, T56-7	07/01/83	77.08	12.00	0.55	0.02	0.07	0.54	0.08	3.64	5.15	100.00	0.8502
16	1997 WL-5-26 (97.21m) T165-10	5/22/88	77.06	12.00	0.55	0.05	0.09	0.42	0.09	4.22	4.54	100.01	0.8501
17	1250 TLN-2 T96-9	5/29/85	76.87	12.94	0.58	0.04	0.09	0.43	0.06	3.77	5.23	100.01	0.8482
18	2062 FLV-63-CS T170-8	9/3/88	76.87	12.94	0.58	0.04	0.09	0.43	0.06	3.77	5.23	100.01	0.8482
19	1453 LOS CHOCOVOS SC-7 T116-3	01/28/86	78.24	12.84	0.44	0.11	0.09	0.65	0.10	3.36	4.16	99.99	0.8466
20	1900 E67-113 1640 (2) T151-2	11/10/87	76.81	13.88	0.50	0.09	0.01	0.48	0.08	2.41	3.52	100.01	0.8459
21	1249 TLN-1 T96-8	5/29/85	77.28	12.76	0.56	0.04	0.08	0.44	0.08	4.09	4.69	100.02	0.8454
22	2194 FLV-65-WA T182-1	1/24/89	77.63	12.95	0.70	0.02	0.02	0.43	0.06	3.72	4.45	99.98	0.8441
23	1252 TLN-4 T96-11	5/29/85	77.26	12.83	0.58	0.04	0.08	0.45	0.08	3.95	4.74	100.01	0.8421
24	1899 E67-13 1640 T151-2	11/10/87	75.86	16.37	0.23	0.69	0.02	0.46	0.00	2.78	3.59	100.00	0.8418
25	1671 84 NV 14-1	10/21/86	77.54	12.68	0.58	0.05	0.06	0.46	0.07	3.75	4.89	99.99	0.8413
26	2001 WL-5-12 (61.28m) lo Ca fract.	5/22/88	77.45	12.80	0.61	0.01	0.06	0.45	0.05	3.85	4.63	100.00	0.8413
27	1529 85-G-54 T113-2	10/22/85	77.45	12.65	0.57	0.06	0.06	0.38	0.09	3.69	5.05	100.00	0.8412
28	2147 SAF2-5, T167-8, lo Ca 10sh		77.15	13.53	0.55	0.05	0.09	0.58	0.08	4.35	3.64	100.02	0.8410
29	280 PICO-74, T36-5		76.55	12.99	0.74	0.03	0.04	0.42	0.07	4.12	4.05	99.01	0.8408
30	281 PICO-76, T36-6		76.59	12.86	0.72	0.03	0.04	0.42	0.05	4.16	3.72	99.01	0.8387
31	284 PICO-78(3), T36-7		76.59	12.86	0.72	0.04	0.04	0.42	0.05	4.13	4.16	99.01	0.8385
32	17 BF-4, T28-7		76.05	14.34	0.65	0.13	0.08	0.52	0.04	4.04	4.15	100.00	0.8377
33	1716 TTC-13 T138-9	4/23/87	77.96	12.59	0.58	0.05	0.04	0.43	0.08	3.62	4.62	100.00	0.8372
34	1772 THOSIA T141-14	5/27/87	77.84	12.73	0.77	0.03	0.05	0.42	0.06	3.69	4.78	99.99	0.8367
35	34 BT-11A1, T13-6		77.55	12.72	0.69	0.03	0.04	0.43	0.06	3.69	4.78	99.99	0.8367
36	41 BT-11D2, T13-13		77.63	13.13	0.76	0.02	0.04	0.42	0.05	3.73	4.66	99.98	0.8366
37	2375 FLV-136-WP T201-3	10/12/89	77.71	12.74	0.72	0.03	0.03	0.43	0.05	3.61	4.75	99.99	0.8364
38	953 DR-66		77.71	12.70	0.73	0.03	0.04	0.42	0.07	3.80	4.50	100.00	0.8361
39	1715 TTC-12 T138-8	4/23/87	77.84	12.73	0.77	0.03	0.05	0.42	0.06	3.52	4.57	99.99	0.8359
40	29 BT-1C, T13-5		75.91	14.43	0.65	0.13	0.11	0.53	0.05	4.25	3.94	100.00	0.8358
41	218 MILLVILLE-5, T28-3		77.71	12.59	0.72	0.03	0.04	0.42	0.06	3.67	4.76	100.00	0.8357
42	38 BT-11C1, T13-10	5/22/88	77.93	12.32	0.60	0.05	0.06	0.46	0.11	3.77	4.71	100.01	0.8356
43	1909 WL-5-22 (85.15m) T165-2	9/30/87	77.97	12.55	0.55	0.04	0.10	0.34	0.09	3.78	4.57	99.99	0.8350
44	1868 FLV-40-WW T147-14	9/30/87	77.74	12.65	0.55	0.05	0.08	0.40	0.09	3.17	5.28	100.01	0.8347
45	1866 FLV-37-WW T147-11		75.93	14.35	0.63	0.12	0.10	0.54	0.05	3.98	4.30	100.00	0.8346
46	7 ASH CREEK-1, T28-1		78.59	13.16	0.64	0.15	0.05	0.37	0.14	4.35	2.55	100.00	0.8345
47	599 SM-ASH-35, T56-8	07/01/83	77.38	12.94	0.73	0.03	0.05	0.42	0.04	4.01	4.39	99.99	0.8340
48	276 PICO-41A, T8-8		77.29	12.84	0.73	0.03	0.02	0.42	0.07	3.68	4.91	99.99	0.8339
49	293 PICO-141, T39-7		78.43	12.39	0.64	0.06	0.05	0.40	0.09	3.33	4.59	99.98	0.8337
50	2322 NAP-20 T193-2	6/1/89	78.43	12.39	0.64	0.06	0.05	0.40	0.09	3.33	4.59	99.98	0.8337

Listing of 50 closest matches for COMP. NO. 1901 for elements: Na, Mg, Al, Si, K, Ca Date of Update: 2/12/90													
C.No	Sample Number	Date	SiO2	Al2O3	Fe2O3	MgO	MnO	CaO	TiO2	Na2O	K2O	Total R	Sim. Co.
1	1901 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	1.0000
2	2371 E67-113 2178 T151-12	11/10/87	75.77	16.08	0.45	0.57	0.01	0.42	0.00	3.58	3.12	100.00	1.0000
3	1900 E67-113 1640 (2) T151-2	11/10/87	76.81	15.88	0.30	0.59	0.01	0.48	0.01	2.41	3.52	100.01	0.8958
4	1899 E67-113 1640 T151-2	11/10/87	75.86	16.37	0.23	0.69	0.02	0.46	0.00	2.78	3.59	100.00	0.8947
5	1902 E67-113 1856 T151-11	11/10/87	77.21	15.64	0.23	0.49	0.00	0.51	0.00	2.49	3.43	100.00	0.8737
6	1842 FLV-17-WW T146-S	8/25/87	71.88	15.85	2.30	0.60	0.05	2.15	0.29	3.72	3.15	99.99	0.8388
7	1903 E67-113 1564 T151-3	11/10/87	75.20	16.70	0.21	0.71	0.01	0.47	0.00	2.04	4.66	100.00	0.8152
8	2354 FLV-108-WW T196-2	8/7/89	72.25	14.56	2.54	0.54	0.07	1.68	0.53	4.66	3.18	100.01	0.8010
9	955 DR-68M		72.31	15.24	2.48	0.57	0.06	1.94	0.47	4.31	2.61	99.99	0.7976
10	882 CB-8		72.63	14.47	2.41	0.51	0.05	1.80	0.49	4.52	3.11	99.99	0.7959
11	1413 MADRAS T112-4	10/22/85	73.18	15.21	2.63	0.44	0.07	1.87	0.37	3.75	2.69	100.01	0.7937
12	883 CB-9		72.30	14.54	2.46	0.52	0.05	1.80	0.50	4.71	3.11	99.99	0.7935
13	655 57M(2), T59-A4 (not org oxda)	xx/xx/xx	72.15	14.90	2.35	0.53	0.04	1.83	0.44	4.75	3.01	100.00	0.7928
14	1515 MOD-4 (2) (373) T119-14	4/28/86	74.85	14.90	1.26	0.39	0.12	1.86	0.12	3.59	2.90	99.99	0.7919
15	1676 RUSH CR-1 T133-2	10/21/86	71.66	14.65	2.76	0.62	0.08	1.71	0.64	4.57	3.31	100.00	0.7913
16	1427 ASW-6985-2 T103-2 8el	08/26/85	71.17	15.46	2.49	0.53	0.07	1.69	0.42	4.77	3.40	100.00	0.7912
17	881 CB-7		72.38	14.56	2.49	0.50	0.05	1.80	0.49	4.62	3.11	100.00	0.7905
18	654 57M(1), T55-3 (not orig oxida)	xx/xx/xx	71.59	15.64	2.90	0.71	0.07	2.45	0.44	3.45	2.75	100.00	0.7895
19	319 RBW-80-133C, MSH6-1		72.70	15.16	2.26	0.50	0.03	1.97	0.35	4.23	2.80	100.00	0.7894
20	2033 PF-88-E T169-2	10/2/88	73.41	14.61	2.14	0.43	0.04	2.06	0.26	3.95	3.10	100.00	0.7893
21	1674 PAOH-3(A) T132-15	10/21/86	73.84	13.96	2.26	0.45	0.04	2.10	0.28	3.89	3.19	100.01	0.7884
22	1586 ASW 61186-5C T129-1	8/19/86	71.11	15.43	3.27	0.52	0.13	1.41	0.56	4.82	2.74	99.99	0.7882
23	1563 WA 9-F T127-6	7/18/86	75.57	12.38	1.43	0.49	0.04	1.49	2.17	3.74	2.69	100.00	0.7880
24	1366 B7-1/2-TM1-22 T104-2	8/26/85	72.51	13.42	3.12	0.59	0.03	1.96	0.71	3.67	4.00	100.01	0.7879
25	1740 BRICE-2 T-136-7	4/22/87	77.25	13.45	1.26	0.15	0.08	0.56	0.21	3.59	3.47	100.02	0.7878
26	1095 61384-24 ASW T81-12	9/4/84	70.95	14.70	3.20	0.56	0.10	1.82	0.55	3.94	4.16	99.98	0.7871
27	1154 15-IV-84-9A T86-8	12/4/84	71.75	14.69	2.57	0.63	0.06	2.17	0.46	4.26	3.41	100.00	0.7857
28	1536 M7810 T124-7	5/5/86	73.36	14.56	2.19	0.44	0.03	2.08	0.26	4.03	3.05	100.00	0.7856
29	228 MOD-4, T12-9		73.66	16.09	1.30	0.35	0.06	1.80	0.13	3.71	2.90	100.00	0.7856
30	951 DR-63		74.27	13.93	2.16	0.48	0.04	1.87	0.43	4.01	2.81	100.00	0.7844
31	506 CL-0315	08/16/83	73.62	14.20	2.11	0.50	0.04	2.22	0.35	4.13	2.84	100.01	0.7830
32	676 BUR-872, T59-B1	xx/xx/xx	70.15	15.13	3.39	0.57	0.08	1.88	0.47	5.40	2.94	100.01	0.7826
33	813 GS-57		72.38	14.74	2.38	0.49	0.03	1.77	0.49	4.71	3.01	100.00	0.7823
34	1222 CRL-9 T88-12	5/2/85	72.29	14.33	2.51	0.51	0.06	1.74	0.45	4.88	3.22	99.99	0.7807
35	2070 PF-88-E (2) T173-6	9/28/88	73.65	14.46	2.13	0.42	0.04	2.00	0.26	4.03	3.02	100.01	0.7791
36	2262 T189-1 912-M	5/9/89	72.22	14.03	2.75	0.54	0.03	1.64	0.54	3.79	4.46	100.00	0.7789
37	1289 Tulelake 2382 T100-1	07/02/85	72.17	14.51	2.63	0.49	0.05	1.73	0.47	4.64	3.31	100.00	0.7786
38	1548 PI-D5 (0.6CM)	7/17/86	74.31	13.86	1.92	0.46	0.06	2.15	0.35	3.99	2.89	99.99	0.7781
39	1539 KRL 10779-A T124-10	5/5/86	73.31	14.49	2.27	0.43	0.04	2.11	0.30	4.06	3.00	100.01	0.7776
40	1011 TULE LAKE 715 (682) T74-8	5/30/84	71.49	14.92	2.41	0.55	0.05	1.64	0.41	4.60	3.93	100.00	0.7774
41	673 TULELAKE-715 (wh pum), T59-A1	xx/xx/xx	70.87	15.50	2.67	0.68	0.06	1.99	0.42	4.14	3.68	100.01	0.7769
42	734 S-13		73.48	14.15	2.26	0.50	0.04	1.89	0.45	4.42	2.81	100.00	0.7766
43	1602 MOD-16 T130-12	9/19/86	72.88	13.84	2.42	0.50	0.08	1.52	0.54	4.97	3.24	99.99	0.7766
44	1152 11-IV-84-0 T86-6	12/4/84	71.71	14.91	2.26	0.51	0.09	1.50	0.50	5.05	3.46	99.99	0.7765
45	149 JCD-8, T1-16, P		73.66	14.98	1.85	0.36	0.07	1.30	0.35	4.38	3.06	100.01	0.7761
46	488 758-354H, T16-15, low total		76.93	14.04	1.46	0.03	0.01	0.52	0.10	3.62	3.29	100.00	0.7759
47	1068 324-M-RT T76-2	7/28/84	71.86	14.99	2.43	0.49	0.10	1.96	0.44	4.77	2.96	100.00	0.7756
48	869 LM-25		73.87	15.54	2.03	0.36	0.07	1.73	0.28	3.01	3.11	100.00	0.7755
49	726 LD-94		73.68	14.25	2.08	0.46	0.09	1.86	0.35	4.32	2.91	100.00	0.7755
50	2068 PF-88-I T170-14	9/3/88	71.73	14.87	3.59	0.50	0.11	1.73	0.48	4.38	2.62	100.01	0.7747