

Testing stable isotope paleoaltimetry with Quaternary volcanic glasses in the Ecuadorian Andes

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Chalupas eruption sequence

The complete sequence deposited by the 211 ka Chalupas eruption crops out at the Naxiche Gorge type section, ~4.5 km SW of Salcedo (Fig. 1), described by Beate (1985) and sampled in this study at various levels over the 54 m section (Fig. DR1). The Chalupas sequence from base to top consists of (1) Three Plinian air falls of pumice lapilli that are the immediate precursor to the main body of the Chalupas ignimbrite (Fig. DR1; samples NAX1 through NAX3) (2) the main body of the ignimbrite that is a pyroclastic pumice and ash flow in the proximal Andean region, and distally (towards the Pacific coast) a downwind ash fall (Fig. DR1; NAX4 through NAX6), and (3) an upper bedded pumice and ash deposit that represents the reworked ash cloud that settled afterward (Fig. DR1; NAX7 and NAX8) (Beate, 1985).

In the coastal forearc region, three samples were collected near the Pacific coast between 16 and 20 km NW of the town of Puerto Cayo (Fig. 1). Two are from a single outcrop at 26 m; the lower (EC16L5A) is pumice lapilli corresponding to the basal Plinian fall, and the upper (EC16L6A), as well as the third coastal sample taken from a different outcrop several km away (EC16L4A) at 74 m correspond to the downwind ash fall associated with the main ignimbrite event. Two samples (C3A and C3B) from the eastern coastal forearc region near the town of La Mana at 275 m (Fig. 1) also correspond to this ash fall. All other Chalupas samples correspond to the pyroclastic flow of the main ignimbrite event. Glass major oxide wt.% data further confirm the correlation between proximal and distal Chalupas (Fig. DR2 and Table DR3).

Methods

Sample Preparation

Samples were processed based on procedures described in Cassel and Breecker (2017). Bulk samples of pumice were hand crushed by mortar and pestle and then wet sieved to a 125µm-250µm grain size. To remove carbonate, samples were washed in 6N HCl for between 1 and 3 hours depending on the duration of effervescence and then rinsed. The samples were then treated in an ultrasonic bath using Milli-Q water. The bath water was repeatedly decanted and replaced until the glass no longer discolored the water. Samples were then dried and run through a Frantz Isodynamic Separator. Phenocrysts were removed by density separation using the heavy

liquid lithium polytungstate (LST). Finally, glass separates were abraded with 10% hydrofluoric acid (HF) for eight to ten seconds to remove precipitates (Cassel and Breecker, 2017), then rinsed with Milli-Q water and dried overnight. All glass separates were visually inspected for purity and previous steps were repeated if necessary.

δD isotopic measurements

Between two and 11 replicates of each volcanic glass sample were analyzed for their δD values and weight percent (wt%) water at the University of Texas at Austin Stable Isotope Laboratory using a Thermo Electron thermal conversion elemental analyzer (TC-EA) and Thermo MAT253 isotope ratio mass spectrometer (IRMS). Each replicate contained 2 to 2.5 mg of sample, except for the two Holocene samples (EC17LJ1 and EC17LJ1P) for which around 10 mg of sample per replicate was used. The samples were packed in Costech silver capsules and dried in a vacuum oven at 70 °C for at least 12 hours prior to being loaded into the zero blank autosampler on the TC-EA which was subsequently flushed with UHP helium gas. Measured glass hydrogen isotope compositions are reported in standard δ notation; $\delta D_{\text{glass}} = [(R_{\text{sample}}/R_{\text{standard}}) - 1] \times 1000$, where R is the D/H ratio. Reported sample δD values were normalized to the SMOW scale using standards NBS-22 oil, IAEA GNIP-CH7 foil, IAEA GNIP-C3, NBS-30 biotite (powdered) and SN09052RW glass which were all analyzed alongside unknowns. The δD_{glass} value of standard SN09052RW was -157‰ and was consistently reproduced within ± 3‰ (1σ). Mean water content of glass standard SN09052RW was 4.2 wt% and was consistently reproduced within ± 0.5 wt%.

Major oxide wt% data from electron probe microanalysis

Glass major oxide data was collected by Electron Probe Microanalysis (EPMA) following standard practices (Lowe, 2011) at the Michael J. Drake Electron Microprobe Laboratory at the Lunar and Planetary Laboratory at the University of Arizona. Analyses were performed on either a Cameca SX50 Electron Microprobe with four wavelength dispersive (WDS) spectrometers or a Cameca SX100 Electron Microprobe with five WDS spectrometers. Column conditions for Na, K, and F were 15keV, 6nA, and 10µm beam size, with counting times of 10 seconds on peak and 20 seconds on background. Column conditions for all other elements were 15keV, 8nA and 10µm beam size, with counting times of 20 seconds on peak and 20 seconds on background. Well characterized natural and synthetic standards were used for all elements.

Modern water compilation

A compilation of all available modern water data in the study area includes precipitation from nine meteorological stations for which amount-weighted means of δ¹⁸O and δD values were calculated (IAEA/WMO 2018; Fig. 1; Table DR1), and δ¹⁸O and δD values of water from shallow springs sampled by Garcia et al., (1998) in March 1993, and Maldonado et al., (1995) during two campaigns in January, 1990, and November, 1990, (L. Araguás-Araguás pers. comm. 2017). Only small springs with recharge areas that were assumed to be within 200 m of the sampling point by the original authors were used in this study. The sample elevations reported in this study are the estimates of recharge altitude based on topographic maps as reported by the original authors (Maldonado et al., 1995; Garcia et al., 1998; L. Araguás-Araguás pers. comm. 2017).

Values of δD versus $\delta^{18}\text{O}$ for all modern water data fall near the Global Meteoric Water Line ($\delta D = 8 \delta^{18}\text{O} + 10$; Craig, 1961) indicating limited evaporation (Rozanski, et al., 1993). The Local Meteoric Water Line (LMWL) in the study area (1°N – 3.4°S) is defined by the equation: $\delta D = 8.17 \delta^{18}\text{O} + 10.75$ ($R^2=0.99$) (Fig. DR3). This LMWL for Ecuador is similar to the LMWL for Colombia (4 – 7°N), that is: $\delta D = 8.02 \delta^{18}\text{O} + 12.12$ ($r^2 = 0.95$) (Saylor et al., 2009).

Thermodynamic Rayleigh distillation model and modern water data

We use a 1-dimensional thermodynamic Rayleigh distillation model that calculates changes in δD (or $\delta^{18}\text{O}$) of precipitation considering the temperature dependent liquid-vapor fractionations occurring in an air parcel during adiabatic ascent and rain-out, given initial (low elevation) starting values for δD , temperature, and relative humidity (RH) (Rowley et al., 2001; Rowley, 2007). Model calculated δD values of precipitation are the weighted mean over a 1000-m thick layer centered at 2000 m (Rowley, 2007). For low elevation starting values, we use the mean of the δD values of precipitation from low elevation IAEA stations at the Ecuadorian coast (MACHALA at 6 m in southern Ecuador, and ESMERALDAS at 30 m in northern Ecuador) of -20‰ as a datum for normalizing the higher elevation modern waters.

The mean temperature recorded at these stations during months when isotopes in precipitation were also collected is $25 \pm 1.3^\circ\text{C}$ (1σ , $n = 18$). Relative humidity values from a nearby meteorological station in the INAHMI database (M005 PORTOVIEJO-UTMN; <http://www.serviciometeorologico.gob.ec/biblioteca/>) have a mean of $78.4 \pm 2.2\%$ (INAMHI; IAEA/WMO). Initial δD values of vapor were chosen that resulted in δD values of the low elevation data. The initial vapor value resulting in the low elevation δD_{mw} value was -84‰. For the Pleistocene, the initial vapor value resulting in the δD_{pw} value of low elevation Chalupas glass was -88.5‰.

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FIGURE CAPTIONS

Figure DR1. Right: stratigraphic column of the Naxiche Gorge outcrop, after Beate (1985). Pink triangles with numbers correspond to samples collected, and photos on the right. Right: Photos of the Naxiche Gorge stratigraphic section, with numbers corresponding to samples collected and labeled on the column to the left. A: basal Plinian falls. B and C: main body of the pyroclastic flow. D: upper part of the section corresponding to the reworked ash cloud that settled afterward.

Figure DR2. Selected plots highlighting volcanic glass major oxide composition (as average raw wt. % among replicate analyses) of Chalupas, Pifo A, and Pifo B volcanic glass samples collected in this study. Different colored outlines on the Chalupas symbols correspond to samples collected in the different physiographic regions discussed in the text (see Figure 1 in main text). Polygons are drawn around samples from the different deposits. A: K_2O vs CaO . B: MgO vs CaO . C: MgO vs SiO_2 .

Figure DR3. Plot of δD versus $\delta^{18}O$ (‰, VSMOW) values for the compiled modern water data from the Ecuadorian Andes. Squares are precipitation amount weighted means of rainfall data from IAEA GNIP stations. Closed circles are springwater data reported in Garcia et al. (1998) and open circles are springwater data from Maldonado et al. (1995). The dashed line is the Global Meteoric Water Line (GMWL) defined by the equation $\delta^{18}O=8*\delta D+10$ Craig (1961). The solid line is the Local Meteoric Water Line (LMWL) from linear regression of the data that has the equation $\delta^{18}O=8.17*\delta D+10.75$ ($R^2=0.99$).

Figure DR4. Plots of calculated elevation versus actual elevations (in meters above sea level) for: (A) modern water and Holocene glass using a 1-dimensional thermodynamic isotope rainout model parameterized with modern temperature (B) all volcanic glass samples using the same 1-dimensional thermodynamic isotope rainout model parameterized with modern temperature, resulting in an overestimation of glacial MIS 6 Pifo sample elevations (C) Holocene and Chalupas sample elevations are calculated using modern temperature. Error bars show 2σ uncertainty determined by the Monte Carlo simulation. Pifo A and Pifo B samples elevations were calculated using a 5 °C cooler temperature.

Fig DR1

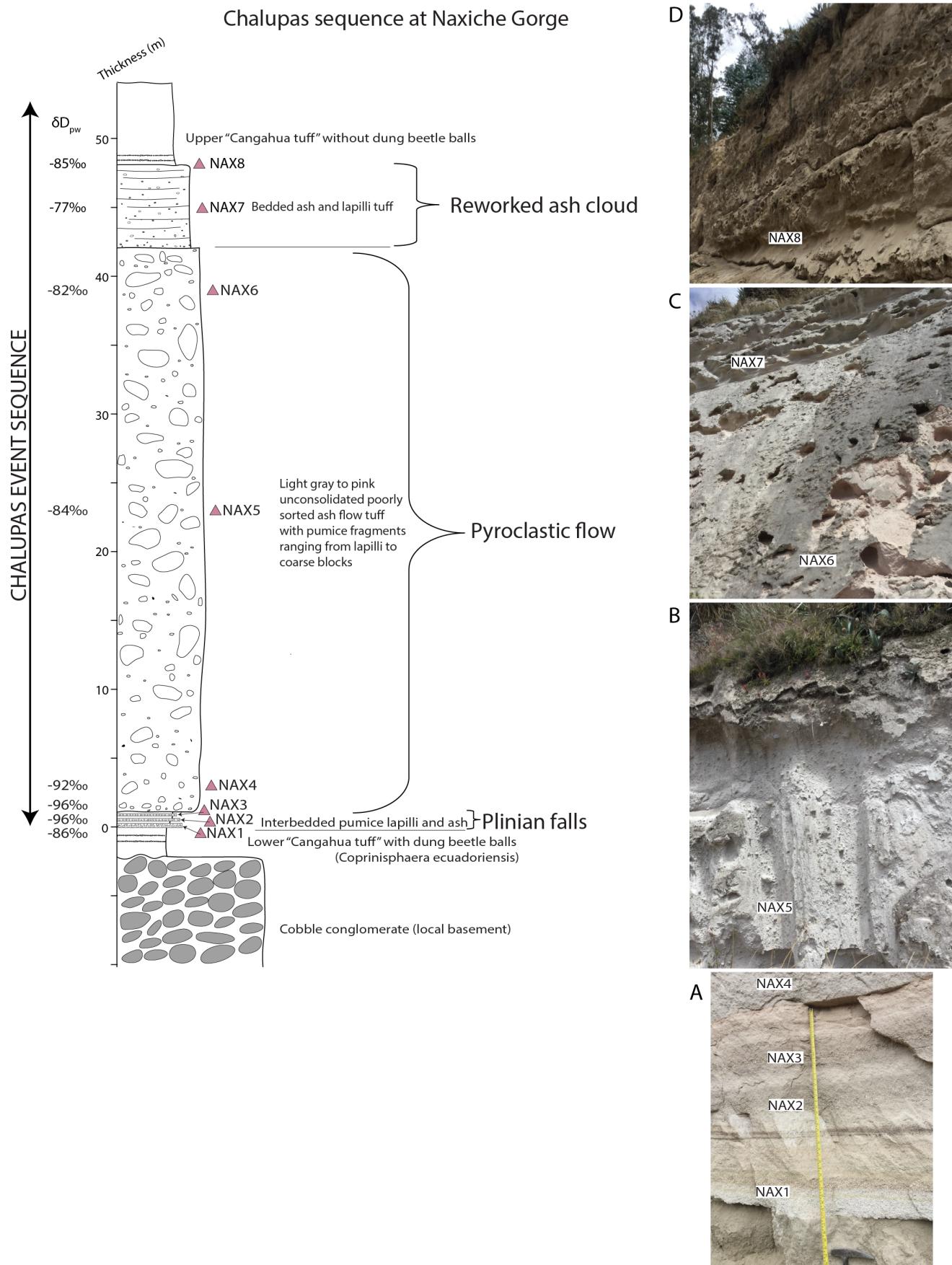


Fig DR2

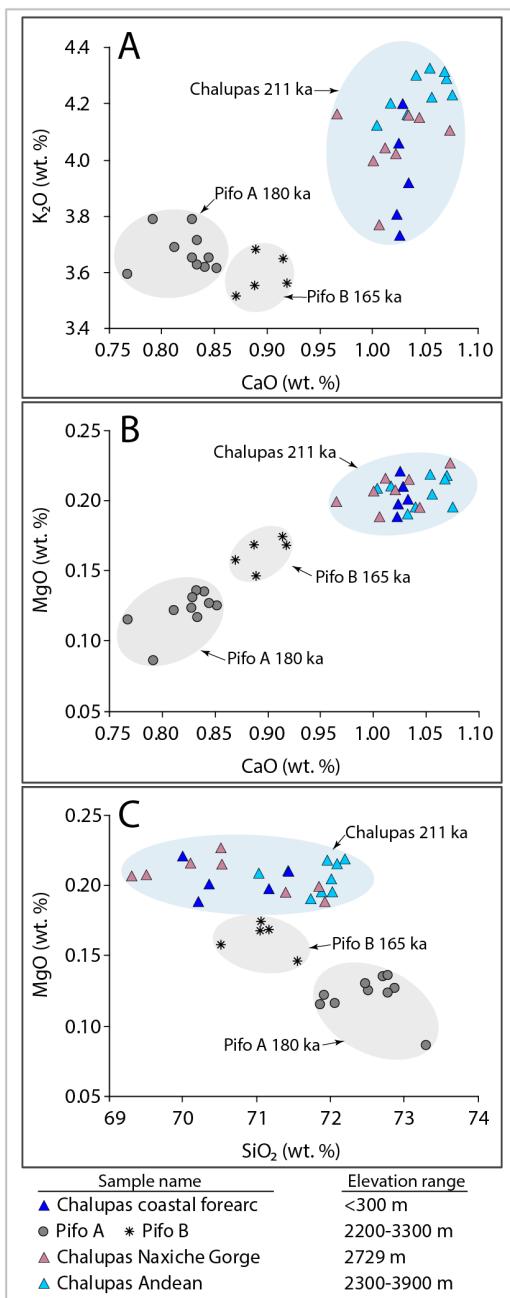


Fig DR3

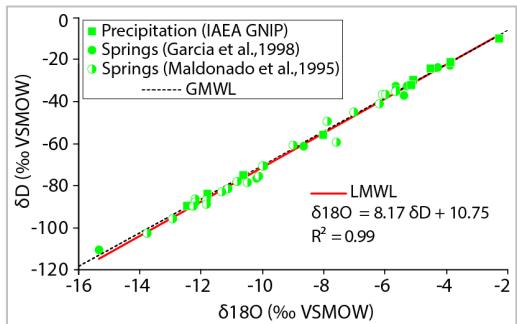


Fig DR4

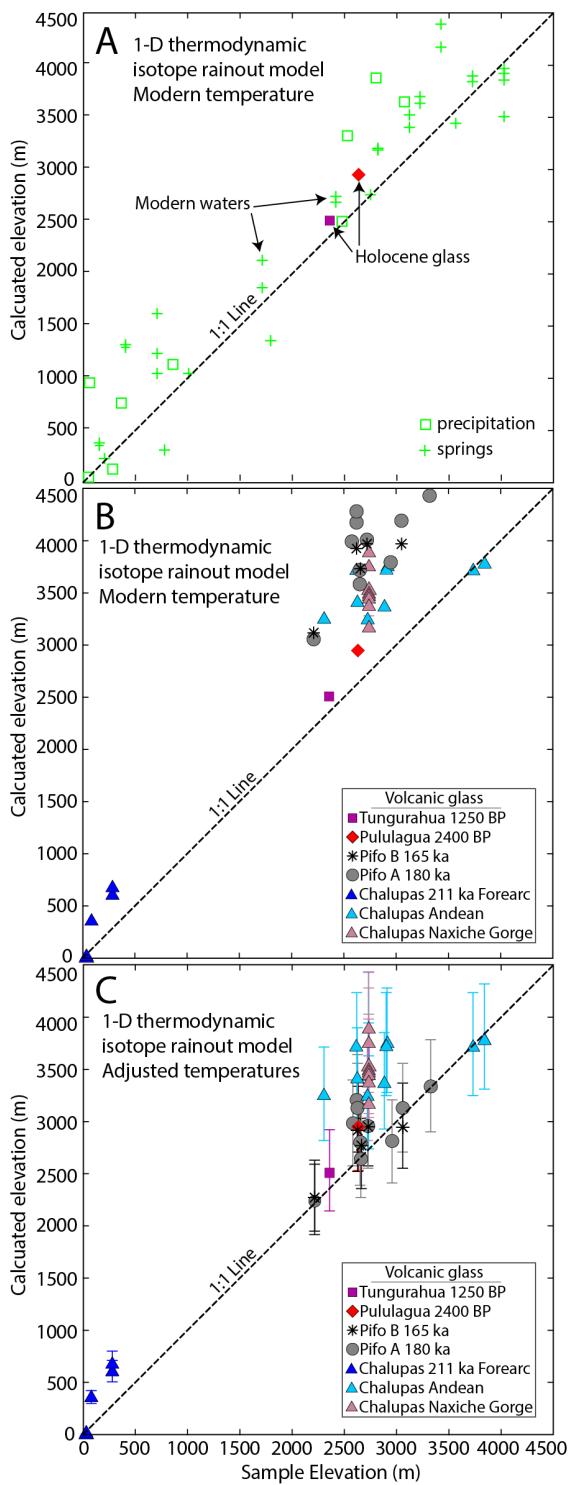


TABLE DR1. MODERN WATER LOCATION AND ISOTOPE DATA

Station name	Lat (°N)	Lat (°W)	Elevation (m asl)	δ18O (‰ VSMOW)	δD (‰ VSMOW)
<u>Precipitation: IAEA/WMO (2018)</u>					
MACHALA	-3.250	-79.983	6	-2.3	-9.4
ESMERALDAS	0.967	-79.633	30	-5.2	-31.8
UZHCURRUMI	-3.322	-79.600	290	-3.8	-21.1
LA CONCORDIA	0.105	-79.283	360	-5.1	-29.1
ALLURIQUIN	-0.317	-78.967	850	-5.7	-34.1
SAN ANTONIO DE PICHINCHA	-0.009	-78.440	2450	-8.0	-55.5
CUENCA	-2.883	-78.983	2510	-10.6	-74.6
QUITO-INAMHI	-0.167	-78.483	2789	-12.5	-89.4
IZOBAMBA	-0.370	-78.550	3058	-11.8	-83.4
<u>Spring name</u>					
<u>Spring name</u>					
Spring name	Lat (°N)	Lat (°W)	Recharge altitude* (m asl)	δ18O (‰ VSMOW)	δD (‰ VSMOW)
<u>Springs: Garcia et al., (1998)</u>					
La Independencia	0.05	-79.41	200	-3.9	-22.4
Sto. Domingo	-0.30	-79.06	700	-5.6	-32.4
Huascachaca	-3.30	-79.53	770	-4.3	-23.2
Tandapi	-0.34	-78.90	1000	-5.3	-32.4
Girón	-3.22	-79.20	1780	-5.4	-36.7
Portete	-3.11	-79.11	2730	-8.7	-60.7
Cordillera Real	-0.28	-78.25	3540	-10.2	-76.3
La Virgen N	-0.35	-78.20	3870	-15.3	-110.1
<u>Springs: Maldonado et al., (1995)</u>					
Indice Precipit Local (Guayas)	-1.96	-79.88	150	-4.5	-24.0
Pallantanga-Bucay (S. Pablo)	-2.19	-79.10	400	-6.0	-36.5
Pallantanga (14 Km despues)	-2.14	-79.05	700	-6.2	-40.9
Panza Redonda	-1.99	-78.96	1700	-7.0	-44.6
Rosas de Poliongo	-1.95	-78.95	2400	-7.6	-59.3
Pangor (6 Km SW)	-1.90	-78.91	2800	-10.0	-70.4
Pangor bajo	-1.85	-78.89	3100	-10.1	-75.4
Pangor alto	-1.82	-78.88	3200	-11.3	-82.7
Curva Juan de Velasco	-1.81	-78.86	3700	-12.2	-86.4
Divisoria Atlantico-Pacifico	-1.77	-78.80	4000	-11.8	-86.9
Calpi-Acequia	-1.62	-78.77	3400	-13.8	-102.6
Comd. Tuntatacto	-1.52	-78.67	4000	-11.8	-88.7
Indice Precipit Local (Guayas)	-1.96	-79.88	150	-4.5	-24.0
Pallantanga-Bucay (S. Pablo)	-2.19	-79.10	400	-6.1	-36.5
Pallantanga (14 Km despues)	-2.14	-79.05	700	-5.6	-34.8
Panza Redonda	-1.99	-78.96	1700	-7.9	-49.3
Rosas de Poliongo	-1.95	-78.95	2400	-9.0	-60.6
Pangor (6 Km SW)	-1.90	-78.91	2800	-10.0	-70.6
Pangor bajo	-1.85	-78.89	3100	-10.5	-78.2
Pangor alto	-1.82	-78.88	3200	-11.1	-81.1
Curva Juan de Velasco	-1.81	-78.86	3700	-12.2	-87.9
Divisoria Atlantico-Pacifico	-1.77	-78.80	4000	-10.8	-77.9
Calpi-Acequia	-1.62	-78.77	3400	-12.9	-95.7
Comd. Tuntatacto	-1.52	-78.67	4000	-12.3	-89.9

TABLE DR2. VOLCANIC GLASS SAMPLE LOCATION AND ISOTYPE DATA

Sample	Latitude (°N)	Longitude (°W)	Elevation (masl)	δD_{glass} (‰ VSMOW)	Water content (wt. %)	Average δD_{glass} (‰ VSMOW)	Calculated average $\delta D_{\text{water}}^*$ (‰ VSMOW)
<u>Chalupas 211 ka coastal forearc</u>							
EC16L4A	-1.1836	-80.8222	74	-62	4.9	-62	-30
EC16L4A				-63	4.9		
<u>EC16L5A</u>							
EC16L5A	-1.2193	-80.8162	26	-60	4.8	-59	-26
EC16L5A				-58	4.7		
EC16L5A				-58	4.8		
<u>EC16L6A</u>							
EC16L6A	-1.2193	-80.8162	26	-56	4.8	-56	-23
EC16L6A				-57	4.8		
EC16L6A				-55	4.9		
C3a	-0.9744	-79.2363	275	-67	4.0	-66	-34
C3a				-66	3.9		
C3a				-66	4.0		
C3b	-0.9744	-79.2363	275	-66	3.4	-65	-33
C3b				-65	3.5		
C3b				-63	3.5		
<u>Chalupas 211 ka Andean</u>							
EC1508	-0.9562	-78.6502	2897	-117	3.3	-121	-91
EC1508				-122	3.1		
EC1508				-124	3.2		
EC1501	-0.9331	-78.6629	2878	-113	2.8	-113	-82
EC1501				-113	2.8		
EC1501				-112	2.7		
EC16L1P	-1.1795	-78.5870	2717	-113	3.0	-110	-79
EC16L1P				-111	3.0		
EC16L1P				-113	3.0		
EC16L1P				-110	3.1		
EC16L1P				-107	2.9		
EC16L1P				-106	3.1		
EC16L2P	-0.5891	-78.4337	3728	-119	2.9	-121	-91
EC16L2P				-123	2.9		
EC16L2P				-122	3.0		
EC16L3P	-0.6102	-78.4209	3837	-123	3.0	-123	-93
EC16L3P				-122	3.0		
EC16L3P				-124	3.0		
EC16L4P	-1.0672	-78.5762	2615	-121	2.7	-121	-91
EC16L4P				-121	2.9		
EC16L4P				-121	2.8		
EC16L5P	-0.8636	-78.6042	2905	-121	2.9	-122	-92
EC16L5P				-123	3.0		

EC16L8P	-0.3663	-78.4202	2620	-114	2.8	-113	-83
EC16L8P				-114	3.0		
EC16L8P				-112	2.9		
EC17L9P	-0.1908	-78.4029	2301	-109	3.8	-109	-79
EC17L9P				-108	3.9		
EC17L9P				-111	4.0		
<u>Chalupas 211 ka Naxiche Gorge</u>							
EC16NAX8	-1.0712	-78.6203	2729	-116	4.2	-115	-85
EC16NAX8				-115	4.4		
EC16NAX8				-115	4.4		
EC16NAX7	-1.0712	-78.6203	2729	-109	3.7	-108	-77
EC16NAX7				-107	3.3		
EC16NAX7				-108	3.8		
EC16NAX6	-1.0712	-78.6203	2729	-112	3.7	-112	-82
EC16NAX6				-113	3.8		
EC16NAX6				-112	3.8		
EC16NAX5	-1.0712	-78.6203	2729	-114	2.8	-114	-84
EC16NAX5				-114	2.8		
EC16NAX5				-115	2.8		
EC16NAX4	-1.0712	-78.6203	2729	-121	3.7	-122	-92
EC16NAX4				-123	3.7		
EC16NAX4				-122	3.7		
EC16NAX3	-1.0712	-78.6203	2729	-127	4.1	-126	-96
EC16NAX3				-126	4.2		
EC16NAX3				-125	3.5		
EC16NAX2	-1.0712	-78.6203	2729	-127	4.3	-126	-96
EC16NAX2				-129	4.5		
EC16NAX2				-123	4.4		
EC16NAX1	-1.0712	-78.6203	2729	-115	3.3	-116	-86
EC16NAX1				-118	3.3		
EC16NAX1				-116	3.1		
<u>Pifo A 180 ka</u>							
ECCH01A	-0.0208	-78.2786	2578	-128	4.9	-127	-97
ECCH01A				-127	4.9		
ECCH01A				-127	4.9		
ECCH02A	-0.0447	-78.1775	3055	-131	4.6	-132	-102
ECCH02A				-133	4.7		
ECCH02A				-132	4.2		
ECCH04A	-0.0704	-78.1587	3323	-139	4.5	-140	-110
ECCH04A				-140	4.5		
ECCH04A				-140	4.4		
ECCH05A	-0.0342	-78.2804	2623	-134	4.6	-134	-105
ECCH05A				-135	4.6		
ECCH05A				-133	4.5		

ECCH06A	-0.0342	-78.2804	2623	-132	4.8	-132	-102
ECCH06A				-133	4.8		
ECCH06A				-132	4.9		
ECCH08A	-0.2995	-78.3583	2654	-115	4.3	-116	-86
ECCH08A				-116	4.4		
ECCH08A				-116	4.3		
ECCH10A	-0.2442	-78.3231	2723	-128	4.1	-127	-97
ECCH10A				-127	4.1		
ECCH10A				-127	4.1		
ECCH13A	-0.2523	-78.3021	2953	-121	4.2	-121	-91
ECCH13A				-120	4.2		
ECCH13A				-121	4.1		
ECCH13A				-124	3.9		
ECCH13A				-124	3.9		
ECCH13A				-124	4.0		
ECCH13A				-120	4.1		
ECCH13A				-121	4.0		
ECCH13A				-122	4.1		
ECCH13A				-119	4.1		
ECCH13A				-119	4.0		
ECCH14A	-0.0742	-78.3470	2212	-106	4.2	-104	-74
ECCH14A				-103	4.1		
ECCH14A				-104	3.6		
ECCH16A	-0.0986	-78.4191	2647	-119	4.4	-120	-90
ECCH16A				-121	4.5		
ECCH16A				-119	4.4		
<u>Pifo B 165 ka</u>							
ECCH03B	-0.0447	-78.1775	3055	-126	4.4	-126	-96
ECCH03B				-127	4.5		
ECCH03B				-125	4.5		
ECCH07B	-0.0342	-78.2804	2623	-123	2.6	-125	-95
ECCH07B				-126	4.4		
ECCH07B				-125	4.3		
ECCH09B	-0.2990	-78.3581	2659	-121	4.4	-120	-89
ECCH09B				-120	4.4		
ECCH09B				-118	4.1		
ECCH11B	-0.2442	-78.3231	2723	-126	4.4	-126	-96
ECCH11B				-127	4.4		
ECCH11B				-126	4.3		
ECCH15B	-0.0742	-78.3470	2212	-105	4.6	-105	-75
ECCH15B				-105	4.6		
ECCH15B				-105	4.6		
<u>Pululagua 2400 BP</u>							
EC17LJ10P	-0.0946	-78.4581	2631	-99	1.2	-97	-66
EC17LJ10P				-97	1.3		
EC17LJ10P				-97	1.1		

Tungurahua 1250 BP

EC17LJ1	-1.4799	-78.5114	2355	-89	1.9	-88	-57
EC17LJ1				-88	1.8		
EC17LJ1				-87	1.9		

*Calculated δD values of environmental water using the glass-water fractionation factor $\alpha=1.0343$ from Friedman et al. (

TABLE DR3. GLASS MAJOR OXIDE DATA

Sample name	Na ₂ O (wt. %)	K ₂ O (wt. %)	F (wt. %)	Al ₂ O ₃ (wt. %)	MgO (wt. %)	SiO ₂ (wt. %)	CaO (wt. %)	FeO (wt. %)	MnO (wt. %)	TiO ₂ (wt. %)	P ₂ O ₅ (wt. %)	Cl (wt. %)	SO ₂ (wt. %)	Total* (wt. %)
<u>Chalupas 211 ka coastal forearc</u>														
EC16L4A	3.17	3.83	0.04	13.28	0.22	70.06	1.02	0.98	0.03	0.24	0.00	0.10	0.08	93.04
EC16L4A	3.18	3.71	0.23	13.68	0.20	70.32	1.02	0.86	0.06	0.30	0.19	0.12	0.00	93.87
EC16L4A	3.09	3.73	0.00	13.29	0.24	69.64	1.08	0.96	0.02	0.17	0.00	0.12	0.00	92.35
EC16L4A	3.23	3.71	0.00	13.21	0.20	70.09	1.03	0.91	0.07	0.23	0.13	0.09	0.02	92.92
EC16L4A	3.22	3.63	0.00	13.22	0.21	70.22	1.00	0.89	0.05	0.12	0.00	0.09	0.05	92.70
EC16L4A	2.73	3.80	0.09	13.14	0.26	69.63	1.01	0.93	0.04	0.16	0.00	0.12	0.00	91.91
EC16L5A	3.23	3.88	0.12	13.25	0.21	70.65	0.98	0.83	0.04	0.17	0.00	0.10	0.03	93.51
EC16L5A	2.85	3.79	0.13	13.20	0.19	69.33	1.00	0.90	0.00	0.19	0.26	0.10	0.04	91.98
EC16L5A	3.36	3.66	0.12	13.52	0.17	70.61	1.07	1.07	0.05	0.23	0.00	0.11	0.00	93.95
EC16L5A	3.34	3.90	0.19	13.33	0.19	70.62	0.99	1.07	0.06	0.19	0.33	0.11	0.01	94.34
EC16L5A	3.17	3.82	0.08	13.21	0.17	70.14	1.08	0.98	0.09	0.28	0.39	0.10	0.03	93.54
EC16L5A	3.31	3.81	0.00	13.04	0.20	69.88	1.02	0.97	0.04	0.17	0.13	0.13	0.00	92.71
EC16L6A	3.07	3.98	0.00	13.24	0.18	70.16	0.97	0.94	0.09	0.15	0.00	0.11	0.03	92.93
EC16L6A	3.45	3.69	0.00	13.34	0.19	70.62	1.02	1.04	0.04	0.27	0.00	0.09	0.00	93.75
EC16L6A	3.03	4.00	0.00	13.47	0.22	70.12	1.02	1.00	0.00	0.24	0.00	0.10	0.03	93.23
EC16L6A	3.40	4.13	0.00	13.55	0.21	70.65	1.09	0.99	0.05	0.19	0.19	0.12	0.03	94.62
EC16L6A	3.36	3.88	0.00	13.43	0.23	70.26	1.01	0.85	0.06	0.15	0.52	0.11	0.00	93.85
EC16L6A	3.39	3.84	0.00	13.34	0.18	70.29	1.09	0.93	0.13	0.23	0.06	0.11	0.00	93.59
C3A	3.64	4.14	0.02	13.46	0.18	71.35	1.01	1.12	0.02	0.15	0.13	0.12	0.06	95.40
C3A	3.70	4.04	0.00	13.53	0.20	70.70	1.03	0.97	0.01	0.23	0.39	0.10	0.00	94.89
C3A	3.64	4.11	0.00	13.75	0.19	71.67	1.00	0.93	0.00	0.28	0.19	0.10	0.00	95.87
C3A	3.70	3.89	0.12	13.29	0.24	71.27	1.07	0.99	0.05	0.14	0.06	0.13	0.05	95.01
C3A	3.53	4.13	0.12	13.49	0.18	70.85	1.02	1.05	0.00	0.21	0.00	0.10	0.04	94.73
C3B	3.45	4.13	0.20	13.53	0.21	71.68	1.02	0.94	0.08	0.22	0.00	0.09	0.04	95.58
C3B	3.59	4.28	0.00	13.58	0.20	71.71	1.07	0.99	0.00	0.29	0.19	0.10	0.01	96.04
C3B	3.67	4.25	0.00	1.17	0.21	69.25	1.06	1.06	0.06	0.11	0.00	0.09	0.01	80.95
C3B	3.65	4.30	0.09	13.61	0.21	72.40	0.96	0.97	0.09	0.28	0.00	0.11	0.05	96.72
C3B	3.66	4.08	0.10	13.67	0.23	72.36	1.00	0.92	0.04	0.30	0.00	0.10	0.05	96.52
C3B	3.66	4.17	0.13	13.92	0.20	71.17	1.06	1.06	0.02	0.08	0.00	0.11	0.02	95.60
<u>Chalupas 211 ka Andean</u>														
EC1508	3.64	4.11	0.04	13.57	0.18	71.19	1.04	1.05	0.01	0.19	0.00	0.10	0.01	95.14
EC1508	3.38	4.15	0.00	13.76	0.17	71.87	1.03	0.88	0.03	0.22	0.19	0.09	0.02	95.78
EC1508	3.51	4.16	0.00	13.76	0.17	72.23	1.07	1.05	0.05	0.21	0.00	0.10	0.04	96.35
EC1508	3.50	4.10	0.00	13.64	0.22	71.41	1.02	1.10	0.11	0.18	0.06	0.11	0.00	95.46
EC1508	3.56	4.24	0.00	13.65	0.15	71.95	1.03	0.99	0.00	0.24	0.19	0.10	0.00	96.11
EC1508	3.49	4.21	0.00	13.58	0.24	71.72	1.02	1.00	0.04	0.18	0.00	0.12	0.03	95.63
EC1501	3.74	4.22	0.22	13.98	0.19	72.03	1.06	0.32	0.05	0.28	0.00	0.06	0.03	96.17
EC1501	3.60	4.17	0.04	13.88	0.21	72.37	1.06	0.88	0.05	0.12	0.00	0.09	0.02	96.50
EC1501	3.82	4.24	0.16	13.62	0.15	72.28	1.13	0.75	0.06	0.19	0.13	0.09	0.02	96.65
EC1501	3.65	4.29	0.03	13.63	0.23	71.37	1.07	0.87	0.08	0.24	0.45	0.10	0.01	96.04
EC16L1P	4.05	4.39	0.15	13.81	0.22	72.67	1.07	1.00	0.03	0.23	0.02	0.12	0.03	97.77
EC16L1P	3.73	4.37	0.19	13.54	0.19	72.14	1.05	1.10	0.02	0.22	0.00	0.11	0.03	96.69
EC16L1P	3.78	4.31	0.19	13.14	0.17	70.35	1.02	0.90	0.00	0.17	0.02	0.15	0.04	94.23
EC16L1P	3.87	4.21	0.00	13.46	0.18	72.64	1.04	0.83	0.04	0.15	0.01	0.14	0.00	96.57
EC16L1P	3.92	4.22	0.06	13.20	0.22	71.56	1.02	1.05	0.03	0.22	0.06	0.14	0.03	95.72
EC16L2P	3.86	4.27	0.00	13.58	0.20	72.47	1.02	0.99	0.05	0.18	0.03	0.12	0.03	96.81
EC16L2P	3.41	4.36	0.00	13.40	0.23	71.55	1.07	0.93	0.03	0.16	0.05	0.17	0.03	95.40
EC16L2P	3.73	4.43	0.09	13.54	0.22	72.46	0.99	0.97	0.06	0.17	0.03	0.11	0.03	96.81
EC16L2P	3.65	4.52	0.15	13.54	0.21	72.08	1.07	1.00	0.08	0.24	0.06	0.16	0.00	96.75
EC16L2P	3.71	4.07	0.00	13.60	0.23	72.41	1.12	0.98	0.06	0.18	0.01	0.16	0.03	96.55
EC16L3P	2.46	4.35	0.00	13.66	0.18	72.55	1.08	1.03	0.09	0.21	0.01	0.13	0.00	95.76
EC16L3P	4.07	4.36	0.00	13.66	0.22	71.40	1.10	0.98	0.09	0.19	0.01	0.19	0.00	96.27
EC16L3P	3.66	4.37	0.09	13.53	0.24	71.59	1.06	1.09	0.02	0.19	0.07	0.12	0.02	96.05
EC16L3P	3.82	4.19	0.00	13.37	0.25	72.16	1.06	1.07	0.11	0.17	0.02	0.13	0.05	96.39
EC16L3P	3.78	4.18	0.04	13.37	0.20	72.05	1.06	0.83	0.02	0.24	0.05	0.15	0.05	96.03
EC16L4P	3.77	4.22	0.00	13.10	0.18	71.85	1.11	1.00	0.00	0.17	0.03	0.14	0.01	95.57
EC16L4P	3.92	4.26	0.00	13.51	0.20	71.91	1.05	0.98	0.04	0.17	0.01	0.12	0.05	96.22
EC16L4P	4.04	4.19	0.24	13.13	0.22	71.72	1.05	1.03	0.04	0.20	0.03	0.13	0.00	96.02
EC16L4P	4.23	4.31	0.09	13.56	0.23	73.09	1.07	1.01	0.03	0.24	0.00	0.11	0.01	97.97
EC16L4P	3.90	4.14	0.00	13.33	0.20	71.49	1.00	1.03	0.05	0.21	0.00	0.14	0.00	95.49

EC16L5P	3.52	4.21	0.03	13.63	0.23	71.91	1.09	1.07	0.06	0.20	0.00	0.14	0.01	96.10
EC16L5P	3.62	4.35	0.23	13.42	0.23	71.87	1.06	0.91	0.04	0.16	0.00	0.14	0.02	96.06
EC16L5P	3.79	4.34	0.18	13.50	0.23	72.20	1.06	1.08	0.06	0.18	0.03	0.13	0.00	96.78
EC16L5P	3.80	4.33	0.00	13.61	0.20	71.66	1.06	0.85	0.00	0.20	0.08	0.12	0.05	95.95
EC16L5P	3.69	4.34	0.00	13.31	0.19	72.77	1.07	1.02	0.00	0.19	0.10	0.14	0.03	96.86
EC16L8P	3.92	4.12	0.24	13.45	0.22	71.60	1.06	1.00	0.00	0.22	0.02	0.13	0.04	96.03
EC16L8P	4.13	4.20	0.00	13.16	0.21	71.16	1.03	1.05	0.01	0.17	0.05	0.12	0.02	95.32
EC16L8P	3.96	4.19	0.09	13.31	0.24	71.03	0.97	0.98	0.05	0.18	0.03	0.13	0.04	95.21
EC16L8P	4.06	4.13	0.00	13.22	0.19	70.83	1.01	1.04	0.07	0.16	0.09	0.14	0.00	94.93
EC16L8P	3.74	4.00	0.37	13.20	0.19	70.53	0.95	1.00	0.08	0.17	0.01	0.11	0.01	94.35
EC16L9P	4.02	4.10	0.24	13.45	0.19	71.80	1.03	1.04	0.07	0.18	0.04	0.12	0.00	96.29
EC16L9P	3.96	4.21	0.09	13.53	0.23	71.54	1.03	0.92	0.01	0.20	0.02	0.15	0.01	95.91
EC16L9P	3.84	4.22	0.05	13.50	0.20	70.76	0.97	0.97	0.00	0.19	0.01	0.15	0.01	94.87
EC16L9P	3.61	4.21	0.15	13.35	0.22	71.45	1.01	0.96	0.09	0.20	0.04	0.16	0.03	95.48
EC16L9P	3.91	4.29	0.01	13.66	0.21	71.54	1.04	1.00	0.04	0.20	0.07	0.14	0.04	96.14
<u>Chalupas 211 ka Naxiche Gorge</u>														
EC16NAX8	3.64	4.09	0.00	13.61	0.18	71.53	1.05	1.03	0.06	0.34	0.52	0.11	0.03	96.18
EC16NAX8	3.49	4.23	0.13	13.78	0.24	72.19	1.01	1.11	0.03	0.06	0.45	0.12	0.00	96.83
EC16NAX8	3.29	4.04	0.00	13.63	0.22	72.18	0.98	0.99	0.04	0.08	0.06	0.10	0.00	95.62
EC16NAX8	3.39	2.95	0.14	13.85	0.18	70.67	1.21	0.86	0.11	0.07	0.00	0.07	0.03	93.54
EC16NAX8	3.37	4.13	0.00	12.66	0.16	73.42	0.82	0.79	0.04	0.19	0.33	0.06	0.00	95.97
EC16NAX8	3.49	3.18	0.00	13.45	0.16	71.56	0.98	0.85	0.09	0.11	0.00	0.08	0.06	94.01
EC16NAX7	3.83	3.93	0.00	12.93	0.20	69.77	1.06	1.00	0.01	0.20	0.01	0.14	0.02	93.09
EC16NAX7	4.05	4.14	0.02	13.16	0.19	70.98	1.05	0.93	0.00	0.20	0.05	0.12	0.03	94.92
EC16NAX7	3.98	4.21	0.11	13.37	0.22	70.91	1.08	1.02	0.00	0.17	0.04	0.16	0.03	95.29
EC16NAX7	3.92	4.06	0.16	13.62	0.34	69.51	1.17	1.31	0.00	0.23	0.02	0.14	0.04	94.50
EC16NAX7	3.94	4.19	0.11	13.36	0.18	71.39	1.00	1.11	0.03	0.21	0.04	0.13	0.05	95.74
EC16NAX6	4.10	4.13	0.00	13.46	0.17	71.32	1.06	1.09	0.00	0.19	0.01	0.15	0.00	95.68
EC16NAX6	3.93	4.15	0.09	13.81	0.22	71.40	1.06	1.12	0.13	0.21	0.03	0.11	0.01	96.28
EC16NAX6	3.76	4.13	0.00	13.31	0.18	71.74	1.03	1.05	0.06	0.21	0.02	0.16	0.00	95.64
EC16NAX6	3.79	4.15	0.05	13.53	0.18	71.13	1.04	1.07	0.06	0.20	0.02	0.15	0.01	95.40
EC16NAX6	3.89	4.19	0.05	13.24	0.23	71.31	1.03	0.99	0.03	0.20	0.01	0.13	0.03	95.33
EC16NAX5	3.91	4.20	0.02	13.20	0.20	71.96	1.01	1.06	0.00	0.19	0.02	0.13	0.00	95.89
EC16NAX5	3.71	4.28	0.00	13.31	0.22	71.21	1.03	0.96	0.08	0.20	0.06	0.13	0.02	95.21
EC16NAX5	4.04	4.18	0.00	13.11	0.19	71.97	0.95	0.92	0.00	0.20	0.03	0.15	0.03	95.77
EC16NAX5	3.49	4.03	0.32	12.60	0.19	72.91	0.81	0.76	0.03	0.18	0.04	0.06	0.05	95.47
EC16NAX5	3.92	4.12	0.13	13.29	0.19	71.14	1.02	1.02	0.02	0.21	0.04	0.13	0.00	95.24
EC16NAX4	3.90	4.18	0.17	13.39	0.21	70.57	1.03	1.09	0.02	0.21	0.03	0.13	0.01	94.94
EC16NAX4	4.04	4.23	0.00	13.15	0.19	70.67	1.07	1.15	0.03	0.22	0.04	0.14	0.02	94.95
EC16NAX4	3.91	4.19	0.00	13.46	0.25	70.23	1.04	0.98	0.01	0.17	0.08	0.16	0.04	94.53
EC16NAX4	3.84	4.16	0.00	13.41	0.23	70.52	1.01	0.96	0.06	0.17	0.02	0.16	0.01	94.55
EC16NAX4	4.05	4.03	0.14	13.34	0.20	70.61	1.02	1.11	0.01	0.20	0.00	0.15	0.02	94.88
EC16NAX3	4.05	4.20	0.27	13.22	0.24	69.78	0.92	0.88	0.00	0.20	0.03	0.13	0.00	93.92
EC16NAX3	3.72	3.93	0.00	13.07	0.18	70.25	1.02	1.08	0.00	0.23	0.03	0.14	0.03	93.70
EC16NAX3	3.97	3.93	0.00	13.40	0.21	70.48	1.04	0.98	0.00	0.21	0.02	0.11	0.00	94.35
EC16NAX3	3.75	4.11	0.00	12.97	0.22	69.63	1.08	1.05	0.06	0.23	0.01	0.11	0.00	93.23
EC16NAX3	3.77	4.05	0.00	13.20	0.23	70.38	1.00	1.10	0.03	0.21	0.06	0.16	0.00	94.19
EC16NAX2	4.02	3.93	0.00	12.75	0.21	69.43	1.01	1.01	0.02	0.14	0.03	0.14	0.03	92.72
EC16NAX2	3.66	3.95	0.14	12.92	0.19	69.62	0.99	0.96	0.06	0.18	0.04	0.12	0.02	92.84
EC16NAX2	3.80	4.02	0.10	12.74	0.19	69.43	1.05	1.01	0.06	0.20	0.03	0.14	0.03	92.78
EC16NAX2	3.90	4.20	0.09	12.95	0.22	69.21	0.97	1.02	0.05	0.21	0.03	0.15	0.03	93.04
EC16NAX2	3.88	4.01	0.19	13.29	0.23	69.86	1.08	1.03	0.07	0.23	0.01	0.16	0.04	94.08
EC16NAX1	3.87	3.99	0.15	12.82	0.21	70.19	1.01	1.00	0.00	0.20	0.05	0.15	0.00	93.64
EC16NAX1	4.12	4.12	0.00	12.91	0.21	69.43	1.05	0.99	0.00	0.21	0.01	0.13	0.08	93.27
EC16NAX1	3.72	4.05	0.01	12.94	0.17	69.40	1.01	1.05	0.00	0.19	0.08	0.15	0.03	92.81
EC16NAX1	3.97	4.00	0.09	12.74	0.23	69.19	1.00	1.06	0.01	0.22	0.01	0.11	0.00	92.63
EC16NAX1	3.97	3.84	0.27	12.83	0.22	68.90	0.98	1.03	0.00	0.26	0.00	0.17	0.00	92.48
EC16NAX1	3.59	3.90	0.00	12.76	0.19	68.80	0.93	0.97	0.01	0.23	0.03	0.14	0.01	91.55
EC16NAX1	3.55	4.10	0.18	12.91	0.21	69.25	1.01	0.88	0.05	0.18	0.04	0.13	0.02	92.52
<u>Pifo A 180 ka</u>														
ECCH01A	3.63	3.59	0.09	12.41	0.10	71.90	0.83	0.67	0.11	0.13	0.02	0.10	0.00	93.57

ECCH01A	2.72	3.58	0.05	12.40	0.14	71.54	0.85	0.62	0.05	0.15	0.03	0.12	0.01	92.28
ECCH01A	3.47	3.92	0.05	12.30	0.12	71.94	0.80	0.62	0.02	0.12	0.06	0.08	0.02	93.52
ECCH01A	3.88	3.73	0.00	12.51	0.11	72.24	0.84	0.64	0.05	0.09	0.06	0.09	0.00	94.26
ECCH01A	3.94	3.76	0.00	12.47	0.12	72.57	0.84	0.71	0.05	0.16	0.03	0.12	0.03	94.81
ECCH02A	3.69	3.66	0.09	12.40	0.11	73.08	0.85	0.60	0.02	0.13	0.06	0.10	0.00	94.80
ECCH02A	3.53	3.56	0.05	12.36	0.13	71.96	0.84	0.64	0.06	0.13	0.04	0.10	0.00	93.41
ECCH02A	3.62	3.56	0.05	12.53	0.14	73.12	0.85	0.73	0.00	0.13	0.06	0.10	0.03	94.92
ECCH02A	3.68	3.66	0.00	12.40	0.16	72.87	0.80	0.67	0.03	0.13	0.03	0.10	0.01	94.54
ECCH02A	3.70	3.67	0.16	12.51	0.13	72.47	0.85	0.68	0.00	0.16	0.00	0.10	0.04	94.47
ECCH04A	3.54	3.57	0.05	12.15	0.05	72.01	0.76	0.66	0.02	0.07	0.00	0.09	0.02	93.00
ECCH04A	3.56	3.93	0.23	12.48	0.14	72.89	0.88	0.66	0.03	0.12	0.02	0.09	0.01	95.03
ECCH04A	3.61	3.57	0.00	12.24	0.16	71.07	0.77	0.59	0.00	0.10	0.00	0.09	0.02	92.22
ECCH04A	3.63	3.81	0.00	12.39	0.13	71.34	0.84	0.70	0.00	0.12	0.04	0.10	0.05	93.15
ECCH04A	3.86	3.57	0.33	12.37	0.13	72.17	0.80	0.66	0.01	0.13	0.06	0.10	0.01	94.20
ECCH05A	3.62	3.59	0.00	12.63	0.12	72.11	0.78	0.71	0.04	0.15	0.00	0.10	0.02	93.86
ECCH05A	3.61	3.76	0.00	12.34	0.14	72.52	0.77	0.61	0.05	0.11	0.08	0.09	0.00	94.06
ECCH05A	3.75	3.40	0.00	12.18	0.10	70.82	0.73	0.58	0.04	0.11	0.00	0.11	0.04	91.87
ECCH05A	3.70	3.64	0.00	12.31	0.10	71.96	0.78	0.64	0.01	0.10	0.06	0.10	0.00	93.41
ECCH06A	4.00	3.70	0.00	12.45	0.13	71.96	0.90	0.60	0.06	0.15	0.00	0.09	0.00	94.04
ECCH06A	3.86	3.64	0.09	12.56	0.13	72.76	0.83	0.71	0.03	0.14	0.01	0.09	0.02	94.86
ECCH06A	3.59	3.63	0.14	12.35	0.12	72.27	0.82	0.80	0.05	0.10	0.03	0.08	0.00	93.98
ECCH06A	3.81	3.47	0.00	12.36	0.11	73.21	0.86	0.69	0.02	0.13	0.03	0.10	0.00	94.79
ECCH06A	3.66	3.65	0.00	12.37	0.13	72.28	0.85	0.62	0.02	0.16	0.00	0.10	0.02	93.85
ECCH08A	3.77	3.67	0.00	12.39	0.11	72.69	0.86	0.65	0.05	0.12	0.03	0.10	0.03	94.47
ECCH08A	3.88	3.72	0.05	12.31	0.15	72.78	0.84	0.56	0.06	0.10	0.02	0.09	0.05	94.59
ECCH08A	3.60	3.66	0.00	12.32	0.14	72.80	0.85	0.66	0.07	0.13	0.03	0.09	0.01	94.37
ECCH08A	3.99	3.71	0.09	12.49	0.12	73.64	0.86	0.65	0.11	0.13	0.02	0.10	0.06	95.95
ECCH08A	3.66	3.51	0.00	12.47	0.12	72.39	0.81	0.67	0.08	0.11	0.04	0.08	0.03	93.96
ECCH10A	3.92	3.57	0.00	12.51	0.12	73.37	0.86	0.84	0.05	0.08	0.00	0.10	0.04	95.45
ECCH10A	3.98	3.65	0.14	12.58	0.12	71.92	0.84	0.65	0.05	0.11	0.05	0.13	0.03	94.25
ECCH10A	3.87	3.55	0.05	12.65	0.13	73.04	0.81	0.80	0.03	0.14	0.05	0.12	0.00	95.22
ECCH10A	3.79	3.72	0.00	12.56	0.12	72.72	0.83	0.69	0.10	0.10	0.00	0.10	0.00	94.72
ECCH10A	3.46	3.62	0.05	12.33	0.16	72.92	0.85	0.66	0.09	0.10	0.00	0.08	0.03	94.34
ECCH10A	3.82	3.69	0.00	12.22	0.18	72.64	0.81	0.74	0.04	0.14	0.03	0.10	0.02	94.43
ECCH13A	3.84	3.79	0.00	12.71	0.10	73.83	0.79	0.64	0.01	0.11	0.00	0.05	0.03	95.91
ECCH13A	3.72	3.72	0.00	12.39	0.10	74.07	0.79	0.56	0.04	0.16	0.00	0.07	0.02	95.65
ECCH13A	3.78	3.81	0.00	12.60	0.04	73.58	0.78	0.55	0.06	0.14	0.00	0.07	0.00	95.42
ECCH13A	3.61	3.59	0.00	12.25	0.10	71.23	0.71	0.54	0.05	0.13	0.03	0.08	0.00	92.32
ECCH13A	3.82	3.87	0.00	12.42	0.11	73.61	0.89	0.67	0.04	0.11	0.01	0.07	0.04	95.66
ECCH13A	3.69	3.98	0.00	12.68	0.07	73.35	0.79	0.64	0.00	0.10	0.02	0.08	0.03	95.42
ECCH14A	3.93	3.86	0.00	12.75	0.14	72.91	0.89	0.69	0.07	0.13	0.02	0.10	0.02	95.50
ECCH14A	3.92	3.68	0.01	12.84	0.12	72.84	0.85	0.71	0.03	0.12	0.02	0.10	0.00	95.23
ECCH14A	3.83	3.52	0.02	12.55	0.12	72.89	0.85	0.64	0.04	0.13	0.02	0.08	0.00	94.68
ECCH14A	4.01	3.66	0.10	12.24	0.11	71.89	0.75	0.63	0.03	0.13	0.00	0.09	0.01	93.64
ECCH14A	3.81	3.55	0.09	12.57	0.17	71.75	0.81	0.75	0.00	0.14	0.02	0.08	0.03	93.76
ECCH16A	3.80	3.78	0.00	12.49	0.09	73.17	0.81	0.68	0.07	0.07	0.02	0.09	0.00	95.08
ECCH16A	3.71	3.91	0.00	12.80	0.14	73.04	0.84	0.69	0.00	0.12	0.01	0.10	0.02	95.38
ECCH16A	3.82	3.74	0.00	12.42	0.15	71.46	0.81	0.71	0.04	0.15	0.03	0.09	0.00	93.42
ECCH16A	4.00	3.72	0.04	12.65	0.11	73.38	0.79	0.61	0.04	0.13	0.02	0.11	0.01	95.61
ECCH16A	3.74	3.82	0.16	12.64	0.13	72.75	0.89	0.66	0.05	0.13	0.01	0.10	0.00	95.08
Pifo B 165 ka														
ECCH03B	3.71	3.73	0.00	12.37	0.12	72.38	0.84	0.57	0.00	0.11	0.03	0.07	0.05	93.98
ECCH03B	3.79	3.80	0.00	12.41	0.14	72.57	0.85	0.79	0.01	0.14	0.01	0.11	0.04	94.65
ECCH03B	3.71	3.71	0.00	12.39	0.13	72.71	0.90	0.73	0.05	0.11	0.00	0.11	0.00	94.55
ECCH03B	3.90	3.62	0.09	12.97	0.17	69.83	0.89	0.89	0.10	0.16	0.02	0.13	0.03	92.81
ECCH03B	3.79	3.55	0.14	12.84	0.17	70.26	0.97	0.89	0.13	0.20	0.02	0.13	0.04	93.12
ECCH07B	4.35	3.41	0.11	13.27	0.17	70.38	0.90	0.88	0.01	0.18	0.08	0.15	0.06	93.94
ECCH07B	4.21	3.62	0.00	12.89	0.13	70.76	0.84	0.94	0.04	0.15	0.01	0.15	0.01	93.74
ECCH07B	4.24	3.68	0.23	13.18	0.19	70.41	0.91	0.88	0.06	0.17	0.02	0.17	0.03	94.17
ECCH07B	4.69	3.31	0.09	12.82	0.15	69.64	0.89	0.91	0.05	0.16	0.09	0.15	0.06	93.03
ECCH07B	4.26	3.57	0.00	12.97	0.15	71.38	0.80	0.79	0.00	0.14	0.03	0.14	0.04	94.27

ECCH09B	4.07	3.46	0.00	13.04	0.15	71.54	0.86	0.90	0.04	0.15	0.01	0.15	0.01	0.01	94.38
ECCH09B	3.99	3.64	0.00	12.83	0.19	70.90	0.87	0.79	0.05	0.17	0.02	0.15	0.02	0.02	93.63
ECCH09B	4.31	3.61	0.00	13.09	0.14	71.64	0.90	0.91	0.02	0.17	0.04	0.16	0.01	0.01	95.00
ECCH09B	4.36	3.50	0.00	13.00	0.14	71.14	0.87	0.78	0.00	0.15	0.06	0.17	0.01	0.01	94.19
ECCH09B	4.02	3.57	0.00	13.30	0.21	70.62	0.93	0.81	0.03	0.19	0.07	0.14	0.06	0.06	93.95
ECCH11B	4.07	3.55	0.00	13.19	0.20	70.50	0.95	0.91	0.06	0.19	0.00	0.16	0.03	0.03	93.81
ECCH11B	4.14	3.62	0.23	13.14	0.16	70.49	0.96	1.01	0.00	0.16	0.00	0.20	0.01	0.01	94.11
ECCH11B	4.05	3.42	0.16	12.99	0.16	72.04	0.85	0.71	0.01	0.17	0.02	0.17	0.04	0.04	94.81
ECCH11B	4.17	3.66	0.42	13.14	0.17	70.65	0.92	0.76	0.03	0.19	0.03	0.16	0.03	0.03	94.34
ECCH11B	4.21	3.58	0.00	13.45	0.15	71.53	0.91	0.86	0.07	0.16	0.01	0.18	0.00	0.00	95.11
ECCH15B	4.17	3.59	0.28	13.32	0.20	70.68	0.92	0.85	0.07	0.17	0.02	0.18	0.02	0.02	94.47
ECCH15B	4.39	3.45	0.00	13.40	0.16	70.91	0.91	0.95	0.08	0.19	0.01	0.17	0.06	0.06	94.69
ECCH15B	4.37	3.68	0.01	13.33	0.16	71.70	0.90	0.78	0.07	0.15	0.05	0.16	0.02	0.02	95.40
ECCH15B	4.55	3.76	0.00	13.47	0.20	71.58	0.98	0.90	0.01	0.18	0.03	0.16	0.01	0.01	95.83
ECCH15B	4.08	3.77	0.10	13.01	0.16	70.39	0.85	0.73	0.03	0.14	0.01	0.18	0.00	0.00	93.46
<u>Pululagua 2400 BP</u>															
EC17LJ10P	5.82	0.10	0.37	28.34	0.00	55.43	9.83	0.21	0.02	0.04	0.00	0.01	0.01	0.01	100.17
EC17LJ10P	5.19	0.13	0.00	29.25	0.00	53.38	11.14	0.15	0.02	0.02	0.00	0.00	0.00	0.00	99.29
EC17LJ10P	5.71	0.11	0.00	27.95	0.01	54.69	9.67	0.30	0.02	0.00	0.05	0.01	0.00	0.00	98.51
EC17LJ10P	6.09	0.10	0.10	27.88	0.02	55.58	9.13	0.19	0.00	0.00	0.02	0.00	0.03	0.03	99.13
EC17LJ10P	6.35	0.12	0.07	27.68	0.00	56.60	9.25	0.17	0.03	0.02	0.02	0.00	0.01	0.01	100.32
EC17LJ10P	6.34	0.13	0.02	27.86	0.00	56.52	8.94	0.17	0.00	0.00	0.05	0.00	0.00	0.00	100.03
<u>Tungurahua 1250 BP</u>															
EC17LJ1	3.93	4.40	0.16	12.37	0.21	74.22	0.70	1.54	0.04	0.38	0.03	0.12	0.03	0.03	98.13
EC17LJ1	4.93	2.89	0.00	21.66	0.08	62.07	6.05	0.95	0.00	0.12	0.02	0.04	0.00	0.00	98.82
EC17LJ1	5.75	0.40	0.08	27.55	0.02	54.71	9.49	0.32	0.01	0.01	0.02	0.00	0.00	0.00	98.37
EC17LJ1	4.38	3.91	0.00	13.35	0.38	70.26	1.34	2.05	0.08	0.56	0.08	0.10	0.00	0.00	96.49
EC17LJ1	6.77	0.56	0.00	25.55	0.00	58.62	7.29	0.45	0.00	0.03	0.03	0.01	0.02	0.02	99.33
EC17LJ1	4.28	4.25	0.00	12.83	0.29	71.19	0.93	1.67	0.06	0.47	0.05	0.10	0.00	0.00	96.12
EC17LJ1	3.92	4.27	0.14	12.52	0.27	70.55	0.90	1.63	0.09	0.40	0.05	0.10	0.00	0.00	94.84

*Totals are non-normalized.
