Sediment coring

A 327-cm-long continuous sediment core was taken from the depocenter (21.5 m) of Yanacocha in 2011 using a percussion coring system, and the top 23 cm were sampled in the field at 0.25-cm intervals. A core was also collected from the shallow basin of the lake for a basal radiocarbon age (Table DR1).

Lake Sediment Geochronology

The age model is based on ^{210}Pb dating of the upper 10 cm of the core and radiocarbon ages (Table DR1) that were calibrated and converted to calendar and modeled ages (with present defined as A.D. 1950) using Oxcal version 4.2 and the Intcal13 dataset (Bronk Ramsey, 2008; Reimer et al., 2013). Ages were omitted if they were excluded by the OxCal depositional model as outliers.

Sedimentology and Geochemistry

The sediment core data are available for download from the National Climatic Data Center (http://www.ncdc.noaa.gov/paleo/study/18495). Sediment cores were analyzed using an ITRAX scanning X-Ray Fluorescence (XRF) at 1 mm spacing. The extruded sediments were measured using an Innov-X handheld XRF. Principal component 1 (PC1) analysis was applied to a subset of geochemical data that are typical of quartz monzonite bedrock: Al, Si, S, K, Ca, Ti, Mn, Fe, Zn, Rb, Sr and Zr. Total inorganic carbon (TIC) and total carbon (TC) values were measured by coulometry every 3 to 5 cm down core. Total carbon was measured by combusting samples at 1000°C using a UIC 5200 automated furnace, and TIC was measured by acidifying samples in 1.0 N $HClO_4$ using a UIC 5240 acidification module; the carbon dioxide liberated in both cases was measured using a UIC Coulometrics™ carbon dioxide coulometer at Union College. Weight percentage total organic carbon (TOC) was calculated by subtracting TIC from TC (TOC=TC-TIC) and converted to percent organic matter by multiplying by 1.72.

Weight percentage biogenic silica ($bSiO_2$) was measured on centimeter-thick sections, taken every 10 to 20 cm down-core. A modified wet alkali sequential digestion method (DeMaster, 1979, 1981; Conley, 1998) was used on approximately 10 mg of freeze-dried sediment (Conley and Schelske, 2001). The clastic sediment component was calculated as the fraction remaining after subtracting organic matter and biogenic silica from the total dry sediment bulk density. However, biogenic silica concentrations are <1% throughout the record and are considered negligible. Clastic sediment was converted to flux ($g/cm^2/yr$) by multiplying the clastic component of dry bulk density (g/cm^3) by sedimentation rate (cm/yr).

^{10}Be Exposure Ages

Samples for ^{10}Be exposure dating were collected from quartz monzonite erratics following previously described field protocols (e.g. Licciardi et al., 2009). Rock was chiseled from near the center of boulder top surfaces on stable parts of moraine crests. The tallest stable boulders (>1 m where possible) with glacial polish, smoothing, and/or negligible surface pitting were targeted to minimize issues with erosion and to reduce the potential for soil and snow cover. Geographic coordinates and altitudes of each boulder were obtained using a handheld GPS, and topographic measurements and strike and dip of rock surfaces were used to derive shielding corrections for each sample site.

Samples collected for ^{10}Be exposure dating were sawed to a measured uniform thickness (0.5–5.0 cm), and milled to a 710–355 μm size fraction at Union College. Beryllium was extracted from milled rock to produce purified BeO target material for accelerator mass spectrometry (AMS) analysis, following established geochemical procedures (Licciardi et al., 2009) in clean laboratory facilities at the University of New Hampshire. Crushed samples were sonicated in 6 N HCl for pre-cleaning, and quartz was then isolated by repeated etching in a 2% HF/1% HNO_3 solution (Kohl and Nishiizumi, 1992) . ^{9}Be carrier (~0.2 mg) was added to the purified quartz samples before dissolution in concentrated HF. Beryllium was extracted from samples using ion-exchange chromatography, selective precipitation, and oxidation to BeO. All AMS measurements of ^{10}Be/^{9}Be were obtained at the Lawrence Livermore National Laboratory Center for Accelerator Mass Spectrometry. See Table DR2 for additional measurement details.

Exposure ages were derived using the CRONUS-Earth (Cosmic-Ray prOduced NUclide Systematics on Earth) online ^{10}Be exposure age calculator version 2.2 (http://hess.ess.washington.edu/math; Balco et al., 2008). The largest limitation in exposure dating accuracy (but not precision) is commonly associated with knowledge of *in situ* cosmogenic nuclide production rates and their scaling with latitude, altitude and time. In this regard, our work benefits from recently published ^{10}Be production rate calibrations in the high Andes (Blard et al., 2013; Kelly et al., in press). Only modest latitudinal and altitudinal scaling of ^{10}Be production rates is required from these calibration sites to Huaguruncho, which minimizes potential uncertainties in scaled production rates. All ^{10}Be ages are calculated with the ^{10}Be production rate calibration developed at Quelccaya (Kelly et al., in press), as implemented on the CRONUS-Earth calculator with the time-invariant ‘St’ scaling scheme of Stone (2000) following Lal (1991) and zero erosion (3.85 ± 0.09 atoms g^{-1} $year^{-1}$ in quartz at sea level high latitude). We note that a recent compilation of ^{10}Be production rate calibration data (Heyman, 2014) yields a global mean ^{10}Be production rate of 3.94 ± 0.20 atoms g^{-1} $year^{-1}$ in quartz at sea level high latitude, which results in exposure ages at Huaguruncho that are ~2% younger than those derived from the Quelccaya calibration data set alone. All ^{10}Be exposure ages are reported as years before present.

Snow cover attenuates cosmic rays and reduces surface production of ^{10}Be, whereas erosion removes surface concentrations of cosmogenic nuclides, both of which lead to anomalously young apparent exposure ages (Gosse and Phillips, 2001). Snowpack data are not available for the Huaguruncho field area, but we observe no positive correlation between boulder height and exposure age, as would be expected if snow shielding was a problem. Consequently, snow cover issues are considered unlikely and the exposure ages are not corrected for snow shielding. Rock surface erosion rates are also not known in the field area, but the common presence of glacial polish on late Holocene moraine boulder surfaces indicates negligible erosion. Boulders on the early Holocene and older moraines did not contain polish, although sampled surfaces appeared glacially smoothed with minimal etching and no erosion corrections were applied.

The ^{10}Be exposure age populations on individual moraine positions are reported as arithmetic means and associated analytical uncertainties (1 standard deviation), and do not include outliers (see below). We interpret the mean of boulder ages on a moraine to date the culmination of steady-state conditions and subsequent moraine abandonment; that is, the onset of glacial retreat. Importantly, the external uncertainties associated with the sea level high latitude ^{10}Be production rate calibrated at Quelccaya (Kelly et al., in press) and the implemented scaling schemes (Lal, 1991; Stone, 2000) must be added to the analytical age uncertainties reported here when comparing the Huaguruncho ^{10}Be chronologies with records dated by other independent methods.

Although the ^{10}Be exposure age populations on individual moraine positions generally display high internal consistency, we consider 8 of the 48 ages reported here to be outliers in these populations (gray ages in Figure 2 of the main text; italicized ages in Table DR2). Seven of the outliers are anomalously old, most likely due to isotope inheritance from prior exposure. One outlier (DRPE13-45) is anomalously young, and is interpreted to indicate either post-glacial rockfall from the headwall above the moraine or post-depositional boulder rotation. All outliers are more than three standard deviations beyond the mean of the moraine age populations.

Table DR1. Radiocarbon ages measured on aquatic mosses.

UCIAMS	Core	Depth (cm)	Measured ^{14}C age	Measured error ±	Median calibrated age	Oxcal median modeled age (cal yr BP)	Oxcal 2σ modeled calibrated age (cal yr BP)
101317	Percussion core - deep basin	12.9	165	15	190	199	0-285
113101	Percussion core - deep basin	16.1	285	15	384	314	295-428
113103	Percussion core - deep basin	22	1165	20	1093	1088	1000-1177
101392	Percussion core - deep basin	40	2345	15	2351	2350	2338-2360
146812	Percussion core - deep basin	62	3950	20	4420	4419	4296-4514
146813	Percussion core - deep basin	81	5390	20	6228	6247	6183-6280
101318	Percussion core - deep basin	85	5525	15	6306	6303	6284-6391
101319	Percussion core - deep basin	124.1	6235	20	7186	7190	7028-7251
101394	Percussion core - deep basin	154.1	7580	20	8392	8392	8369-8414
101320	Percussion core - deep basin	192	9865	20	11250	11248	11218-11292
146940	Percussion core - deep basin	266	10125	30	11770	11834	11645-12014
146941	Percussion core - deep basin	278	10605	40	12600	12448	12095-12522
101322	Percussion core - deep basin	283	10380	25	12253	12485	12111-12525
113102*	Percussion core - deep basin	19.3	1245	15		*omitted from age model	
101393*	Percussion core - deep basin	94.1	4685	20		*omitted from age model	
101395*	Percussion core - deep basin	221	11100	25		*omitted from age model	
101321*	Percussion core - deep basin	251	8070	20		*omitted from age model	

UCIAMS	Core	Depth (cm)	Measured ^{14}C age	Measured error ±	Median calibrated age	2σ age range
99895	Basal age - shallow basin		11880	160	13733	13409-14120

Table DR2. Beryllium data and ages for Nevado Huaguruncho samples.

Sample ID	Latitude	Longitude	Elevation[a]	Quartz	Be carrier[b]	Thickness[c]	Shielding[d]	$^{10}Be/^{9}Be$[e,f]	±	[Be-10][b,f]	±	Age[g,h]	±
	(°S)	(°W)	(m.a.s.l.)	(g)	(mg)	(cm)	factor		(1σ)	(atoms g^{-1})	(atoms g^{-1})	(yr BP)	(yr BP)
Moraine enclosing Laguna Yanacocha													
DRPE-11-15	10.55603	75.93057	4474	31.8581	0.2184	3.10	0.9890	1.092E-12	1.588E-14	5.002E+05	7.274E+03	14460	210
DRPE-11-12	10.55617	75.92968	4450	40.0050	0.2070	3.50	0.9704	1.364E-12	2.419E-14	4.715E+05	8.364E+03	14070	250
DRPE-11-13	10.55617	75.93057	4474	30.1584	0.2065	3.10	0.9890	1.040E-12	1.305E-14	4.760E+05	5.974E+03	13750	170
											ave ± st dev	14090	360
Moraine trending south from Laguna Yanacocha													
DRPE-13-01	10.56264	75.92941	4420	30.2706	0.2118	2.50	0.9803	9.118E-13	1.748E-14	4.262E+05	8.170E+03	*12660*	*240*
DRPE-13-03	10.56325	75.92910	4445	30.3498	0.2114	2.00	0.9803	8.432E-13	1.663E-14	3.924E+05	7.741E+03	11470	230
DRPE-13-04	10.56444	75.92872	4483	30.0288	0.1871	2.50	0.9693	8.961E-13	1.324E-14	3.731E+05	5.514E+03	10890	160
DRPE-13-02	10.56302	75.92920	4438	30.0414	0.1865	2.50	0.9421	8.399E-13	1.137E-14	3.484E+05	4.718E+03	10670	150
											ave ± st dev	11010	410
Moraine belt west of Laguna Jaico - distal													
DRPE-13-29	10.55418	75.92960	4390	30.0835	0.1847	1.50	0.9602	1.016E-12	1.270E-14	4.170E+05	5.213E+03	*12700*	*160*
DRPE-13-27	10.55370	75.92819	4332	30.1254	0.2080	2.00	0.9584	8.152E-13	8.166E-15	3.761E+05	3.767E+03	11830	120
DRPE-13-28	10.55382	75.92863	4348	30.0189	0.1976	1.50	0.9584	8.634E-13	1.044E-14	3.799E+05	4.593E+03	11810	140
DRPE-11-28	10.55060	75.92783	4315	30.0235	0.2052	4.00	0.9418	7.792E-13	9.633E-15	3.559E+05	4.400E+03	11660	150
DRPE-11-26	10.55065	75.92778	4313	30.0424	0.2060	4.00	0.9489	7.643E-13	1.293E-14	3.503E+05	5.926E+03	11400	190
DRPE-11-29	10.55058	75.92783	4315	30.2031	0.2061	4.00	0.9466	7.602E-13	1.401E-14	3.467E+05	6.388E+03	11300	210
											ave ± st dev	11600	240
Moraine belt west of Laguna Jaico - intermediate													
DRPE-11-22	10.55000	75.92910	4367	30.1713	0.2056	4.00	0.9244	1.012E-12	1.481E-14	4.608E+05	6.743E+03	*15030*	*220*
DRPE-11-20	10.55362	75.93007	4396	40.0650	0.2085	4.00	0.9627	1.111E-12	1.793E-14	3.863E+05	6.234E+03	11940	190
DRPE-11-23	10.55028	75.92862	4350	29.9534	0.2065	4.00	0.9244	7.653E-13	9.487E-15	3.526E+05	4.372E+03	11580	140
DRPE-11-16	10.55350	75.92993	4386	40.0483	0.2096	4.00	0.9493	1.039E-12	2.276E-14	3.632E+05	7.962E+03	11430	250
DRPE-11-17	10.55358	75.93002	4391	40.0849	0.2140	3.00	0.9608	1.029E-12	1.333E-14	3.673E+05	4.756E+03	11310	150
DRPE-11-24	10.55070	75.92788	4322	30.5683	0.2060	4.00	0.9489	7.726E-13	1.245E-14	3.480E+05	5.608E+03	11280	180
DRPE-11-21	10.54993	75.92925	4369	30.1632	0.2051	4.00	0.9241	7.579E-13	1.110E-14	3.444E+05	5.044E+03	11220	170
											ave ± st dev	11460	270
Moraine belt west of Laguna Jaico - proximal													
DRPE-13-25	10.55288	75.93035	4363	30.1484	0.2080	1.00	0.9392	1.350E-11	7.281E-14	6.223E+06	3.356E+04	*204810*	*1160*
DRPE-13-24	10.55276	75.93024	4358	29.9529	0.1977	1.50	0.9370	7.745E-13	1.630E-14	3.417E+05	7.191E+03	10810	230
DRPE-13-23	10.55270	75.93027	4356	30.6946	0.2085	1.50	0.9392	7.509E-13	9.842E-15	3.408E+05	4.467E+03	10770	140
DRPE-13-26	10.55312	75.93042	4392	30.1762	0.1996	1.00	0.9594	7.680E-13	8.429E-15	3.395E+05	3.725E+03	10290	110
											ave ± st dev	10620	290
Moraine downvalley of Laguna Jaico													
DRPE-11-41	10.55647	75.91500	4333	39.3019	0.2070	4.50	0.9839	1.031E-12	2.902E-14	3.627E+05	1.021E+04	11330	320
DRPE-11-42	10.55663	75.91422	4337	40.7623	0.2170	4.00	0.9942	1.012E-12	2.979E-14	3.599E+05	1.060E+04	11070	330
DRPE-11-40	10.55653	75.91513	4323	39.8457	0.4250	4.00	0.9881	4.802E-13	9.103E-15	3.422E+05	6.488E+03	10650	200
											ave ± st dev	11020	340
Moraine belt near eastern shore of Laguna Jaico													
DRPE-13-30	10.55205	75.92062	4320	29.9875	0.1996	1.50	0.9406	9.588E-13	2.096E-14	4.264E+05	9.320E+03	*13680*	*300*
DRPE-13-32	10.55217	75.92097	4300	30.2133	0.2070	2.00	0.9406	7.208E-13	8.797E-15	3.299E+05	4.027E+03	10720	130
DRPE-13-31	10.55211	75.92088	4306	30.1240	0.1970	1.00	0.9402	7.263E-13	1.134E-14	3.174E+05	4.955E+03	10200	160
											ave ± st dev	10460	370
Moraine ridge north of Laguna Jaico - distal													
DRPE-13-42	10.54938	75.92271	4302	40.0678	0.1972	2.00	0.8886	9.407E-13	1.820E-14	3.094E+05	5.987E+03	10620	210
DRPE-13-41	10.54928	75.92254	4329	40.0038	0.1972	3.00	0.9145	9.472E-13	1.836E-14	3.121E+05	6.048E+03	10370	200
DRPE-13-44	10.55002	75.92434	4297	40.2691	0.1970	2.50	0.9290	9.398E-13	1.574E-14	3.073E+05	5.147E+03	10160	170
DRPE-13-43	10.54945	75.92277	4305	39.9668	0.1974	1.50	0.9575	9.638E-13	2.379E-14	3.181E+05	7.853E+03	10090	250
DRPE-13-45	10.54998	75.92432	4305	39.9502	0.1978	2.00	0.9637	8.825E-13	1.871E-14	2.920E+05	6.192E+03	*9240*	*200*
											ave ± st dev	10310	240
Moraine ridge north of Laguna Jaico - intermediate													
DRPE-13-34	10.54901	75.92307	4320	40.0371	0.1975	1.00	0.9355	7.796E-14	1.702E-15	2.570E+04	5.612E+02	*820*	*20*
DRPE-13-35	10.54953	75.92392	4304	40.0330	0.1976	0.75	0.9302	3.137E-14	1.476E-15	1.035E+04	4.868E+02	340	20
DRPE-13-33	10.54833	75.92157	4384	40.0792	0.1979	2.50	0.9537	2.951E-14	1.066E-15	9.741E+03	3.517E+02	300	10
DRPE-13-36	10.54975	75.92434	4276	40.0321	0.1980	1.00	0.8738	2.580E-14	8.977E-16	8.531E+03	2.968E+02	300	10
											ave ± st dev	310	20
Moraine ridge north of Laguna Jaico - proximal lower track													
DRPE-11-37	10.54740	75.92247	4388	40.0418	0.2080	5.00	0.9589	2.970E-13	5.549E-15	1.031E+05	1.926E+03	*3230*	*60*
DRPE-11-35	10.54732	75.92205	4397	40.0882	0.2056	4.00	0.8979	3.575E-14	9.192E-16	1.225E+04	3.151E+02	400	10
DRPE-11-38	10.54743	75.92313	4374	39.9807	0.2077	4.50	0.9596	3.653E-14	9.827E-16	1.268E+04	3.411E+02	400	10
DRPE-11-36	10.54742	75.92220	4394	40.1087	0.2058	4.00	0.9161	3.189E-14	8.441E-16	1.094E+04	2.895E+02	350	10
											ave ± st dev	380	30
Moraine ridge north of Laguna Jaico - proximal upper track													
DRPE-13-37	10.54717	75.92274	4379	13.1968	0.1884	4.00	0.9330	1.353E-14	6.238E-16	1.291E+04	5.951E+02	410	20
DRPE-13-38	10.54736	75.92349	4373	39.9951	0.1971	4.50	0.9549	3.878E-14	1.172E-15	1.277E+04	3.859E+02	400	10
DRPE-11-39	10.54743	75.92370	4367	40.1592	0.2071	4.00	0.9596	3.329E-14	9.188E-16	1.148E+04	3.167E+02	360	10
DRPE-13-40	10.54817	75.92504	4358	40.1142	0.1976	0.50	0.9620	2.993E-14	9.268E-16	9.855E+03	3.051E+02	300	10
DRPE-13-39	10.54784	75.92461	4370	39.9797	0.1973	2.50	0.9599	2.272E-14	1.242E-15	7.494E+03	4.095E+02	230	10
											ave ± st dev	340	80

[a] Age calculations are performed with an atmosphere approximation derived from elevation using the standard atmosphere equation with geographically variable surface pressure and 1000 mbar temperature, as implemented on the CRONUS-Earth calculator (Balco et al., 2008).
[b] Eight samples (DRPE11-12,15,16,17,20,40,41,42) were spiked with ^{9}Be carrier prepared from $BeSO_4$ at the Lamont-Doherty Earth Observatory (LDEO); analysis of two $BeSO_4$ blanks processed in parallel with these samples yielded a mean $^{10}Be/^{9}Be$ ratio of 7.1×10^{-15}. All other samples were spiked with low-level ^{9}Be LDEO Carrier 5.1 prepared from shielded beryl; analyses of 12 blanks processed in parallel with these latter samples yielded a mean $^{10}Be/^{9}Be$ of 6.4×10^{-16} and ranged as low as 2.4×10^{-16}.
[c] Sample thickness corrections employ a measured rock density of 2.6 g cm^{-3}.
[d] Topographic shielding corrections were derived from field measurements using the CRONUS-Earth geometric shielding calculator (http://hess.ess.washington.edu/math/general/skyline_input.php).
[e] Isotopic ratios are normalized to $^{10}Be/^{9}Be$ standard 07KNSTD3110 (Nishiizumi et al., 2007)and reported with 1σ analytical error.
[f] All $^{10}Be/^{9}Be$ ratios and ^{10}Be concentrations reported here are corrected for background using mean values of blanks processed in parallel with samples.
[g] All ^{10}Be exposure ages are calculated with the time-invariant 'St' scaling scheme of Stone (2000) following Lal (1991).
[h] Individual boulder ages are reported with 1σ uncertainty reflecting analytical error only and rounded to the nearest 10 years. Age populations on each moraine are ordered from oldest to youngest; means and standard deviations do not include italicized ages, which are considered outliers.

REFERENCES

Balco, G., Stone, J. O., Lifton, N. A., and Dunai, T. J., 2008, A complete and easily accessible means of calculating surface exposure ages or erosion rates from 10Be and 26Al measurements: Quaternary Geochronology, v. 3, no. 3, p. 174-195.

Blard, P. H., Braucher, R., Lavé, J., and Bourlès, D., 2013, Cosmogenic 10Be production rate calibrated against 3He in the high Tropical Andes (3800–4900 m, 20–22° S): Earth and Planetary Science Letters, v. 382, no. 0, p. 140-149.

Bronk Ramsey, C., 2008, Deposition models for chronological records: Quaternary Science Reviews, v. 27, p. 42-60.

Conley, D. J., 1998, An interlaboratory comparison for the measurement of biogenic silica in sediments: Marine Chemistry, v. 63, p. 39-48.

Conley, D. J., and Schelske, C. L., 2001, Biogenic Silica, *in* Smol, J. P., Birks, H. J., and Last, W. M., eds., Tracking environmental changes using lake sediments. Terrestrial, algal, and siliceous indicators, Volume 3, Springer.

DeMaster, D. J., 1979, The marine budgets of silica and 32-SiPh.D. dissertation]: Yale University, New Haven.
-, 1981, The supply and accumulation of silica in the marine environment: Geochimica et Cosmochimica Acta, v. 45, p. 1715-1732.
Gosse, J. C., and Phillips, F. M., 2001, Terrestrial in situ cosmogenic nuclides: theory and application: Quaternary Science Reviews, v. 20, p. 1475-1560.
Heyman, J., 2014, Paleoglaciation of the Tibetan Plateau and surrounding mountains based on exposure ages and ELA depression estimates: Quaternary Science Reviews, v. 91, no. 0, p. 30-41.
Kelly, M. A., Lowell, T. V., Applegate, P. J., Phillips, F. M., Schaefer, J. M., Smith, C. A., Kim, H., Leonard, K. C., and Hudson, A. M., in press, A locally calibrated, late glacial 10Be production rate from a low-latitude, high-altitude site in the Peruvian Andes: Quaternary Geochronology.
Kohl, C. P., and Nishiizumi, K., 1992, Chemical isolation of quartz for measurement of in-situ -produced cosmogenic nuclides: Geochimica et Cosmochimica Acta, v. 56, no. 9, p. 3583-3587.
Lal, D., 1991, Cosmic ray labeling of erosion surfaces: in situ nuclide production rates and erosion models: Earth and Planetary Science Letters, v. 104, no. 2-4, p. 424.
Licciardi, J. M., Schaefer, J. M., Taggart, J. R., and Lund, D. C., 2009, Holocene Glacier Fluctuations in the Peruvian Andes Indicate Northern Climate Linkages: Science, v. 325, no. 5948, p. 1677-1679.
Nishiizumi, K., Imamura, M., Caffee, M. W., Southon, J. R., Finkel, R. C., and McAninch, J., 2007, Absolute calibration of 10Be AMS standards: Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms, v. 258, no. 2, p. 403-413.
Reimer, P., Bard, E., Bayliss, A., Beck, J., Blackwell, P., Bronk Ramsey, C., Buck, C., Cheng, H., Edwards, R., Friedrich, M., Grootes, P., Guilderson, T., Haflidason, H., Hajdas, I., Hatte, C., Heaton, T., Hoffmann, D., Hogg, A., Hughen, K., Kaiser, K., Kromer, B., Manning, S., Niu, M., Reimer, R., Richards, D., Scott, E., Southon, J., Staff, R., Turney, C., and van der Plicht, J., 2013, IntCal13 and Marine13 Radiocarbon Age Calibration Curves 0–50,000 Years cal BP: Radiocarbon, v. 55, no. 4, p. 1869-1887.
Stone, J. O., 2000, Air pressure and cosmogenic isotope production: Journal of Geophyscial Research, v. 105, p. 23, 753-723, 759.