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UNIVERSIDAD NACIONAL DE INGENIERIA (PERU) TL DATES - 1984 (I)

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The TL measurements to date pottery from Telarmachay, a shelter in the Peruvian Central Andes, were made in 1981-1982. The "fine-grains" technique of Zimmerman (1971) was used. Details about the equipment and procedure to obtain the natural and annual doses were published by López Carranza et al. (1983). First results of these dates without considerations of moisture were reported by Pereyra et al. (1982).

For the annual dose, radioactive analyses were carried out on the pottery and soil by alpha counting (U and Th) and flame photometry (K), and the calculations were made using the conversion factors of Bell (1977). If the ratio between the sealed (α_1) and unsealed (α_0) alpha counts, α_1/α_0 , was greater than 1.05, the value $(\alpha_1 + \alpha_0)/2$ was used. In other cases α_0 was taken. For the soil, the stone content was not considered and the ratio α_1/α_0 was 1.17. An alpha efficiency (1) of 0.15 with an overall uncertainty $\delta a=20\%$ was assumed for both sherd and soil. 15 mrads/yr was used as the contribution of the cosmic radiation to the dose-rate. To take account of the moisture content, which was very high in the excavation site, saturation water uptake was considered for soil and sherds; soil wt. sat./soil wt. dry was equal to 1.4. Anomalous fading was not studied in any case. The error assessment of Aitken (1976) was used, taking zero for the uncertainties σ_7 (radon emanation) and σ_8 (wetness estimate). The TL and ¹⁴C dates are in years before A.D. 1980 and the TL errors appear within parenthesis.

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ARCHAEOLOGIC SAMPLES

TELARMACHAY (Province of Tarma, Department of Junín, 11 ° 11'S, 75 ° 52'W) Peru

This archaeological site is located at an altitude of 4,420 m and was occupied between 7000 B.C. (lithic period) and 170 B.C. (formative period). The excavation was realized by D. Lavallée and her archaeological research group within the Archaeologic Project Junin-Palcamayo of the URA no. 25, CNRS-France (Lavallée et al. 1975; Lavallée 1977). The ^{14}C dates on associated charcoal were measured in the Centre des Faibles Radioactivités, CNRS-CEA, France.

UNI-TL-6: 2570 (---, ± 310), 590 B.C.

Pottery: 1468-30

Comments- Natural dose: 1310 rads ($I=70$), $\delta Q = 9\%$, plateau $\simeq 70^\circ \text{C}$.
Annual dose: 0.51 rads/yr with $\alpha_1/\alpha_0=1$ for the fragment,
sherd wt. sat./dry = 1.06 and $a = 0.15$, $\delta a = 20\%$.
 ^{14}C date for the context is 2220 ± 100 (GIF 3772).

UNI-TL-7 2400 (---, ± 260), 420 B.C.

Pottery: 1468-57

Comments- Natural dose: 670 rads ($I=50$), $\delta Q = 7\%$, plateau $\simeq 60^\circ \text{C}$.
Annual dose: 0.28 rads/yr with $\alpha_1/\alpha_0=1$ for the fragment
sherd wt. sat./dry = 1.06 and $a = 0.15$, $\delta a = 20\%$.
 ^{14}C date for the context is $2220 + 100$ (GIF 3772).

UNI-TL-8 1820 (---, ± 240), A.D. 160

Pottery: 1478-117

Comments- Natural dose: 1110 rads ($I=40$), $\delta Q = 8\%$, plateau $\simeq 70^\circ \text{C}$.
Annual dose: 0.61 rads/yr with $\alpha_1/\alpha_0=1$ for the fragment,
sherd wt. sat./dry = 1.06 and $a = 0.15$, $\delta a = 20\%$.
 ^{14}C date for the context is 2310 ± 100 (GIF 3773).

UNI-TL9 2890 (---, ± 430), 910 B.C.

Pottery: 1643

Comments- Natural dose: 1010 rads ($I=10$), $\delta Q = 9\%$, plateau $\simeq 80^\circ \text{C}$.
Annual dose: 0.35 rads/yr with $\alpha_1/\alpha_0=1$ for the fragment,
sherd wt. sat./dry = 1.13 and $a = 0.15$, $\delta a = 20\%$.
 ^{14}C date for the context is 2630 ± 90 (GIF 4187).

UNI-TL-10

3670 (---, ± 620), 1690 B.C.

Pottery: 1614-41

Comments- Natural dose: 1580 rads ($I=30$), $\delta Q = 6\%$, plateau $\simeq 60^\circ \text{C}$.
Annual dose: 0.43 rads/yr with $\alpha_1/\alpha_0 = 1.03$ for the fragment,
sherd wt. sat./dry = 1.13 and $a = 0.15$, $\delta a = 20\%$.
 ^{14}C date for the context is 3440 ± 100 (GIF 4188).

UNI-TL-11

3240 (---, ± 420), 1260 B.C.

Pottery: 1721

Comments- Natural dose: 940 rads ($I=110$), $\delta Q = 11\%$, plateau $\simeq 70^\circ \text{C}$.
Annual dose: 0.29 rads/yr with $\alpha_1/\alpha_0 = 1.09$ for the fragment,
sherd wt. sat./dry = 1.11 and $a = 0.15$, $\delta a = 20\%$.
 ^{14}C date for the context is 3660 ± 100 (GIF 4833).