

Cosmogenic ^{36}Cl chronology for Pleistocene shoreline deposits in Panamint Valley, California

FRED M. PHILLIPS¹, SHASTA M. MARRERO¹,
STEVEN ROOF², ROGER S.U. SMITH³ AND
ANGELA S. JAYKO⁴

¹Dept. Earth & Environmental Science, New Mexico Tech,
Socorro NM 87801, USA (phillips@nmt.edu,
shasta@nmt.edu)

²Hampshire College, 893 West St., Amherst MA 01002, USA
(srNS@hampshire.edu)

³(rsusmith@mcableone.net)

⁴USGS, 3000 East Line St., Bishop, California 93514, USA

We have employed a combination of chlorine-36 measurements from depth profiles in shorelines and on shoreline features to help constrain the age of deep pluvial lake stands in Panamint Valley, California. We sampled two accretionary beach features, lacustrine bars, one on the east side of the valley at 614 m elevation and one on the west at 616 m elevation. One of the ^{36}Cl profiles on the east side of the valley yielded a profile age of 62 +17/-21 ka and the profile on the west side an age of 91 +22/-26 ka. Results are pending an additional third profile.

The ^{36}Cl ages on tufa samples ranged from ~20 ka to ~90 ka at elevations between 517 and 665 m. Anomalously young samples have apparently undergone ^{36}Cl loss due to recrystallization of the tufa. Several independent lines of evidence indicate that the high lake stand may be as old as marine isotope stage (MIS) 6. A reasonable degree of confidence in the validity of the lacustrine chronology will require careful assessment of both the regional paleoclimatic framework and the specific dating methods employed.

Migration of U in a polluted calcareous peat-land

V. PHROMMAVANH¹, M. DESCOSTES^{1,2*}, C. BEAUCAIRE¹,
E. LAPORTE¹ AND J.P. GAUDET³

¹L3MR, CEA Saclay, 91191 Gif-sur-Yvette Cedex, France
(*correspondence: michael.descostes@cea.fr)

²UMR 8587 CEA – Université d'Evry – CNRS, France

³CNRS-INPG-IRD-UJF-LTHE, BP 53, 38041 Grenoble
Cedex 09, France

A calcareous peatland polluted with uraninite ($\text{UO}_{2(s)}$) particles (about 3.5 ppb) shows high concentrations of total dissolved uranium from the surface to 0.8 m deep (up to $7.10 \cdot 10^{-6}$ mol.L⁻¹). Measurements indicate that $[\text{U}]_{\text{total dissolved}}$ varies periodically: it increases in winter and decreases in summer.

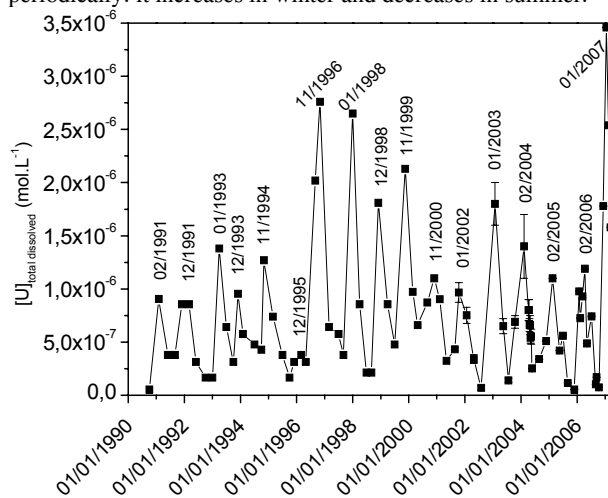


Figure 1: Uranium content in PZX1 piezometer as a function of time.

Porewater chemistry and redox conditions were monitored during several years. Results indicate that such U content variations are correlated with both porewater composition and redox conditions. Hence in winter, U is found to be mostly under the +VI oxidation state (calcium carbonate complex $\text{Ca}_2\text{UO}_2(\text{CO}_3)_3$), which is potentially mobile, while it is reduced into less soluble $\text{U}^{(\text{IV})}$ species in summer in equilibrium with $\text{UO}_{2(s)}$. These observations are correlated with changes of the redox potential due to the activity of sulphate-reducing bacteria (SRB) [1]. Despite the production of carbonate ions in summer, SRB produce sufficiently reducing conditions that can immobilize U and possibly other trace metals.

[1] Phrommavanh *et al.* (2007) *GCA* **71**, A788.