



Mercoledì 29 Maggio, in Aula A alle ore 11.30, il Prof. J.C. Varekamp del Dipartimento di Scienze della Terra ed Ambientali della Wesleyan University Middletown, CT (USA) terrà una conferenza dal titolo

A Tale of Two Lakes, Newberry Caldera, OR, USA

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The Newberry caldera in Oregon contains two small crater lakes, Paulina Lake and East Lake, separated by a narrow ridge with a volcanic tuff cone. The water columns and several sediment cores were sampled and analyzed for major and trace elements and stable isotope ratios (O, H, C, N) in order to constrain potential hydrothermal fluxes into these two lakes. These two deep lakes have minor hot springs with CO₂ bubbles on their margins. Despite their peaceful appearance, these are among the more toxic lakes in the western USA: East Lake has high mercury (large fish unsuitable for human consumption) and Paulina Lake has high arsenic in its sediment and water column. The near shore lake floors carry 'Nostoc balls', gelatinous spherical colonies of cyanobacteria. The combination of isotope and chemical data indicates that these very productive lake ecosystems are largely driven by the geothermal inputs of CO₂, Si, P, and Fe, with fixed nitrogen produced by the cyanobacteria. The bottom sediments of Paulina Lake consist largely of silica and iron (up to 14 % Fe₂O₃) with abundant vivianite and minor volcanic ash. The bottom environment of Paulina Lake may resemble that of precambrian oceans with these BIF-like deposits. We deployed a remotely controlled rover to sample lake floor hot springs (ongoing work). Box modeling with stable isotope data provides the water dynamics of the two lakes. The distinct water and sediment chemistries of the two lakes are the result of a phase separation in the geothermal fluids that are rising below the lakes: a CO₂-rich vapor (with Hg) enters East Lake, whereas the residual fluid (rich in dissolved Si, Fe, As, P, carbonate) enters Paulina Lake. East Lake is potentially an "American Lake Nyos". A massive flood deposit in the Paulina Lake outlet indicates an earlier catastrophic lake drainage event, possibly triggered by a CO₂-driven overturn?