Geophysical Research Abstracts
Vol. 20, EGU2018-9800, 2018
EGU General Assembly 2018

Atmospheric mercury deposition to a Holocene sediment record of Lake Titicaca investigated by Hg stable isotopes

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The Lake Titicaca level is controlled by the balance between precipitation and evaporation. Sediment records of Lake Titicaca have served as important archives to reconstruct past climate. Here, we present a sediment record collected in the southern Lake Titicaca basin covering the last past 8 ky cal BP. We have analyzed Hg stable isotope signatures of the sediment record and performed in-depth geochemical characterization. The sediment record was generally characterized by negative δ^{202} and positive Δ^{199}Hg and Δ^{200}Hg values. These signatures are similar to the Hg isotope ratios measured in modern precipitation, supporting that precipitation was the dominant Hg input pathway to Lake Titicaca. During the mid-Holocene, a major draught event between 7 and 4 cal kyr BP (i.e., the middle Holocene dry event) resulted in an approx. 80 meters drop of the northern great lake. Sediment samples of this dry period are characterized by lower Δ^{199}Hg and Δ^{200}Hg values compared to wet periods. At the same time, organic matter biomarkers and diatom communities indicate a shift of lake biota towards saline shallow water assemblage. We will discuss the impact of different climate regimes as well as anthropogenic use of mercury by early settlements and colonial epochs on the atmospheric mercury deposition to lake Titicaca.