Holocene fire history reconstruction using Tibetan lacustrine sediments

Alice Callegaro (1), Torben Kirchgeorg (1), Dario Battistel (1), Broxton Bird (2), and Carlo Barbante (1)

(1) Department of Environmental Science, Informatics and Statistics, University Ca' Foscari of Venice, 30172 Venezia Mestre, Italy, (2) Department of Earth Sciences, Indiana University-Purdue University, Indianapolis, IN 46208, USA

The important role that biomass burning plays in influencing the Holocene's climate is still under discussion. The present work gives information about past biomass burning events in the Tibetan Plateau and helps to increase the understanding of the interaction between climate, humans and fire activity during Holocene. Asiatic area is one of the centers of the advent of agriculture and pastoralism, and it is a strategic area for understanding the interaction between human and fire during the Holocene. We reconstructed past biomass burning events and vegetation from sediments collected from lake Paru Co, a small moraine dammed lake located in the Tibetan Plateau at 4845 m above sea level. We extracted lake sediment samples by accelerate solvent extraction and analysed different organic molecular proxies by GC-MS and IC-MS. We used monosaccharide anhydrides, levoglucosan and its isomers, as proxies for biomass burning. These are specific molecular markers originated from the pyrolysis of cellulose showing significant fire events and indicate changes in burned fuel. Furthermore we analysed polycyclic aromatic hydrocarbons (PAH) as additional combustion proxies. For a better understanding of changes in vegetation and of human habitation at the lake shore we analysed n-alkanes and sterols. Comparing the data of this multi-proxy approach used in the studied area with climatic and meteorological literature data, reconstruction and contextualization of past fire events are possible: we can see the agreement between dry climate period and presence of more intense fire events, especially in the Early Holocene.