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Multidisciplinary analysis at Lake Moo peat bog site: New data from a natural archive to gouge past and future trends in heavy rainfall events over Northern Apennines (Italy).

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A series of record breaking precipitation events have stricken the mountainous area of Emilia-Romagna Region (northern Apennines, Italy) over the last years. As consequence, several geomorphological processes, like widespread debris flows along the slopes and hyperconcentrated flood in the stream channels, shallow landslides and overbank flooding affected the territory, causing serious damages to man-made structures. The detailed study of these recent deposits compared with fossil peat bog and lake paleodeposits can provide useful insight to support a strong match between precipitation intensity and warm climatic phases in antecedent climatic periods, as expected by the increase air water vapour holding capacity at higher temperatures
Here we present the results of the field campaign performed in summer 2017 at Lake Moo a 0.15km2 peat bog located at an altitude of 1130m a.s.l. The chosen area has been affected, during the flooding of the upper Trebbia and Nure valleys 13-14 September 2015, by several high-density flows generated by the stream that flow into the plain. Our main assumption is that, in such a small drainage basin (area <2 km2), with favourable geologic and geomorphic characteristics implying advantageous sediment transfer into lake, high density flood can be triggered only by high precipitation intensity events (HPI) lasting a sufficient amount of time for water to infiltrate and mobilize large quantities of debris.
The sedimentary succession (ca. 13 m-thick) was studied through the extraction of two cores and one trench. The facies/paleoenvironmental interpretation of the sedimentary succession, characterized by clusters of coarse-grained alluvial deposits interbedded with organic-rich silty clays and peaty layers, was achieved combining sedimentological and pollen data with pedological data and radiocarbon dating (AMS 14C).
Observed depositional cycles, retrieved by Lake Moo cores and trench, were put in relation with other specific paleoclimatic proxies available in literature for the North-Apennine area. This comparison illustrate that the increase of extreme paleoflood (associated with coarse-grained deposits similar to the ones observed recently) correlates well with warm phases (at millennial scale) , with a maximum activity in during the holocene thermal maximum.