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Multidisciplinary analysis at Lake Moo site. A natural archive to gouge past and future trends in heavy rainfall events over Northern Apennines.

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Over the last five years, a series of record breaking precipitation events has stricken the mountainous area of Emilia-Romagna Region (northern Apennines, Italy). 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 (e.g, roads, bridges, houses, etc.).

A multidisciplinary project has been launched in 2017 searching for events of such amplitude in the past, starting from geological record and beyond the short instrumental history. As a follow-up to the presentation of the project, we are now showing the first results of the field campaign performed in summer 2017 at Lake Moo (upper Nure Valley), a 0.15km2 peat bog located at an altitude of 1130m a.s.l. The site was investigated through a geomorphological survey complemented by remote sensing analysis, which allowed the identification and mapping of the hyperconcentrated flood deposit triggered by the high intensity precipitation event occurred in September 2015. In order to reconstruct the recent past precipitation-related stratigraphic record, the sedimentary succession (ca. 10 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 paleontological features with pedological data and radiocarbon dating (AMS 14C). The results of radiocarbon dating will be matched with information deriving from targeted historical analysis on the effects local heavy rainfalls.
A strong multidisciplinarity approach and original data acquired during the field survey have the potential to shed new lights on local changes in alluvial activity after the Quaternary last glacial retreat in the Northern Apennines chain. Precipitation falling during extreme events represent a significant percentage of the hydrological annual budget in the Mediterranean climate. Therefore a measure of their relative change in frequency is also informative on changes of the whole water cycle of the region, providing an important reference for future climate scenarios.