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Deriving hydrologic conditions in the southern Caucasus region during the Little Ice Age using different geomorphological and paleoenvironmental archives

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From the 15th century to ca. 1850 AD, the Little Ice Age (LIA), was one of the most prominent climatic fluctuations during the Holocene. It was characterized by negative temperature anomalies evidenced for many regions of the Northern Hemisphere (Mann 2002). During the LIA, many of these regions showed significant changes of their landscape dynamics such as glacier advances and an intensified hydrological cycle. Although glacier advances and reduced pine growth are reported from the Greater Caucasus for parts of the LIA (Solomina 2005), little is known about the hydrological conditions of the humid to semi-arid Lesser Caucasus and Transcaucasus region during the LIA. Existing pollen records are so strongly disturbed by anthropogenic activity during the last millenia that the LIA is not resolved in the only existing pollen-based precipitation reconstruction for the region (Connor & Kvavadze 2008).

Here, we present data derived from different kinds of geomorphological archives from the southern Caucasus region (fluvial sediments, indicators for the timing of incision of recently dry valleys). These data demonstrate intensive geomorphic activity during the LIA obviously caused by a strongly intensified hydrological cycle. Given the rather low temporal resolution of these geomorphological archives, however, more highly-resolved palaeoenvironmental data are needed to better understand also minor climatic and hydrologic fluctuations around the LIA period. To this end, we intend to use a recently developed multispecies tree-ring network from living trees (Martin-Benito et al., in revision). This tree-ring network will be expanded both in space and time using subfossil wood material (stems) found embedded into fluvial LIA-terrace deposits and radiocarbon-dated to the end of the 15th century AD. By overlapping these samples with the living tree network, we will be able to better characterize sub-ordinate climatic and hydrologic fluctuations during the LIA period.

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