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# ELSA flood stack for MIS 2-3 from dry maar lakestructure Auel (Eifel/Germany)

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Lacustrine sediments are very sensitive to natural and anthropogenically enviromental changes. Thus, lake sediments are excellent climate archives and can be used for reconstructions of past precipitation and flood events. However, until now, there is no continous flood record for the entire last 60 000 years for Central Europe.

The present study reconstructs paleo floods from event layers in the sediment, of dry maar lakestructure Auel (Eifel). This silted up basin has an inflow by a local stream. Accordingly the sedimentation rate is directly linked to runoff activity. The bioturbation was low so that event layers become visible, but varves are not preserved. The maar site is near to the town of Gerolstein in the Eifel; the core AU2 was drilled in the ELSA (Eifel Laminated Sediment archive) project and is 123m long. AU2 has the highest sedimentation rate of all ELSA cores, due to abundant fluvial input. The Eifel area is well suited to approximate Central European weather, because modern water level gauge data from Eifel rivers correlate with respective data from the Rhine (Wernli and Pfahl, 2009). Due to the high inflow into the maar, Auel has the highest number of botanical macro remains of all ELSA cores. These specific conditions explain why only in AU2 all 21 Greenland interstadials can be observed in the abundance of wood remains and the organic carbon concentration. In a final stratigraphic step the time series of Corg was tuned to the Greenland ice core chronology to link the central European landscape evolution directly to the Greenland climate curve (Svensson et al., 2008). Combined sedimentological, paleobotanical and geochemical data received from AU2 builds the foundation of the 14C based chronology. The synchronisation of the record with other cores is controlled by tephra time markers and pollen. Both are used to align the main cores of the ELSA project and construct an integrated age model for the last 220 000 years [b2k] (Förster and Sirocko, 2014).

To study the past flood events in detail, 10 cm long thin sections were analyzed to distinguish flood layers from distal turbidites. Turbidites have a continuous grain size gradation; the grains size profile of flood events is in contrast characterized by several grain size maxima over the entire layer thickness. A flood event over several days shows numerous peaks of intense discharge, which lead to a discontinuous grain size gradient. The thickness of each flood layer was measured for the classification of the event intensity. As a consequence, 88 flood layers over 7.5 mm thickness were detected. Our time-series represents the first highly-resolved chronology for flood events from 60 000 years until present times and indicates variable periodicities of flood activity linked to predominant climatic development. The fore main sections of all flood layers are: 44 000 – 45 500, 30 000 – 37 000, 20 000 – 22 500 and 11 000 – 17 000 years [b2k].