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# The ELSA – Flood – Stack: A reconstruction from the laminated sediments of Eifel Maar structures during the last 60 000 years

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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.

This study reconstructs the history of the main flood events in central Europe from event layers in sediment cores from Holocene Eifel maar lakes and Pleistocene dry maar structures. The cores were drilled in the Eifel region of western Germany. All maars have an inflow by a local stream and the largest flood events and associated suspension injections are nicely visible in the sediment. The specific sedimentation conditions explain the unique possibility to detect all 18 Greenland Interstadials in the total carbon concentration of the analysed maars. The allocation of the core material to all Greenland Interstadials and Stadials enables the exact climatic interpretation of the flood frequency. The stratigraphical concept leads to a classification of Landscape Evolution Zones in the Eifel region, which reconstruct the vegetation and the climate change (Sirocko et al., 2015). This classification is used to discuss the flood event succession concerning environmental changes.

To study the past flood events in detail, 10 cm long thin sections were sedimentological and geochemical analysed to distinguish flood layers from turbidites and slumps. 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. As a consequence, 233 flood layers over 7.5 mm thickness were detected. The main flood stages are from: 0 – 4000, 11 500 – 17 500, 23 000 – 24 000, 29 000 – 35 000 and 44 000 – 44 500 b2k (Brunck et al., 2015).

Our time-series from the Eifel 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 and anthropogenic development. It turns out that low vegetation coverage related to Greenland Stadial phases or anthropogenic impact is the main cause for the development of flood layers in maar sediments, while precipitation plays only a secondary role.

References

Brunck, H., Albert, J., Sirocko, F., 2015 (in press). The ELSA – Flood – Stack: A reconstruction from the laminated sediments of Eifel Maar structures during the last 60 000 years. Global and Planetary Change, Elsevier.

Sirocko, F., Knapp, H., Dreher, F., Förster, M., Albert, J., Brunck, H., Veres, D., Dietrich, S., Zech, M., Hambach, U., Röhner, M., Rudert, S., Schwibus, K., Adams, C., Sigl, P., 2015 (in press). The ELSA-Vegetation-Stack: Reconstruction of Landscape Evolution Zones (LEZ) from laminated Eifel maar sediments of the last 60 000 years. Global and Planetary Change, Elsevier.