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Sedimentation architecture of the volcanically-dammed Alf valley in the West Eifel Volcanic Field, Germany

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In the southeastern part of the Quaternary West Eifel Volcanic Field, the Alf valley with its morphologically wide ($\sim$ 500 m) and flat valley bottom is visibly outstanding. This flat valley bottom was formed during the Marine Isotope Stage 2 due to fluviolacustrine sediments which deposited upstream of a natural volcanic dam. The dam consisted of lava and scoria breccia from the Wartgesberg Volcano complex (Cipa 1958, Hemfler et al. 1991) that erupted $\sim$ 31 BP (40Ar/ 39Ar dating on glass shards, Mertz, pers. communication 2014). Due to this impoundment, the Alf creek turned into a dendritic lake, trapping the catchment sediments. The overall aim is to create the sedimentation architecture of the Alf valley. In comparison to maar archives like Holzmaar or Meerfelder Maar in the vicinity, the fluviolacustrine sediments of the Alf valley show clay-silt lamination despite the water percolation. This archive covers the transition from the Last Glacial Maximum to Early Holocene (Pirrung et al. 2007).
Focus of this study is the creation of a 3D model by applying the program ESRI ArcGIS 10.2 to reconstruct the pre-volcanic Alf valley. Moreover, the sedimentation architecture is reconstructed and the sediment fill quantified. Therefore, the digital elevation model with 5 m resolution from the State Survey and Geobasis Information of Rhineland-Palatinate, polreduced magnetic data measured on top of the Strohn lava stream, shear seismic data and core stratigraphies were utilized.
Summarizing previous results, Lake Alf had a catchment area of $\sim$ 55 km^2 (Meerfelder Maar: 1.27 km^2) and a surface area of 8.2 km^2 (Meerfelder Maar: 0.24 km^2) considering a maximum lake water level of 410 m a.s.l.. In the deepest parts ($\sim$ 50 m) of Lake Alf, lake sediments are laminated, up to 21 m thick and show a very high sedimentation rate $\sim$ 3 mm a-1 (Dehner Maar $\sim$ 1.5 mm a-1, (Sirocko et al. 2013)). The sediments become coarser upstream und stratigraphically above the fine-grained lake sediments. Due to the density of core locations in the valley and shear seismic data, an architecture model of this high resolution archive was established.

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