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115 years of sediment deposition in the Urft reservoir (Eifel Mountains, western Germany)

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The sediments of the artificial Urft reservoir represent a unique archive of human influence on late Holocene sediment composition. The Urft dam, located in the Eifel Mountains in western Germany, was built between 1900 and 1905. At the time of its construction, the Urft reservoir was the largest reservoir and, with 12 MW, drove the most powerful water storage power plant in Europe. The reservoir has a length of 12 km and, when fully dammed, has a volume of 45.51 million m³ over an area of 2.16 km². The most important inflow is the river Urft. Today, the Urft Lake is completely enclosed by the Eifel National Park.

Consequently, sediments were deposited in the lake almost undisturbed over the last 115 years. Due to construction work on the Urft dam and the inspection of the 2.7 km long Kermeter Tunnel, which powers the Heimbach hydroelectric power plant, the reservoir was almost completely drained in November 2020. This offered the rare opportunity to sample the deposits in detail and to record the entire lake area photogrammetrically using an Unmanned Aircraft System (UAS). The work was carried out in cooperation between the Water Board Eifel-Rur (WVER) and the Chair of Physical Geography and Geoecology (PGG) at RWTH Aachen University.

Within the framework of the project, the sediments in the reservoir will be investigated in detail. The comparison of the high-resolution UAS digital elevation models and historical maps will give insights in the amount of sediment deposition in the different areas of the lake during the last 115 years. Geochemical markers will be used to quantify the anthropogenic influence on the sediments in the form of mining-induced pollutant contamination (e.g., heavy metals) and to relate this to the history of use in the catchment area. Another focus will be on recording the microplastics content of the different sediment layers. Since microplastics have only been introduced into the natural system by humans for the last 70 years since the beginning of mass production around 1950, the sediment layers can also be differentiated in terms of time. For these investigations, a total of ten sediment cores with a length of up to 4 m were taken from the deposits.