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A European vision for hydrological observations and experimentation

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## MOSES Campaigns to Study the Evolution of Hydrological Extremes in the Mueglitz Valley

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MOSES (Modular Observation Solutions for Earth Systems) is a research initiative comprising nine Helmholtz research centres which are part of the research field “Earth and Environment”. MOSES focuses on 4 research areas covering Ocean Eddies, Permafrost Thaw, Heat Waves, and Hydrological Extremes. Highly flexible and mobile observing systems, combining the expertise of the involved Helmholtz Institutes, were developed to study effects along full event chains in highly dynamic situations (such as floods or droughts) as well as the long-term trends in environmental systems.

To study Hydrological Extremes, the Elbe river basin in Germany was selected as investigation area during the implementation phase of MOSES. The measurements in headwater catchments of the Elbe river includes several campaigns, coordinated by the Karlsruhe Institute of Technology (KIT). These campaigns took place in the Mueglitz Valley in the Eastern Ore Mountains, Germany, aiming at the investigation of the effects of extreme rainfall events along an entire process chain from the origination in the atmosphere, over the land-surface and the subsurface including their storage dynamics, up to flood generation in the contributing sub-catchments. The Institute for Meteorology and Climate Research - Department Tropospheric Research (IMK-TRO) of KIT provides essential data on the formation and evolution of heavy precipitation events, as well as high resolution measurements of precipitation distributions and evaporation. The Research Centre Jülich (FZJ) study the handover of water vapour and trace substances into the upper troposphere and even into the lower stratosphere.

The Helmholtz Centre for Environmental Research (UFZ) and the German Research Centre for Geosciences (GFZ) studies the catchment storage dynamics and runoff generation during flood and drought events by absolute and relative gravimeters, soil moisture monitoring with wireless sensor networks as well as with stationary and roving Cosmic Ray measurements, and river water level and discharge monitoring.

The presentation will explain the research questions and introduce the field and monitoring set up and the methods applied.

