



MOSES: A novel observing system for highly dynamic events

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MOSES (Modular Observation Solutions for Earth Systems) is a novel observing system developed by the Helmholtz Centres in the research field “Earth and Environment”. It is designed to unravel the impact of short-term events on the long-term development of Earth and environmental systems. Heat waves and droughts, hydrologic extremes, abrupt permafrost thaw and ocean eddies are in the focus of this event-oriented observation and research initiative. Although it is well known that the Global Change affects the Earth and environment at many different time and length scales, currently, only very limited knowledge is available on the importance of such distinct dynamic events. MOSES is being developed to close this gap. The investigation of the long-term effects of these events is most acute as the impact of global and climate change on society becomes increasingly evident: The increase in extreme weather events is under intense debate, Arctic warming is accelerating and marine circulations and ecosystems are undergoing rapid change.

The Helmholtz Association is investing € 30 million to implement the new research facility, which is designed as a ‘system of systems’. During the implementation phase from 2017 to 2021, the participating centres develop, miniaturise and automate sensor and measuring systems, which are combined into specific observation modules. These record energy, water, greenhouse gas and nutrient cycles on the land surface, in coastal regions, in the ocean, in snow and ice regions, and in the atmosphere – but especially the interactions between Earth compartments. MOSES campaigns and the resulting data sets aim at improving predictions of Earth and environmental change and at supporting the development of societal adaptation strategies.

The mobile infrastructure also represents an important addition to existing monitoring networks and satellite missions, which are mostly designed for long-term, large-scale environmental observation. Examples include ICOS (Integrated Carbon Observation System), LTER (Long-Term Ecological Research) or TERENO (Terrestrial Environmental Observatories). First MOSES test campaigns started in summer 2018 and will be continued during the next three years with various scientific partners. Homepage: www.moses-helmholtz.de