



Helmholtz program MOSES

Three research vessels - one mission

Research team takes a closer look at extreme high-flow and low-flow events

[16. April 2019] **Based on global forecasts, storm events accompanied by heavy rainfall and flooding will occur 10 to 20 percent more frequently by the end of this century. Moreover, they and extreme low-water phases will produce a tremendous amount of damage, not to mention both socio-economic and ecological impacts. In order to better understand those impacts, on 16 and 17 April 2019 three research ships in the Helmholtz programme MOSES will undertake a joint research cruise from the Elbe estuary to Helgoland.**



Clearly recognisable extremes in Central Europe include floods in the Elbe basin during the summers of 2002 and 2013, as well as the extreme low-flow phase in 2018. Each of these events resulted in billions of euros in damage, together with tremendous socio-economic and ecological impacts. "To better understand hydrological extremes and their role in water and material cycles, we need reliable information on the interrelations between the conditions that produce these extremes - like the weather conditions, amount of precipitation, and local topography - and influencing parameters throughout the river and ocean systems, such as sources of nutrients and pollutants," says Prof Philipp Fischer. The biologist from the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI) on Helgoland is coordinating the current test cruise with three research ships, the goal of which is to provide this essential data.

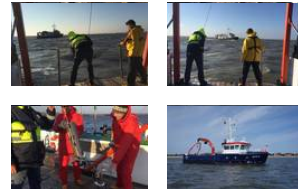


Rally MOSES (Photo: Dorit Kerschke)

flow and low-flow events using the Elbe basin as an example, and to assess the potential chemical, physical and ecological consequences of extreme events for the system as a whole, from the headwaters to the coastal areas.

The joint cruise is part of the Helmholtz programme MOSES (Modular Observation Solutions for Earth Systems - www.moses-helmholtz.de). The programme's focus is on investigating the effects of these extreme high-

Downloads



Contact

Science

Philipp Fischer
 +49(4725)819-3344

Philipp.Fischer@awi.de

Press Office

Folke Mehrtens
 +49(471)4831-2007

Folke.Mehrtens@awi.de

Photos

[Public media](#)
[Press media](#)

Abo/Share



Subscribe to AWI press release RSS feed



The



Institute

The Alfred

Thanks to specially adapted, and in some cases newly developed, mobile and modular sensor systems, the researchers can accurately record and assess situations in the river basin's water budget (heavy rains or prolonged dry spells) that are characterised by an 'extreme' development. These readings can then be compared with time series from established long-term observatories or data from the autonomous monitoring systems used on the ferries (ferry boxes) from Büsum and Cuxhaven to Helgoland, and the similarities and differences can be analysed. These observatories and the integration of the ferries were established in the framework of the Cosyna (Coastal Observing Systems for Northern and Arctic Seas) project in the mouth of the Elbe.

On 16 and 17 April, the first test campaign for MOSES will take place, a 'dress rehearsal' involving the research ships Littorina, Mya II and Ludwig Prandtl. During future extreme events, the three ships from the GEOMAR Helmholtz Centre for Ocean Research in Kiel, the AWI, and the Helmholtz Centre for Materials and Coastal Research in Geesthacht (HZG) will be used to collect samples and gather data in real-time; resources that can subsequently be used e.g. to model possible environmental scenarios and the impacts of extreme events.

Experts from five research centres will join the journey from Cuxhaven and Büsum to Helgoland and back - the previously mentioned GEOMAR, AWI and HZG, as well as the Helmholtz Centre Potsdam / German Research Centre for Geosciences (GFZ) and the Helmholtz Centre for Environmental Research (UFZ). One of their goals will be to test the effectiveness of using multi-ship networked sensor systems to measure ecosystem quality in coastal waters on a broad scale. To do so, on their way to Helgoland the ships will also rendezvous with the ferries Helgoland and Funny Girl from the shipping company Cassen Eils. Both ships are equipped with sensors in a ferry box; these allow them to constantly record environmental data, which will be used to complement the data gathered by the research ships during actual operations.

The test campaign is the first of three planned exercises in the Elbe estuary, which are intended to optimise the coordination and procedures for future data-gathering cruises. If an extreme high-flow event begins taking shape in the Elbe, the research team will only have a relatively small window - roughly one week - to prepare the ships and instruments, assemble the crew, and intercept the wave when it reaches the North Sea. "Though we know a great deal about the consequences of extreme events for towns, cities and municipal regions on the Elbe, we still know very little about their effects on the marine environment. With the exercise in April 2019, MOSES prepares for sampling the Elbe estuary in 'case of emergency' of future extreme flooding," explains AWI biologist Philipp Fischer.

Wegener Institute pursues research in the polar regions and the oceans of mid and high latitudes. As one of the 19 centres of the Helmholtz Association it coordinates polar research in Germany and provides ships like the research icebreaker Polarstern and stations for the international scientific community.

More information

Topic pages

» [Shelf Sea System Ecology](#)

Related news

» [In the right place at the right time](#)

» [Expedition vor Helgoland](#)