



## **The joint occurrence of extreme water levels with high precipitation events and their consequences for the dewatering of the Kiel-Canal in the past and in the future**

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Within the BMVI project “Expertennetzwerk” the potential impact of climate extremes on coastal infrastructure is investigated.

The coastal areas are especially vulnerable to climate change by the combined effects of storm surges, heavy rainfall and insufficient dewatering. High water levels are extra hazardous at the North Sea and Baltic Sea coasts due to both, the risk of flooding low-lying land, and hampering adequate dewatering of the hinterland.

The Kiel-Canal is not only one of the most heavily used shipways worldwide. It also forms an important dewatering system in northern Germany for a catchment area of about 1500 km<sup>2</sup>. Precipitation, here, is discharged to approximately 90 % in the tidal Elbe river, where dewatering is possible during low tide period, only. Consequently, Kiel-Canal dewatering can be fraught with problems in the event of high water levels during low Elbe river tides (case 1), during high precipitation in the catchment area (case 2), and, of course, during concurrent events of case 1 and 2 (case 3).

Changes in intensity and duration of extreme water level and precipitation events are investigated as to potential changes in Kiel-Canal dewatering capacity. Past and future such events are explored on the basis of observational data and model data from a coupled Atmosphere-Ocean model (MPI-OM), respectively.

Increased future frequencies are found for case 1 events (due mainly to sea level rise), case 2 events, and, consequently, case 3 events. Hence, this study indicates a decreasing Kiel-Canal dewatering potential for the 21 th century.