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IMPREX – A case study of compound events in The Netherlands

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Floods, whether pluvial, fluvial or coastal, can cause significant damage. The impact of simultaneous occurring or successive floods can be quite severe. The hydrological impact of these sorts of events can add up and result in a so-called compound event: 'An extreme impact that depends on multiple statistically dependent meteorological variables or events'.

This case study investigates the joint probability of occurrence for several water boards in The Netherlands. This paper will demonstrate the preliminary results for water board Noorderzijlvest. In this region people are vulnerable both to high water levels from the sea as well as high water levels in the inland water systems. If a weather event simultaneously causes a storm surge on the sea as well as heavy rainfall inland, the inland water cannot be discharged into the sea. In 2012 such a compound event occurred in this region, whereby a series of low pressure systems resulted in a longer time period with high water levels both at sea and inland. Water boards have to prepare for and manage the possible flood impact to their regions. Therefore a relevant question is how likely it is that such a compound event will occur again. To investigate that likelihood the local hydrological models of the water board have been run with a long high-resolution climate-model simulation, adding up to 800 years of natural variability.

This research is part of a large research project IMPREX – Improving Predictions and Management of Hydrological Extremes.