



Experience from practice: compound storm surge and high precipitation in a coastal area in the Netherlands

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In January 2012 a near-flooding occurred in Northern Netherlands by compound occurrence of a high soil moisture saturation degree due to past long term precipitation, a strong 1/10 year precipitation event and a coinciding storm surge that prevented the area to drain water to the Northsea for 5 days. The situation was nearly critical: reserved floodplains were used to reduce the water level in the populated areas, and evacuation plans were standby. After 5 days, the end of the storm surge allowed to discharge large water volumes, restoring the situation to normal conditions.

The event has triggered the awareness in both the arenas of water management and science. Are the current standards adequate when these compound events occur more frequently than expected from random correlation? And do weather and climate modellers pay adequate attention to the output of their models that is truly meaningful to society, like combinations of strong winds over sea and high precipitation volumes in land?

Preliminary analyses with observed records show that safety standards are sensitive to the assumed correlation between storm surge and local precipitation. Output from high resolution climate model projections for future conditions (with increased winter time precipitation and increased sea level) has been analysed particularly for climate induced changes in the probability of simultaneous occurrence of these relevant events. Sea level rise is shown to give a pronounced contribution to an increased occurrence of adverse conditions, while increases in precipitation intensity weakly enhance this occurrence.

The paper is concluded by a summary of required model experiments and analyses needed to address the influence of current and future compound events on safety standards in the coastal areas in the Netherlands.