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Regional flood impact assessment for Kiel and Eckernförde, Germany

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It is well-observed that extreme flood events bring considerable destruction to coastal communities. The estimates of damage increases when direct and indirect losses are both considered in the assessment. This study applied the INtegrated DisRuption Assessment (INDRA) model which is designed to estimate and compare not only tangible but also intangible losses such as risk to life, recovery mechanisms and household displacement. Multi-criteria analysis (MCA) was performed in order to compare hotspots of high flood risk on the regional scale and detect which impact indicators influence results the most. INDRA allowed assessing the following impact indicators: direct damages to buildings and roads, transport disruption, risk to life and financial recovery mechanisms of private households and businesses. The focus was on two hotspots of flood risk, where direct and indirect impacts from 200 years flood were assessed and analyzed in terms of relative importance to the region. The region here was defined as municipalities located on the Baltic Sea coast within the Schleswig-Holstein state, Germany. The hotspots are the towns of Kiel and Eckernförde. They are urban areas with a high concentration of people and assets, which previously experienced extreme flood events. From the performed investigation it was found out that modeled flood differently impacts Kiel and Eckernförde. The results produced by MCA show that the scores of direct and indirect damage are slightly higher in Eckernförde than in Kiel. Transport disruption is a compelling element in the performed regional impact assessment and demonstrated immense weight. Extreme events may pose significant direct and indirect impacts on the coastal roads, obstructing not only the access to important landmarks such as hospitals, train stations, harbors, etc. but also to contiguous municipalities. Yet, the analysis showed that other impact indicators are rather of local importance and would not cause vast damage on a regional scale. Nonetheless, the study suggests, that these effects should not be underestimated in terms of losses.