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Supporting European coastal sectors to adapt to changes in extreme sea levels with climate change

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Climate change will lead to increases in the flood risk in low-lying coastal areas. Understanding the magnitude and impact of such changes is vital to design adaptive strategies and create awareness. In the context of the CoDEC project (Coastal Dataset for Evaluation of Climate impact), we developed a consistent European dataset of extreme sea levels, including climatic changes from 1979 to 2100. To simulate extreme sea levels, we apply the Global Tide and Surge Model v3.0 (GTSMv3.0), a 2D hydrodynamic model with global coverage. GTSM has a coastal resolution of 2.5 km globally and 1.25 km in Europe, and incorporates dynamic interactions between sea-level rise, tides and storm surges. Validation of the dataset shows a good performance with a mean bias of 0-0.04 m for the 1 in 10-year water levels. When analyzing changes in extreme sea levels for the future climate scenarios, it is projected that by the end of the century the 1 in 10-year water levels are likely to increase up to 0.5 m. This change is largely driven by the increase in mean sea levels, although locally changes in storms surge and interaction with tides can amplify the impacts of sea-level rise with changes up to 0.2 m in the 1 in 10-year water level.

The CoDEC dataset will be made accessible through a web portal on Copernicus Climate Data Store (C3S). The dataset includes a set of Climate Impact Indicators (CIIs) and new tools designed to evaluate the impacts of climate change on different sectors and industries. This data service will support European coastal sectors to adapt to changes in sea levels associated with climate change. In this presentation we will also demonstrate how the C3S coastal service can be used to enhance the understanding of local climate impacts.