**The impact of tidal predictions on historical extreme skew surges**

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**Abstract**

Extreme sea and skew surge levels are variables commonly used in public policies and integrated coastal zone management. In France, this policy is mainly supported by the Ministry of Ecological Transition. More specifically in the framework of nuclear safety, the protective infrastructures are designed for a sea level corresponding to a combination of the highest astronomical tide, the upper bound of the 70% confidence interval corresponding to the 1000-year return skew surge and changes of mean sea level. So far, the extreme skew surges are estimated using systematic tide gauge data, but more and more historical information is considered to improve the estimates and to reduce the associated uncertainties due to the presence of an outlier in the sample.

Defined as the difference between the highest observed sea level and the highest astronomical level during a tidal cycle, the estimation of skew surges implicates the estimation of tidal predictions. While the process is well established for current tidal predictions, different approaches to estimate them for historic events have been used in several research projects.

This study aims to present the impact of using different methods to estimate historic tidal predictions when establishing skew surges.