**Coastal extreme sea levels from the new GESLA-3 tide gauge data set**

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**Abstract**

The Global Extreme Sea Level Analysis (GESLA) dataset contains, in its recently released version 3, a total of 5199 tide gauge records of hourly (or higher) temporal resolution, globally distributed and totalling more than 91000 years of data (www.gesla.org). This represents twice the number of observations compared to the former version of the database. The tide gauge records have been compiled from multiple data providers and so they have different levels of quality controls. Here we describe a set of tools to homogenise and quality control sea level observations from raw GESLA files, including adjustments of datum jumps and time shifts in the time series. We apply these tools to derive sea level products, such as storm surges and skew surges that are made publicly available through the GESLA website. These are used to characterise coastal extreme sea levels from the extended in-situ dataset.