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Identifying key drivers of sea surface variability from satellite altimetry in the North-East Atlantic

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Sea surface height variability (SSV) operates in varying temporal and spatial scales and acts as a source of noise when trying to perform long term trend analysis on the sea surface height (SSH). SSV can be removed through a simple running average process but this approach takes no account of individual contributors to the SSV.

This study seeks to identify (and ultimately remove) the major contributing components of the SSV in the North-East Atlantic to expose the underlying changes in the SSH signal. This allows a trend analysis on the "cleaned" SSH for an accurate determination of sea level rise.

Observations of sea level anomalies (SLA) are taken from 21 years of satellite altimeter data and are used to estimate the SSV in the North-East Atlantic. Seasonal signals are removed and monthly means calculated. The SSV is decomposed into global, regional and local components and a simple multiple linear regression model is constructed on the basis of these components to model the explained SSV.

Initial results show that a region of high SSV exists off the west coast of Denmark and can be well represented with a regression model which uses local wind and global temperature as primary regressors. The same model does not capture a more diffuse region of high SSV in the Atlantic Ocean which suggests that the SSV is driven by other physical processes and highlights the need for specific spatial analyses when seeking to model SSV.

This work will help in understanding regional sea level change over the past 21 years and to provide a foundation for estimates of local sea level change in the near future.