



## **What are the processes behind decadal scale sea level variability in the North Atlantic?**

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Over the past decade, our view of global sea level has been revolutionised by satellite altimetry. Altimetry images have made it clear that sea level varies very significantly on regional scales. However, to examine variability on decadal time-scales we rely on coastal measurements from the global array of tide gauges and aim to gain insight from numerical ocean models.

Here we examine the patterns of decadal variability in the North Atlantic Ocean shown by tide gauges over the past 50 years. We explore the processes that underlie this variability with a high resolution isopycnic ocean model. In particular we aim to understand how thermosteric changes in sea level in the mid-ocean are reflected in the coastal ocean.

We find that the model is able to reproduce much of the decadal variability seen in tide gauges along the eastern US when forced by ECMWF reanalysis data. Similar patterns are also seen when the model is climatologically forced suggesting that some of this variability is internally generated. We explore the processes behind the decadal variability and examine the linkages between atmospheric forcing and coastal sea level.