Project Title: **Attribution of Global Sea Level Rise-induced Coastal Flooding**

Lead Institution/Department: University of Bristol, School of Geographical Sciences
Primary Supervisor: Dann Mitchell- University of Bristol
Co-Supervisor: Matt Palmer- Met Office, Pete Uhe- Fathom, Aimee Slangen- NIOZ

Summary

The latest IPCC climate assessment states that "it is very likely that human influence was the main driver of the observed global mean sea level rise since at least 1971". However, the implications of this statement for local sea-level rise and the consequences for coastal flooding remain under-explored. This project will quantify the magnitude of coastal flooding around the world that can be attributed to observed sea-level rise, and specifically to anthropogenic climate forcing. We will also consider how flood inundation and frequency will increase under a range of future sea-level rise projections. The PhD project will exploit connections to the DARSea (Detection and Attribution of Regional Sea Level Rise) that is underway at the Royal Netherlands Institute of Sea Research (NIOZ). DARSea has two funded PhDs that will focus on sea level budgets and the attribution of observed local sea-level rise. This PhD project will draw on the findings of DARSea and preform the inundation modelling needed the explore coastal flood implications and associated economic costs, by developing counter factual analysis.

Methods

The PhD student will work alongside the DARSea project to help develop local sea level budgets for the UK and other worldwide locations and explore the anthropogenic influence on observed changes to each of the sea-level components (e.g., thermal expansion, glacier mass loss, ice sheet mass loss, land water storage changes). These contributions will be regionally downscaled using the corresponding patterns of Gravity, Rotation and Deformation (GRD). Simulations of local flood events for the UK and worldwide will leverage inundation modelling capability at Fathom applied in counter factual frameworks to estimate the attributed coastal flood impacts. A similar analysis will be carried out on the basis of Met Office sea level projections, including projections based on warming levels, which formed the basis of the latest UK Climate Change Risk Assessment. The PhD student will benefit from interacting with the DARSea research team and will have the opportunity for secondments to both the Met Office and NIOZ in the Netherlands

Background reading and references

Mitchell D, et al. (2022) Increased population exposure to Amphan-scale cyclones under future climates. *Climate Resilience and Sustainability*, 1, e36. https://doi.org/10.1002/cli2.36

Bates PD, et al. (2023) A climate-conditioned catastrophe risk model for UK flooding, Nat. Hazards Earth Syst. Sci., 23, 891–908, https://doi.org/10.5194/nhess-23-891-2023

Slangen ABA, Palmer MD, et al. (2023) The evolution of 21st century sea-level projections from IPCC AR5 to AR6 and beyond. Cambridge Prisms: Coastal Futures. 2023;1:e7. https://doi.org/10.1017/cft.2022.8

How to Apply

The deadline for this position is 8th January 2025. The studentship will begin in September 2025. Please apply to the "Geography- PhD" here
https://www.bristol.ac.uk/study/postgraduate/apply/