

Presentation Preference: Oral

The impact of a tidal barrage on storm surge in the Severn Estuary

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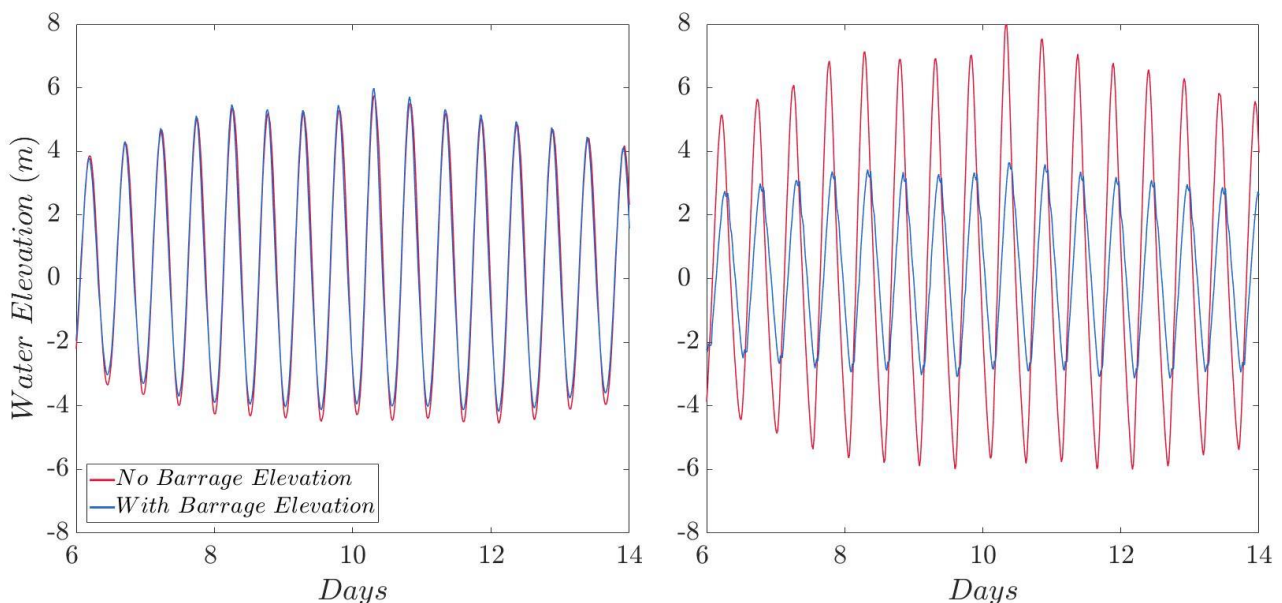
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Abstract (250 words maximum)

The proposed Seven barrage is a controversial but widely discussed proposal to generate clean and renewable energy. A key concern with this technology is that such structures may cause other environmental problems. However, such structures might also create beneficial environmental effects in some areas, such as mitigating the impact of storm surges. In this project we model the hydrodynamics of the Severn barrage and surrounding area using a depth-averaged numerical model. We simulate a number of storm surge events from the past 40 years and analyse how the presence of the Seven barrage modifies the resulting water levels. The figures below illustrate the simulation results of the barrage implementation during the storm surge event at both the ocean (west) and basin (east) side of the barrage. The results indicate the significant reduction of the water level, and hence the flooding risk, in the basin region due to the barrage implementation. The level peak time is delayed during the storm surge event on both sides of the barrage. The negative impact of the barrage inclusion, as seen in the left figure, is the maximum water level increases on the ocean side. We then consider how different barrage operating strategies would influence the resulting water levels and the optimum strategy is selected for the flooding benefit of the whole Seven Estuary.



Figures 1 – Interaction of barrage implementation with storm surge: a) in the ocean (west) side (left); b) in the basin (east) side (right).