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SEARCH

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Incorporating Infrastructure and Vegetation Effects on Sea Level Rise Predictions in Low-Gradient Coastal Landscapes

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Abstract:

At the regional and global scales, coastal management and planning for future sea level rise scenarios is typically supported by modelling tools that predict the expected inundation extent. These tools rely on a number of simplifying assumptions that, in some cases, may result in important overestimation or underestimation of the inundation extent. One of such cases is coastal wetlands, where vegetation strongly affects both the magnitude and the timing of inundation. Many coastal wetlands display other forms of flow restrictions due to, for example, infrastructure or drainage works, which also alters the inundation patterns.

In this contribution we explore the effects of flow restrictions on inundation patterns under sea level rise conditions in coastal wetlands. We use a dynamic wetland evolution model that not only incorporates the effects of flow restrictions due to culverts, bridges and weirs as well as vegetation, but also considers that vegetation changes as a consequence of increasing inundation. We apply our model to a coastal wetland in Australia and compare predictions of our model to predictions using conventional approaches. We found that some restrictions accentuate detrimental effects of sea level rise while others moderate them. We also found that some management strategies based on flow redistribution that provide short term solution may result more damaging in the long term if sea level rise is considered.

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