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IMPACT OF INTERTIDAL HABITATS ON SALT DYNAMICS IN TIDALLY DOMINATED, PERIODICALLY WEAKLY STRATIFIED ESTUARIES

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Estuarine intertidal habitats, such as mudflats and salt marshes, are vital ecosystems due to their co-benefits in flood and erosion risk reduction, biodiversity enhancement, carbon sequestration, and pollutant filtration. Unfortunately, since last century these habitats have been rapidly shrinking by more than 50% worldwide due to land reclamation. Conserving, restoring, and creating intertidal habitats are increasingly proposed as nature-based solutions to mitigate the escalating risks of freshwater shortage posed by human activities and climate change. However, previous research has demonstrated conflicting effects of intertidal areas on estuarine salt intrusion, which are largely uncertain due to their strong dependence on various parameters (geometry, bathymetry, forcing). In this study, we developed a semi-analytical model, that resolves the interactions between intertidal and channel salt transport in tidally dominated, periodically weakly stratified estuaries, to unravel the role of these habitats in estuarine circulation, turbulence/stratification, and salt transport. The water motion and salt transport are dynamically coupled between the channel and intertidal regions, through water, momentum, and salt exchange between both areas. Our research will provide a comprehensive understanding of intertidal functioning in estuarine salt dynamics and bring valuable insights for developing effective strategies to mitigate estuarine water stress. Detailed results will be presented at the conference.