

## Bar morphodynamics in the fluvial-tidal zone

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The hydrodynamics and deposits of the Tidally-Influenced Fluvial Zone (TIFZ) are complex because it experiences competing fluvial and tidal flows, sometimes moderated by waves, and spatially and temporally variable rates of sediment transport and deposition. This paper presents a new integrated field dataset from the Columbia River Estuary, USA, that quantifies the response of the flow structure, bed morphology and bar stratigraphy to fluvial-tidal flows.

A new 3-year, field and modelling program that started in 2011, has been monitoring the dynamics and deposits of a 40 km-reach of the Columbia River Estuary. Data obtained so far throughout the TIFZ include: bathymetry using MBES, flow using ADCP, subsurface sedimentology using GPR and shallow coring to 5 m.

First results suggest there is a complex spatial and temporal lag in the response of the bed morphology and deposits to the fluvial-tidal flows. Zones of strong ebb and flood flow do not necessarily produce channel beds dominated by bi-directional bedforms. Many mid-channel bars are stable over decadal time periods. This paper will illustrate the variety in bar morphologies and channel change throughout the fluvial-tidal zone and contrast these bar dynamics with examples from purely fluvial environments.