



Shelf sea processes mediating land-ocean carbon fluxes

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Carbon and nutrient fluxes in coastal areas remain to be large sources of uncertainty in global budgets and little is known about their spatio-temporal variability or long-term changes. Shelf and coastal processes mediate fluxes of matter from land to ocean, govern carbon turnover and buffering. They determine partitioning of carbon and nutrients between reservoirs and control mechanical energy dissipation and mixing. Specific energy and matter transformation processes on the shelf, near the coast, in estuaries and in the intertidal zone are typically neglected in global ESMs. Even in regional models, they are often treated in an over-simplified manner. We will identify potential candidate coastal ocean processes, which systematically mediate carbon turnover and buffering and present relevant novel model developments in coastal research. We will focus on implications of tides and tidal induced mixing, wave-current interaction, interference of bottom boundary and surface mixed layers, and physical-biological processes structuring benthic-pelagic coupling and discuss their role in the systematic flow of matter between the various reservoirs in the coastal zone.