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- Title and Author Search

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- [Volumes and Issues](#)
- [Contents of Issue 2](#)
- [Special Issue](#)

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Seagrasses and sediment response to changing physical forcing in a coastal lagoon

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Abstract. The Ria de Aveiro is an estuary–coastal lagoon system connected to the Atlantic Ocean by a channel with a cross-sectional area that, for more than a century, has increased steadily, partly because of dredging over the last 50 years. Local ocean tides, with amplitudes of up to 3 m, are today transmitted to the lagoon by the single, engineered inlet channel and propagate to the end of the lagoon channels as a damped progressive wave. The increase in tidal amplitude with time has affected the lagoon ecosystem and the water has become more saline. Seagrass beds are important indicators of ecosystem change; until 1980, much of the lagoon bed was covered by seagrasses (*Zostera*, *Ruppia*, *Potamogeton*), which were collected in large quantities for use in agriculture. After 1960, the harvesting declined and the seagrass beds became covered in sediment, so that the area of seagrasses decreased substantially despite the decline in the quantity collected. The change in the pattern of seagrass populations can be related to changes in the physical forcing associated with increased tidal wave penetration. This has, in turn, induced transport and redistribution of coarser, sandy sediment and increased re-suspension and turbidity in the water column. However, the initiating cause for this ecosystem change was dredging, which, since the 1950s, has been used increasingly to widen and deepen the channels of the system.

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