Sediment deposition and production in SE-Asia seagrass meadows

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Abstract: Seagrass meadows play an important role in the trapping and binding of particles in coastal sediments. Yet seagrass may also contribute to sediment production directly, through the deposition of detritus and also the deposition of the associated mineral particles. This study aims at estimating the contribution of different seagrass species growing across an extensive range of deposition to inorganic (carbonate and non-carbonate) and organic sediment production. Total daily deposition measured with sediment traps varied from 18.8 (±2.0)g DW $m^{-2}d^{-1}$ in Silaqui (Philippines) to 681.1 (±102)g DW $m^{-2}d^{-1}$ in Bay Tien (Vietnam). These measurements correspond to a single sampling event and represent sedimentation conditions during the dry season in SE-Asia coastal areas. Enhalus acoroides was the most common species in the seagrass meadows visited and, together with Thalassia hemprichii, was present at sites from low to very high deposition. Halodule uninervis and Cymodocea species were present in sites from low to medium deposition. The mineral load in seagrass leaves increased with age, and was high in E. acoroides because it had the largest and long-lived leaves (up to 417 mg calcium carbonate per leaf and 507 mg non-carbonate minerals per leaf) and low in H. uninervis with short-lived leaves (4 mg calcium carbonate per leaf and 2 mg non-carbonate minerals per leaf). In SE-Asia seagrass meadows non-carbonate minerals accumulate at slower rates than the production of calcium carbonate by the epiphytic community, consequently the final loads supported by fully grown leaves were, as average, lower than calcium carbonate loads. Our results show that organic and inorganic production of the seagrasses in SE-Asia represents a small contribution (maximum of 15%) of the materials sedimented on a daily base by the water column during the sampling period. The contribution of the carbonate fraction can be locally significant (i.e. 34% in Silaqui) in areas where the depositional flux is low, but is minor (<1%) in sites were siltation is significant (i.e. Umalagan and all the visited sites in Vietnam).
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Index Keywords: coastal sediment; deposition; seagrass; sedimentation; siltation; Asia; Cymodocea; Enhalus acoroides; Halodule uninervis; Halophila; Thalassia hemprichii

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