A fine sediment module for the two-dimensional component of SLIM

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Suspended particulate matter has a great influence on most of the biological and chemical organisms in aquatic environments. A good representation of the sediment dynamics is therefore essential for ecological modeling. To this purpose, a fine sediment module is developed and coupled to the two-dimensional component of the finite-element model SLIM.

In this module, two tracers are calculated: the concentration of suspended sediments and the concentration of sediments on the bottom. The first one is transported according to the hydrodynamics and diffused, while the second one does not move. Classical parameterizations of erosion and deposition allow exchange between tracers. The talk focusses on two studies using SLIM and implying sediments.

The first case studied is the Scheldt Estuary (Belgium, the Netherlands). The model, covering the whole continental shelf, the estuary, the tidal river and the main tributaries of the Scheldt, is thoroughly multi-scale (de Brye *et al*, 2010). In this application, the sediment module is only a step forward in order to obtain a more complex ecological model (fecal bacteria and heavy metals modules interacting with the present sediment module will follow). The Scheldt is a relatively turbid estuary, with a maximum of turbidity zone that is quite well represented by the model. The model is validated against data measured at three different stations along the estuary. While the seasonal variability seems to be correctly predicted by the model, the tidal variability is not. Taking into account wave-

driven resuspension at the mouth or even biology may improve the results. This is still an ongoing study.

In the second study, the sediment module is used to investigate the degradation of coral reefs in Cleveland Bay (Australia). For present land-use conditions, the model shows that the amount of riverine sediments settling on the bay may exceed by 50-75 % the amount of sediment exported from the bay. Sediment is thus accumulating in the bay on an annual basis, which may be responsible of the observed degradation of fringing coral reefs (Lambrechts *et al.*, accepted for publication).

References

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