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VLIZ Young
Scientists' Day

Brugge, Belgium
28 February 2003

THE ECOLOGICAL FUNCTIONING OF THE SCHELDT ESTUARY: TOWARDS INTEGRATION OF RESEARCH

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The Scheldt Estuary is confronted with a loss of functionality, mostly if ecological functions are considered. The system capacity of purifying water is weakened. The ecological infrastructure is scattered. Flood waves gain strength. It is a scientific challenge to quantify to what degree tidal wetlands can support restoration of the ecological functioning of the estuary.

It is illustrated that an integrated multidisciplinary approach is a satisfying strategy to obtain adequate system knowledge so that the complex role of wetlands can be understood. The results of OMES, an integrated research program are presented for this purpose.

Mass balances indicated that tidal wetlands aerate the water column, remove nitrogen from the overlying water and regenerate dissolved silica. Sedimentation takes place, but soil formation only happens in the most elevated parts.

The interactions with the wetland vegetation were targeted at different levels. On the level of individual plants, nutrient removal from the root zone was studied. This resulted in a diagenetic model. On species level (*in casu Phragmites australis*), a model was developed that allows predicting growth under different factors. On plant community level, a model was constructed that shows how development of tidal marsh vegetation is mainly controlled by local management, flooding frequency and the salt gradient. The coupling of these models formed a marsh submodel unit that can be incorporated in an ecological model covering the whole estuary.