

Morphodynamics of tidal environments: the issue of equilibrium

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Abstract: The prediction of the short- and long-term morphodynamic evolution of estuaries and lagoons is an important issue for its implications on the survival of these environments to sea level rise and human interventions. In this sense, lagoon of Venice is the case study of major importance. Evidences of the ongoing environmental changes characterizing the lagoon of Venice, globally expressed in a tendency of the lagoon to lose its original features and to be progressively transformed into a bay, are the reduction and the gradual disappearance of the salt marsh regions, areas characterized by a wide variety of habitats, the erosion of the tidal flats and the degradation of both water and sediments of the lagoon.

In the seminar, an understanding of the morphodynamic evolution of tidal environments will be achieved on the basis of the analysis of the single mechanisms which govern the dynamic equilibrium of each component of the system.

Starting from a single tidal channel, it will be presented various models of increasing complexity, in which different elements (tidal flats and salt marshes) and different effects (such as wind, sea level rise and vegetation) will be progressively introduced. Theoretical and numerical results will be compared with experimental and field data, showing good agreement. Future developments of the research will be finally discussed.