



## **Studying biomorphodynamics for delta's habitat conservation**

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The Po delta (Italy) supports a great biodiversity and supply important resources, so the conservation of habitats is necessary to maintain the ecosystem services provision. Evidences from previous studies show the role of climate on sediment transport while only few accounts for the role of vegetation in the delta landform evolution. This research deals with a multi-temporal analysis of vegetation and morphology of the Po River Delta. Spatial trends of both vegetation cover/typology and sediment/soil distribution are implemented to obtain detailed classification from EO.

In order to understand how changes in the main climatic and hydrodynamic variables may influence spatial non-linearity, and how numerical thresholds can describe this, we calculate the power law exponents due to the variance of scale. Self-organized patchiness of vegetation shows a power law relationship in the frequency distribution of small patch sizes. These are obtained by means of sub-pixel processing techniques (e.g. Spectral Mixing Analysis) and classifications are also analyzed in terms of temporal (Empirical Orthogonal Function) patterns. Finally they are progressively scaled to obtain detailed biophysical maps. The temporal evolution of the biophysical parameters shows high uncertainties that can be associated to the short term climate influence on the vegetation spatial pattern. The method represent the implementation of a uniform classification system and the corresponding database for habitat maps to obtain monitoring products. Developing instruments and tools to allow modular variation of spatial and temporal scales of observation (i. e from local to regional; from seasonal to inter annual) is mandatory for a valuable implementation of current management and conservation strategies (EU Integrated Coastal Zone Management) but also with the use of innovative technologies in current conservation strategies.