06. Sediment management in lagoons and estuaries

Abstract 13

SHORT-TERM SEDIMENTATION ON SALT-MARSH SURFACE: ANALYSIS OF THE INTERPLAY BETWEEN FAIR-WEATHER CONDITIONS AND STORM EVENTS

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Salt marshes can keep pace with relative sea-level rise (RSLR) caused by eustatism and subsidence if sediment input is large enough to guarantee their vertical accretion and avoid marsh drowning and plant death. When riverine sediment sources miss, resuspension driven by severe meteorological storm events may provide the major source of sediment for salt-marsh accretion. However, it is still undefined how much storm events and fair-weather conditions influence the short-term sedimentation on the salt-marsh surface.
To understand sediment deposition dynamics on salt marshes, we selected three different study areas in the Venice lagoon, Italy: San Felice (SF) and Sant'Erasmo (SE) salt marshes in the northern lagoon and Conche (CO) in the southern lagoon. The three study areas are characterized by different exposure to wind-waves generated by the north-easterly Bora wind, which is the main morphologically significant wind in the Venice lagoon. In each study site, we considered different transects and, in each of them, we installed three stations located at 2.5 m, 7.5 m, and 27.5 m from the salt-marsh edge. Each station is provided with an artificial marker horizon to measure vertical accretion and two sediment traps to evaluate the short-term accumulation. We collected sediment deposited in the sediment traps monthly or after any severe storm event, to measure accretion rate, grain size distribution and organic content. The field campaign began in October 2018 and it is still ongoing.
According to a preliminary analysis of field observations, intense storm events are likely to importantly contribute to sediment deposition over the marsh surface, eventually exceeding the sedimentation occurring in several months of relative fair-weather conditions. The sedimentological analysis of the material deposited in the sediment traps will allow us to characterize the contribution of severe storms in the eco-morphological evolution of salt marshes.