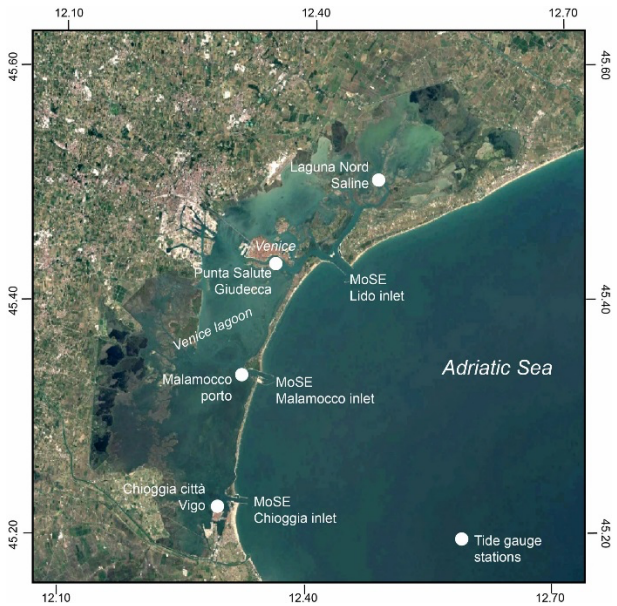


Summary

Extreme events are becoming more frequent due to anthropogenic climate change, posing serious concerns on societal and economic impacts and asking for mitigating strategies, as for Venice. Here we proposed a dynamical diagnostic of Extreme Sea Level (ESL) events in the Venice lagoon by using two indicators based on combining extreme value theory and dynamical systems: the instantaneous dimension and the inverse persistence. We show that the latter allows us to localize ESL events with respect to sea level fluctuations around the astronomical tide, while the former informs us on the role of active processes across the lagoon and specifically on the constructive interference of atmospheric contributions with the astronomical tide. We further examined the capability of the MoSE (Experimental Electromechanical Module), a safeguarding system recently put into operation, in mitigating extreme flooding events in relation with the values of the two dynamical indicators. We show that the MoSE acts on the inverse persistence in reducing/controlling the amplitude of sea level fluctuation and provide a valuable support for mitigating ESL events if operating, in a full operational mode, at least several hours before the occurrence an event.



Figure

The geographical location of the 4 selected tide gauge stations (filled white circles) across the Venice lagoon (Chioggia Città-Vigo, Malamocco Porto, Punta della Salute Giudecca, and Laguna Nord Saline) together with the three MoSE inlets. The map has been produced with Google Earth.

How to cite

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