SINDBAD: a web-based decision support system for navigation assistance at sea

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ABSTRACT

Introduction
SINDBAD is a web-based decision support system for navigation assistance at sea, that implements high resolution met-ocean forecast and Sea Situational Awareness (SSA) for small leisure sailing and touristic yachting.
A digital approach to increase the (SSA) of these stakeholders could increase safety and pleasure at sea and help to reduce the carbon footprint of their activities.

Methods
The service is able to assess the forecasted sea state and, on the base of the vessel's hydrostatic and dynamic characteristics, to evaluate the stability conditions and to predict the possible occurrence of several dangerous phenomena. Based on the integration of meteo-marine data, specific algorithms have been developed to provide information on the interaction between weather situations and vessels of different types. This in order to evaluate the risk and safety conditions for navigation in the selected area. This latter aspect is particularly innovative and can serve leisure sailing as well as fisheries activities which today have very few tools to ensure safety of navigation and the existing solutions are general and not vessel dependent. The detailed knowledge of the impact of expected weather and sea forecasts on a specific vessel is the key to a personalized alert management service.

Results
Given the vessel type and the forecasted sea conditions, the system is able to compute vessel accelerations and to produce, for instance, detailed MSI (Motion Sickness Incidence) maps for the next hours. The same approach is adopted for other indexes expressing the operational capability of the vessel (e.g. the Lateral Force Estimator, LFE). The service will be erogated through a web-portal and mobile apps, hosting both high resolution meteo-marine forecasts and vertical applications related with fisheries and aquaculture.

Conclusion
The first realization covers the Ligurian Sea (a highly touristic area in the North Mediterranean Sea), and an extension to the whole Mediterranean is currently under construction and it will be launched in 2021.