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Human impacts of the motorways of the sea

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Maritime transport plays an important role in the world trade and economics development. In Europe the "motorways on the sea" concept has been an important issue since the launch of the EU Transport white paper (EC 2001). An enclosed sea such as the Mediterranean is particularly vulnerable to ship-associated pressures due to a high-volume of shipping routes, long history of use, and sensitive shallow and deep-sea habitats. Negative impacts associated to maritime traffic include biodiversity loss, introduction of alien species, pollution, marine litter and underwater noise among others. The monitoring and characterization of the spatio-temporal patterns of marine traffic constitutes an important element for the effective management and assessment of environmental impacts of this activity.

Monitoring of real-time ship locations can be achieved through the Automated Identification System (AIS). The AIS is a VHF transmitter that broadcast the ship position, as well as additional information (eg. timestamp, speed, heading, boat type). All ocean-going commercial traffic >300 gross tons, or carrying more than 165 passengers, as well as tug/tows, are required to carry AIS transmitters (IALA 2004). In addition, the rest of the ships are able to carry on these transmitters on a voluntary basis.

In this work we present the development of an information system designed to store, manage, analyze and visualize historical AIS data based on open-source components. We analyse such data to assess and map multiple anthropogenic pressures. For example, segmented regression on speed distribution is carried out to identify and map fishing activity, whereas neighbourhood statistics and GIS methods are used to generate underwater noise maps. We will illustrate these products within the context of risk assessment on marine ecosystems at the Western Mediterranean Sea.

The information provided in this study can be incorporated into Decision Support Systems (DSS) for supporting the implementation of European and national policies for the assessment of environmental impacts and the interactions among human activities as well.