



IT – OSRA: applying ensemble simulations to estimate the oil spill hazard associated to operational and accidental oil spills

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Every year, 270,000 tonnes of oil are estimated to be spilled in the ocean by vessel operations (e.g. tank washing, leakage of lubricants) and the so called operational spills are typically associated with small volumes and high occurrence rate. Vessel-related accidental spills (e.g. collisions, explosions) seldom occur and usually involve high volumes of oil, accounting for about 100,000 tonnes/year. The occurrence of accidental spills and their impacts have been well documented in the available literature. On the other hand, occurrence rates of operational spills and the effects they have on the marine and coastal environments remain very uncertain due to insufficient sampling effort and methodological limitations.

Trying to foresee when and where an oil spill will occur in a certain area, its characteristics and impacts is, at present, impossible. Oil spill risk assessments (OSRAs) have been employed in several parts of the globe in order to deal with such uncertainties and protect the marine environment. In the present work, we computed the oil spill risk applying ensemble oil spill simulations following an ISO-31000 compliant OSRA methodology (Sepp Neves et al. , 2015). The ensemble experiment was carried out for the Algarve coast (southern Portugal) generating a unique data set of 51,200 numerical oil spill simulations covering the main sources of uncertainties (i.e. where and when the spill will happen and oil spill model configuration). From the generated data set, the risk due to accidental and operational spills was mapped for the Algarve municipalities based on the frequency and magnitude (i.e. concentrations) of beaching events and the main sources of risk were identified. The socioeconomic and environmental dimensions of the risk were treated separately. Seasonal changes in the risk index proposed due to the variability of meteo-oceanographic variables (i.e. currents and waves) were also quantified.