MONGOOS-REMPEC operational experience during *Agia Zoni II* oil spill, September 2017

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The Regional Marine Pollution Emergency Response Centre for the Mediterranean Region (REMPEC) was established in 1976 by the decision of the Contracting Parties to the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean (Barcelona Convention) with the mandate to strengthen the capabilities of the Mediterranean coastal states and to facilitate cooperation among them in combatting oil pollution and dealing with marine pollution emergencies.

Since 2009, within the framework of the Mediterranean Assistance Unit (MAU), the Mediterranean Operational Network for the Global Ocean Observing System (MONGOOS) has assisted REMPEC producing the scientifically sound sea conditions and oil spill forecasts in emergency situations and providing support for training and exercises activities.

Recently, operational oil spill predictions have been requested for the Saronic Gulf (Greece), where a 45-year-old tanker, the *Agia Zoni II* carrying 2.195 tons of fuel oil, 355 tons of marine gas oil and 300 l lubricants sank off the Island of Salamis on 10th of September 2017.

During the oil spill emergency response phase, REMPEC provided a real-time coupling the information flow between MONGOOS and end users.

To obtain independent predictions the two oil drift forecasting systems were initiated: POSEIDON OSM and the CMCC oil spill forecasting system based on the community model MEDSLIK-II.

POSEIDON OSM (http://www.poseidon.hcmr.gr/listview.php?id=16#oil_spill) is a Lagrangian oil spill model operationally used by Hellenic Centre for Marine Research (HCMR) in the Aegean and Ionian seas. During the accident, hourly oceanographic data at a horizontal resolution of $1/30^o$, and atmospheric fields at a horizontal resolution of $1/20^o$ forced the model.

The Lagrangian oil spill model MEDSLIK-II is developed by the MEDSLIK-II Consortium (http://medslikii.bo.ingv.it). The CMCC oil spill forecasting system is also available as the WITOIL service (freely accessible at http://www.witoil.com). During the accident, currents and waves at a horizontal resolution of $1/16^o$ provided by Copernicus Marine Environment Monitoring Service, and ECMWF wind at $1/8^o$ were used. Both models describe properly the oil weathering (evaporation, spreading, dispersion, emulsification), oil beaching and sedimentation, although they use different algorithms.

A worst-case scenario was coherently run by the models, assuming maximum oil spill volume and duration.

As a result, three bulletins were provided to REMPEC during the oil spill emergency response phase, 13–15 September 2017. Those bulletins presented forecasts of ocean currents, waves, wind and oil concentration on an hourly basis. As an oil spill scenario could not be totally discarded, this information would have been crucial for planning the prevention measures and optimizing cleanups.

Both model predictions revealed the consistent patterns in oil drift direction and extent realistically foreseeing that the oil reached the coastal suburbs of Athens: the shoreline of Salamis Island and south-east shoreline of Attiki (Peiraiki, Alimos, Elliniko and Glyfada). However, POSEIDON OSM calculated the timing more realistically than MEDSLIK-II, which might be explained by the higher spatial resolution in underlying physics.

During the post-response phase, hindcast scenarios were computed to study uncertainties and outline the problems had arisen within the oil spill emergency response phase.