MOON-REMPEC AGREEMENT 2010 ANNUAL REPORT

Summary

Contributing authors:
Frederic Hebert (REMPEC), Gabino Gonzalez (REMPEC), Sophie Martin (REMPEC), Giovanni Coppini (INGV), Michela De Dominicis (INGV), Nadia Pinardi (INGV), Roberto Sorgente (CNR-IAMC), Leopoldo Fazioli (CNR-IAMC), Andrea Cucco (CNR-IAMC), Rosalia Santoleri (CNR-ISAC), Gianluca Volpe (CNR-ISAC), Simone Colella (CNR-ISAC), Joaquin Tintore (CISC), Guillermo Vizoso (CSIC), Susana Perez (PUERTOS), Enrique Alvarez (Puertos), George Kallos (IASA) and George Galanis (IASA), Christos Spyrou (IASA), George Zodiatis (OC-UCY), Leonidas Perivoliotis (HCMR), Dominique Obaton (MERCATOR-OCEAN), Laurence Crosnier (MERCATOR-OCEAN), Edmee Durand (MERCATOR-OCEAN), Aldo Drago (IOI), Pierre Garreau (IFREMER), Pierre-Marie Poulain (OGS), Giuseppe Manzella (ENEA), Sarantis Sofianos (UATh), Isac Gertman (IOLR), Emin Ozsoy (IMS-METU), Joel Hoffman (MF), Henri Savina (MF), Frederic Thoumieux (MF) and Pierre Daniel (MF), Antonio Morlá de Benito (SASEMAR).

1 Training courses, workshops, exercises.

REMPEC requested ERO support in several exercises for oil spill response, organized by National Authorities. The following paragraphs (1.1-1.4) present the support from ERO to REMPEC and therefore to National Authorities in the framework of these national exercises.

1.1 Montenegro workshop

The Maritime Safety Department of Montenegro in cooperation with IMO and REMPEC organized a national workshop, with a view to define the role and responsibilities of the relevant administrations and test the proposed national system for combating oil marine pollution through a table top exercise. The recommendations of the workshop will serve as basis for the finalization of the National Contingency Plan.

MOON-ERO assistance was requested for the preparation of the table top exercise. ERO provided REMPEC with an oil spill model simulation scenario (animated). The simulation was prepared in advanced based on a scenario suggested by REMPEC. The spill location was fixed at Lat 42.10 Lon 19.02. The position of the simulated oil spill is presented after 12 hours (figure 1 left) and after 24 hours (figure 1 right).

Local authorities and REMPEC confirmed the usefulness of ERO support.

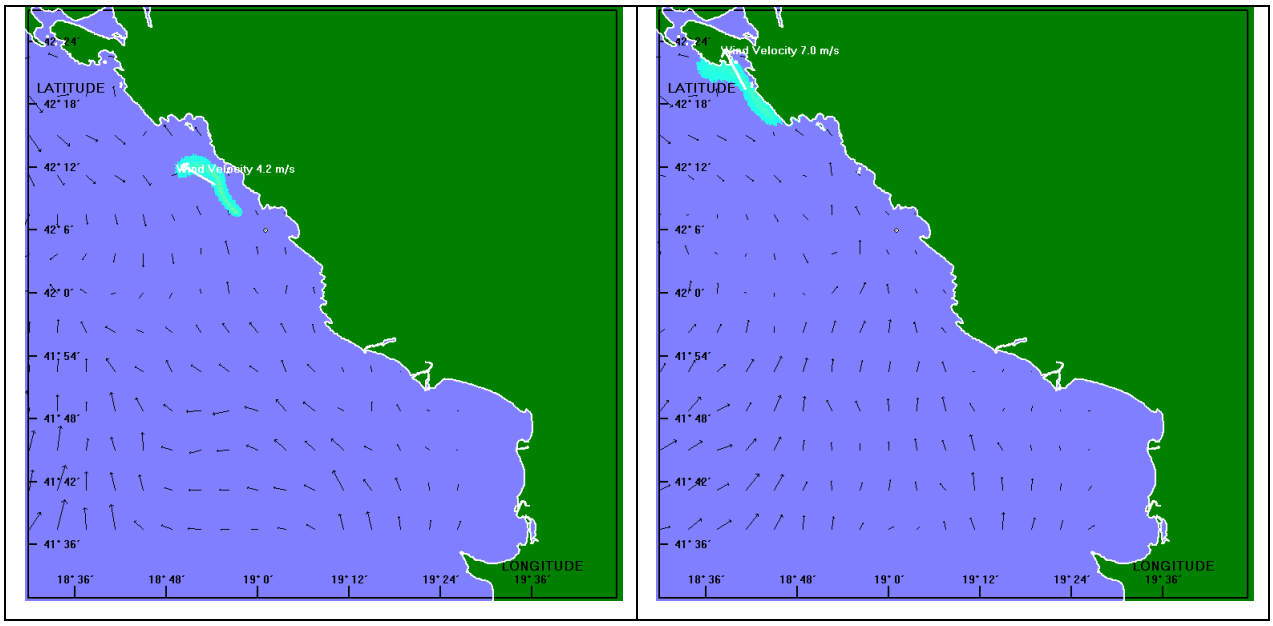

Figure 1: oil spill position after 12 and 24 hours from the starting time of the spill. Black arrows indicate current direction and the white arrow indicate the wind direction in the centre of mass of the oil slick.

1.2 Maltese exercise

REMPEC requested ERO assistance for real time support during an exercise organized by the Maltese authorities (i.e. Transport Malta). ERO provided oil spill forecast and meteo-oceanographic products. ERO experts from the International Ocean Institute-Malta Operational Centre, Physical Oceanography Unit (IOI-MO-POU) provided technical assistance on the site of the exercise.

The oil spill position was decided to be Lat 35° 51.00' N Lon 014° 36.40' E, off Munxar East cardinal mark. Several ERO experts contributed providing oil spill forecasting simulations (INGV, IOI-MO-POU), ocean currents and temperature forecasting products (INGV, IOI-MO-POU, MERCATOR) and wind forecasting products (IASA-UATH).

Figure 2 presents the results of the ROSARIO-MEDSLIK forecasting system provided by the IOI-MO-POU while figure 3 shows the results of MFS-INGV Mediterranean forecasting system coupled with MEDSLIK-II. The forecasts of the potential oil slick show a south movement of the oil. The high resolution oil spill forecast by ROSARIO (figure 2) shows a south-east drift while the low resolution oil spill forecast by MFS-INGV shows a movement of the oil toward south that then evolves south-west after 36 hours (Figures 3).

Local authorities and REMPEC confirmed the usefulness of ERO support during the exercise.

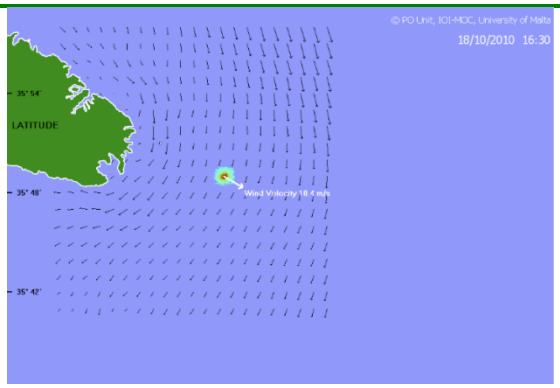

Fig2a: ROSARIO-MEDSLIK oil spill position at 18:30 LT 18/10/2010

Fig2b: ROSARIO-MEDSLIK oil spill position at 00.30 LT 19/10/2010

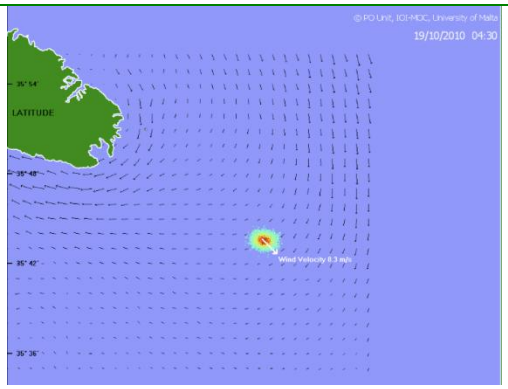

Fig2c: ROSARIO-MEDSLIK oil spill position at 6:30 LT 19/10/2010

Fig2d: ROSARIO-MEDSLIK oil spill position at 11:30 UTC 19/10/2010

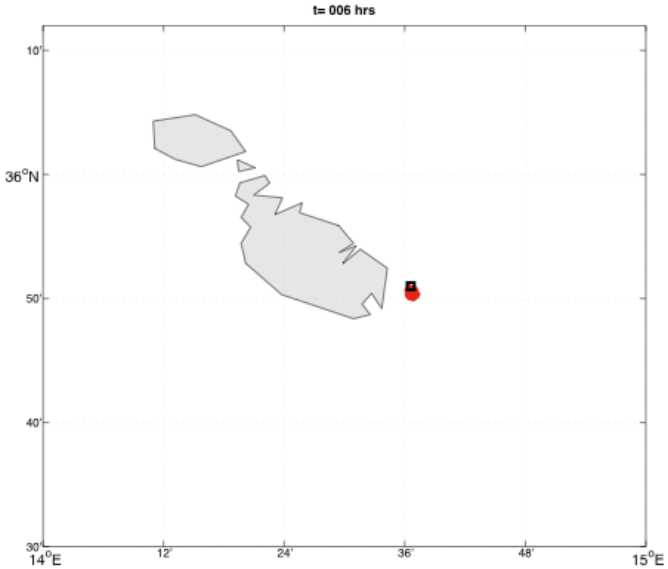

Fig3a: MFS-MEDSLIK oil spill position at 18:45 LT 18/10/2010

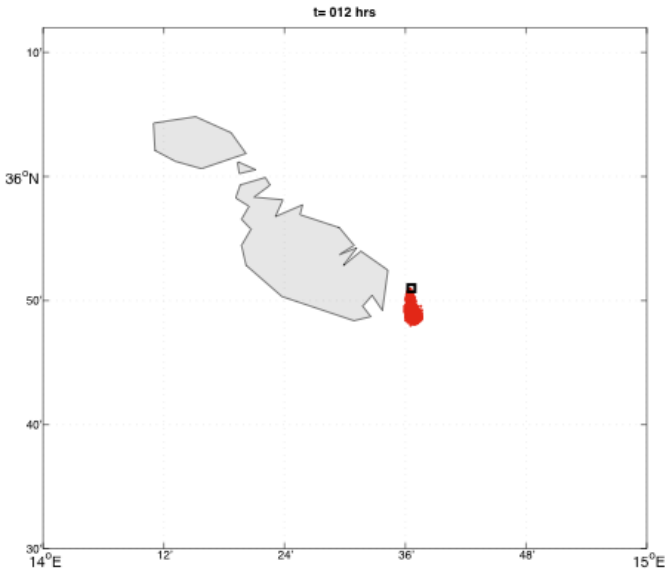

Fig3b: MFS-MEDSLIK oil spill position at 00.45 LT 19/10/2010

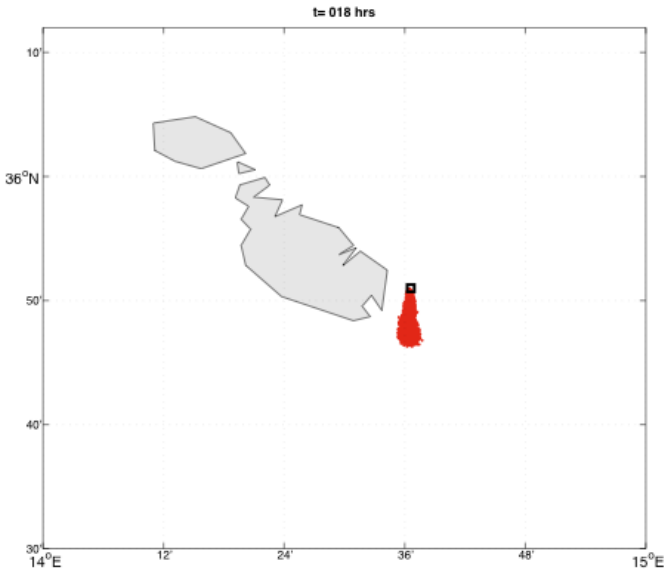

Fig3c: MFS-MEDSLIK oil spill position at 6:45 UTC 19/10/2010

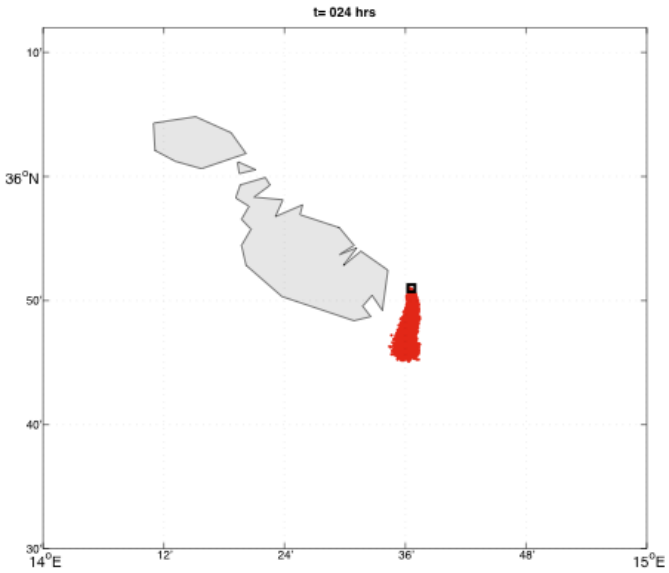

Fig3d: MFS-MEDSLIK oil spill position at 12:45 UTC 19/10/2010

1.3 Egyptian exercise

The Egyptian authorities carried out an exercise on the 1st November 2010 and required assistance to REMPEC, including the possibility to access to oil spill prediction model support. REMPEC asked the assistance of ERO that responded providing oil spill forecasts. The bulletin included oil spill forecast and meteo-oceanographic conditions of the 'accident' area, provided by the ERO partners. Ocean currents and sea surface temperature forecast were provided by ALERMO 6 hourly forecast (University of Athens ERO partner ocean forecasting system) for the period 1-3 November 2010.

Winds forecast was provided by SKIRON hourly forecast (University of Athens – IASA ERO partner atmospheric forecasting system) for the period 1-3 November 2010 (figure 4).

An example of oil spill prediction produced using MEDSLIK-ALERMO forecasting system (University Of Athens and Cyprus Oceanographic Centre) is presented in figure 5. The predictions of the potential oil slick on 1 November 2010 at 08:42 LT, reported by the Egyptian response agency, show a SSW-ward movement of the oil spill, with the potential oil slick reaching the Egyptian coastline after 40 hours.

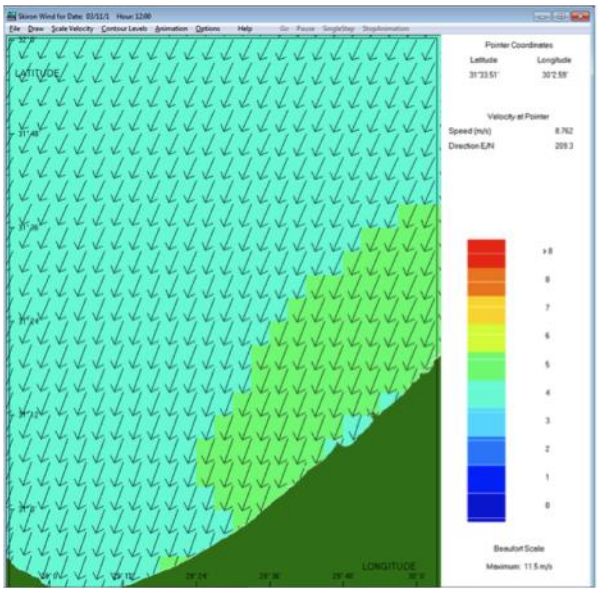

Figure 4: SKIRON forecasts at 12:00, 1 Nov. 2010

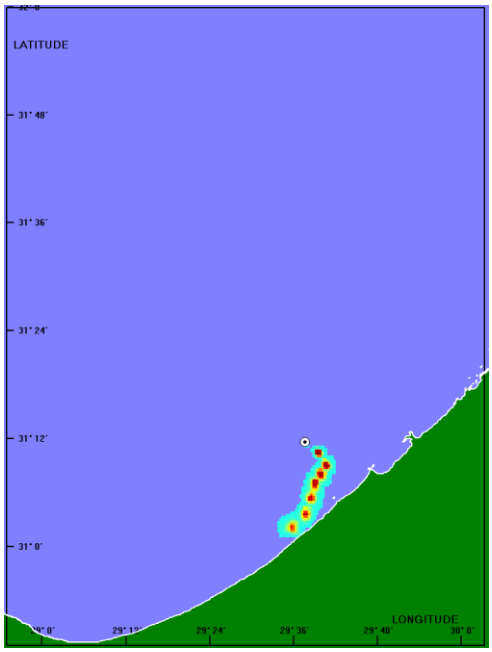

Figure 5: MEDSLIK super-imposed oil spill predictions for the next 40 hours from the incident reported starting time, using meteo-ocean forcing products from MOON-ERO partnership.

Local authorities and REMPEC confirmed the usefulness of ERO support during the exercise.

2 Emergency situations

The only emergency situation supported during 2010 by ERO has been the accident of FURNESS MELBOURNE ship which ran aground in Jorf Lasfar, Morocco, on 5 January 2010. REMPEC was contacted by the Merchant Marine of Morocco regarding the grounding of the FURNESS MELBOURNE and asked for ERO support on 8 January 2010. ERO produced a bulleting with meteo-oceanographic information and oil spill forecasts to support the response of the local authorities. No spillage occurred.

2.1 Description of the accident

Position of the vessel aground: 33 08.23N, 08 37.26W

Type of oil: HFO 380
Quantity: 1338.03 metric tons

Type of oil: Marine Diesel
Quantity: 58.08 metric tons

Products onboard the ship: 13 000 tons of NPK and 11 000 tons DAP

2.2 Actions taken

ERO provided bulletins containing oil spill forecast and meteo-oceanographic information. ERO experts contributing to the bulletin preparation were INGV, University of Athens-IASA, METEOFRANCE, MERCATOR, CSIC and PUERTOS. In addition SASEMAR Spanish oil spill response entity was requested by ERO to support and provided oil spill forecast based on ESEOO (produced by ERO partners) ocean forecast. Examples of the METEOFRANCE-MERCATOR oil spill forecasting using the MOTHY oil spill model coupled with the global ocean MERCATOR ocean forecast is presented in figure 6. The forecasts of the potential oil slick show a south-westward movement of the oil that then evolves northward. Figure 7 shows MERCATOR (7a) and ESEOO (7b) daily mean surface currents (m/s) on the 08/01/2010.

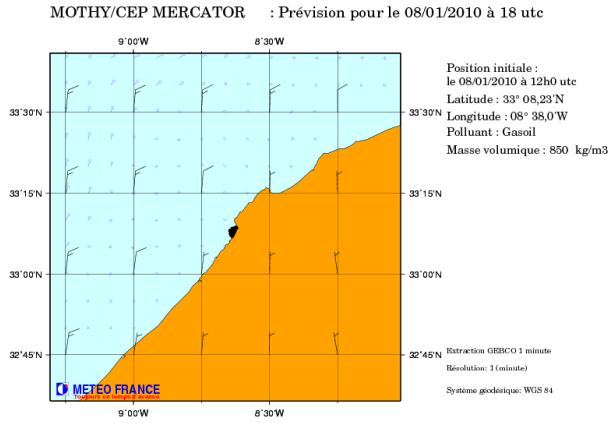

Fig6a: MOTHY oil spill position at 18:00 GMT 08/01/2010

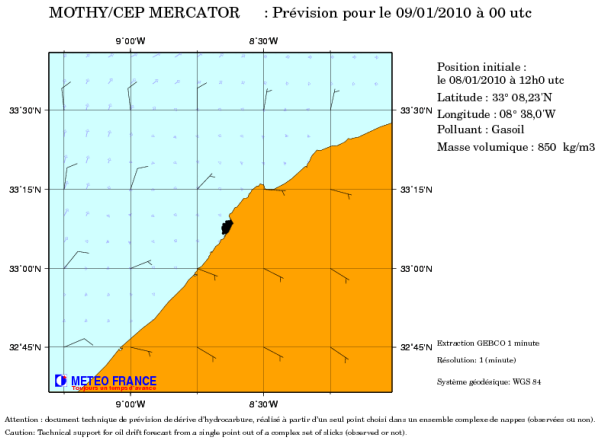

Fig6b: MOTHY oil spill position at 00.00 GMT 09/01/2010

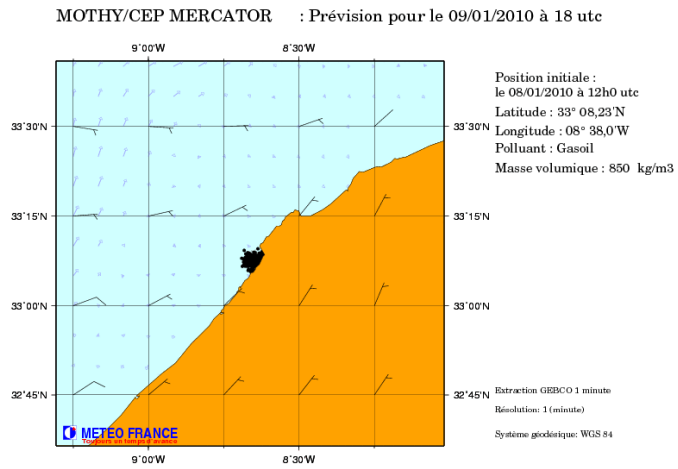

Fig6c: MOTHY oil spill position at 18:00 UTC 09/01/2010

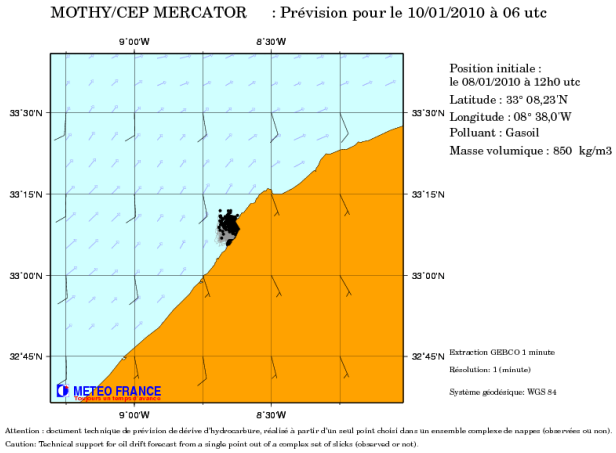

Fig6d: MOTHY oil spill position at 06:00 UTC 10/01/2010

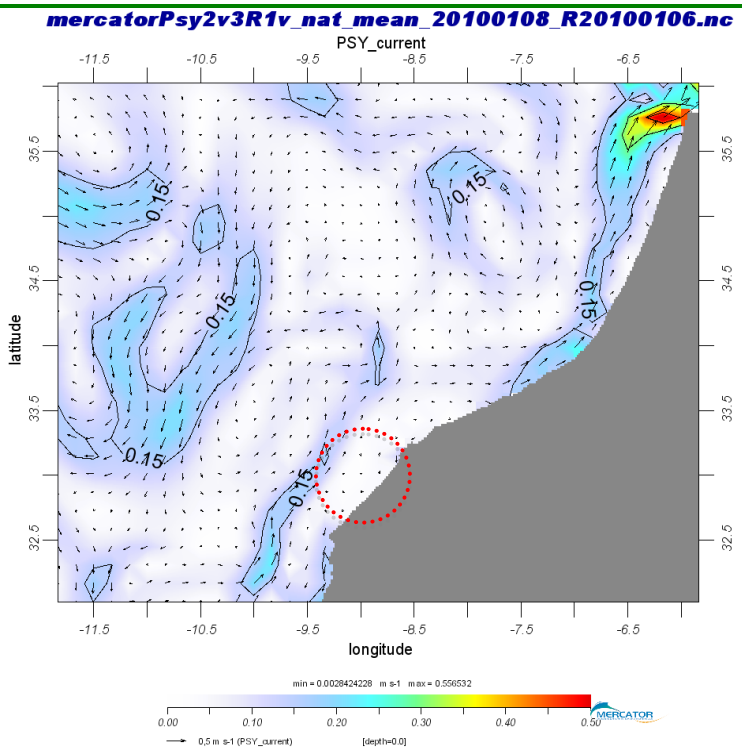

Fig7a: MERCATOR daily mean surface currents (m/s) 08/01/2010 12:00 GMT

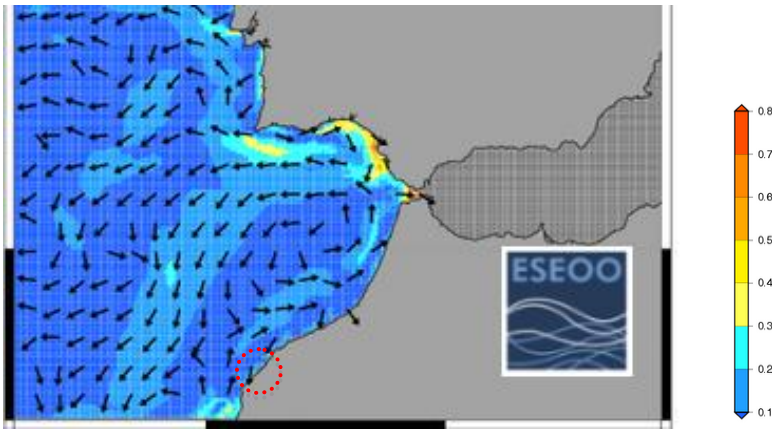

Fig7b ESEOO daily mean surface currents (m/s) 08/01/2010 12:00 GMT

The emergency phase was concluded on 11 January 2010 when as indicated by the Moroccan competent authorities the vessel was towed to the port of Cadiz for repair. Local authorities and REMPEC confirmed the usefulness of ERO support during the emergency.

3 Illegal discharges combating activities

No specific joint MOON-REMPEC activity has been carried out in the field of illegal discharged combating.

4 Agreement evolution

4.1 Present partners and ERO experts

MOON partner	ERO representative
1. Istituto Nazionale di Geofisica e Vulcanologia	G. Coppini (ERO manager)
2. Cyprus Oceanography Center, University of Cyprus	G. Zodiatis
3. Hellenic Centre for Marine Research, Institute of Oceanography	L. Perivoliotis
4. Mercator Ocean	D. Obaton
5. International Ocean Institute-Malta Operational Centre, Physical Oceanography Unit	A. Drago
6. Institut français de recherche pour l'exploitation de la mer	P. Garrau
7. Istituto Nazionale di Oceanografia e di Geofisica Sperimentale	P. Poulain
8.Consejo Superior de Investigaciones Científicas	J. Tintorè
9. Ente per le Nuove Tecnologie, l'Energia e l'Ambiente, Dipartimento Ambiente, Cambiamenti Globali e Sviluppo Sostenibile	G. Manzella
10. University of Athens, Division of Physics of the Environment – Meteorology	S. Sofianos
11. Consiglio Nazionale delle Ricerche, Istituto di Scienze dell'Atmosfera e del Clima	R. Santoleri
12. Israel Oceanographic & Limnological Research	I. Gertman
13. Institute of Accelerating Systems and Applications, Atmospheric Modelling and Weather Forecasting Group (IASA/AM&WFG)	G. Kallos
14. Consiglio Nazionale delle Ricerche, Istituto per l'Ambiente Marino e Costiero	R. Sorgente
15. Institute of Marine Science – Meadle East University	E. Ozsoy

4.2 New partners entered in 2010

No new partners have entered the agreement. The collaboration of ERO with METEOFRANCE and SASEMAR, that are not part of the agreement, has to be highlighted.

4.3 Formal definition of new procedures

The REMPEC-ERO operational procedures for communication and for producing the bulletins have been better defined and improved (figure 7). Collaboration for communication and products transfer during the emergency situations among MOON-ERO partners has been reinforced.

The ERO procedures are not fully activated yet, and for instance the ERO-web is not implemented yet. Therefore for the moment being communications are done by phone and emails, and the assembling of the bulletins is made manually by the ERO-Manager on the basis of the ERO experts contributions sent by email. A scheme of the ERO communication steps is presented in figure 7.

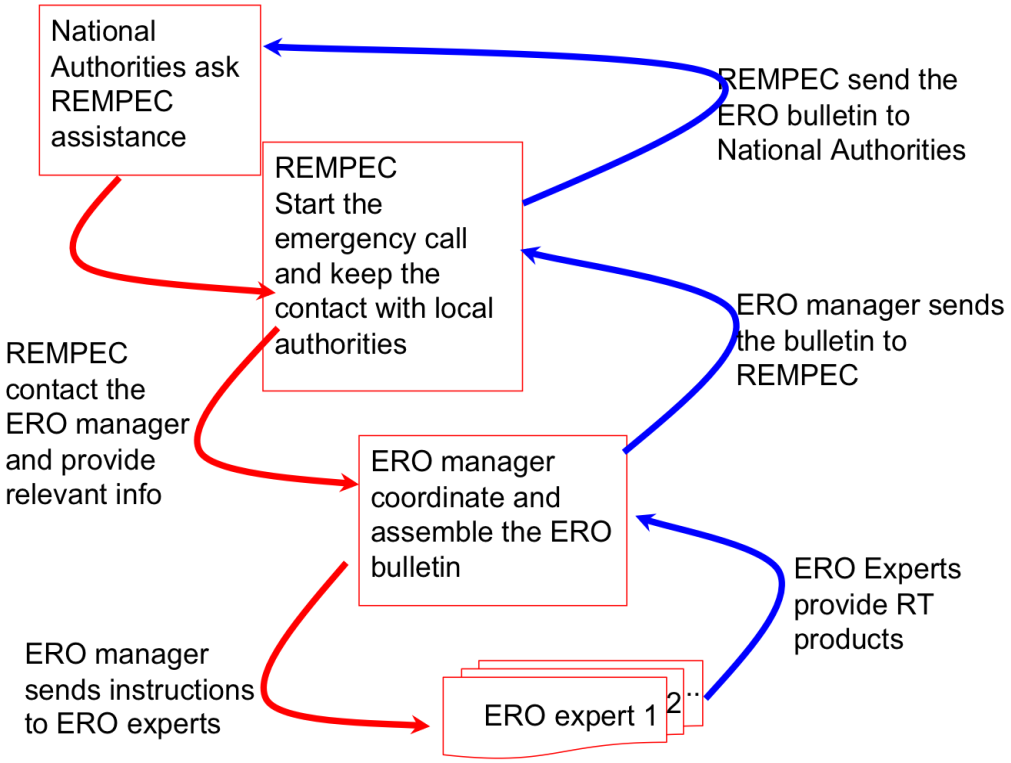

Figure 7: scheme of the ERO communication steps.

The following procedure describes the steps that have been designed to be followed after the request of support by REMPEC to the ERO:

- **Phase 1**: REMPEC will contact by phone the ERO Manager using the telephone number given and introduces him/herself. REMPEC informs him that an emergency call will be activated on ERO-web. ERO-Manager can also be contacted using the email ero-manager@bo.ingv.it.

- **Phase 2**: REMPEC activates the emergency call on the ERO-WEB by filling the dedicated form with the relevant information (accident location, accident time...). Once the available information has been included, the ERO-WEB sends automatically an email with all the information uploaded (preliminary info sheet) to ERO-Manager and REMPEC. An SMS is also sent to the ERO-Manager with the relevant information.

- **Phase 3**: The ERO manager acknowledges the reception of the emergency call (via email, telephone call). In this phase the ERO-Manager could ask for clarifications on the provided information. Just afterwards the ERO-Manager will activate the emergency call on the ERO-WEB and therefore an email and SMS will be sent through the ERO-WEB to all the ERO partners (ero@bo.ingv.it). In this email the ERO-Manager will also suggest which ERO partners should participate to the emergency call on the basis of the accident location and of the characteristics of their systems and products:

    1. Forecasting model domains
    2. Availability of ancillary data (wind, waves, SST)
    3. Availability of satellite oil spill observations

  Invited ERO partners will have to acknowledge the participation to the emergency call (login into the ERO-WEB with their account and confirm or deny participation, an email will be sent by the ERO-WEB to the ERO Manager). The ERO partners that will positively confirm are defined as activated partners.

- **Phase 4**: ERO manager will decide, possibly consulting ERO activated partners, the technical details needed to run the models and to produce the outputs:
    1. Graphical details (palette scale, domain of the figures to be produced...) on the basis of the time of the accident and location;
    2. Information needed to run the models that may be not available at first (Duration of the spill, type of oil ...);
    3. Output frequency of oil spill forecast, duration of the forecast;

  If points 2 and 3 are not available at the very beginning of the emergency, the technical sheet will be used to issued a meteoceanographic bulletin (see P-6).

  ERO Manager will send though the ERO-WEB a new email with this information (technical sheet) to the activated partners. The technical sheet contains the preliminary info sheet.

  Note: the Technical sheet can be re-issued at any time when new information becomes available. The ERO-Manager will update the information on the ERO-web and these will be sent to the activated partners.

- **Phase 5**: ERO activated partners will start at this point the simulations and will start to process their data (satellite...). Once available, the results of the simulation and satellite products will be uploaded by each activated partner on the ERO-WEB. Once they have finished uploading their information (figures, texts...), the ERO activated partner submit the contribution. An automatic acknowledgment is sent to the ERO Manager (mentioning the product issued and the related technical sheet version used).

- **Phase 6**: ERO will first issue an ERO Bulletin (The ERO manager creates/exports it on the ERO web) within a few hours with meteo-oceanographic information (to be fully established after November meeting) in the sub-region of interest. This first bulletin is

issued only if in the first hours there are not enough information to run the oil spill models; if all the information are available, this bulletin is issued with the inclusion of the oil spill forecast (see P8).

- **Phase 7**: The ERO manager discusses the results with the ERO activated experts. In case the first bulletin provides only meteo-ocean information, the procedure restarts at ERO-Phase 4 with the preparation of the complete technical sheet.
- **Phase 8**: The ERO manager delivers the second ERO Bulletin with the oil spill forecasts provided by all the available systems within 6-12 hours.
- **Phase 9**: ERO will continue to follow the emergency case as long as REMPEC requests support, issuing updated bulletins on a daily basis.
- **Phase 10**: After each REMPEC call, ERO will prepare a short note on possible improvements of procedures and protocols and lessons learnt. The objective is to improve the procedures step by step. REMPEC and users may be asked to fill an evaluation report including the feedback from the users and estimate of the advantage (timing, kind of information...) of the service. MOON partners will be ask to assess the cost in terms of personnel hours, computing, etc.
- **Phase 11**: ERO will decide how to disseminate the information to the public on a case-by-case basis.

The second release of the bulletin may contain less model outputs, meaning that ERO may decide to take out less realistic output. The web structure should have a backup and alternative site, which will be describing in a separate document. The backup could be at the Hellenic Center for Marine Research.

The template for the ERO bulletin has been created in 2009 and has been improved in 2010. An "Incident and ERO contribution evaluation sheet" has been drafted (Annex I).

5 Joint projects

5.1 Proposal submission

During 2010 MOON community submitted MEDESS-4MS (Mediterranean Decision Support System for Marine Safety) project coordinated by the Department of Merchant Shipping, Limassol, Cyprus.

MEDESS-4MS service is dedicated to maritime risks prevention and strengthening of maritime safety related to oil spill pollution in the Mediterranean. The main goal of MEDESS-4MS is to deliver an integrated operational multi model oil spill prediction service in the Mediterranean, connected to existing oil spill monitoring platforms (EMSA-CSN, REMPEC

and AIS data), using the well established oil spill modelling systems, the environmental data from the MCS and the downscaled MS national ocean forecasting systems. The overall objectives are:

- to implement an integrated oil spill prediction system based on the requirements of the operational response agencies, international and European organizations, such as REMPEC and MED PDF generated at EMSA;
- to test the service functionalities jointly with the key users;
- to deliver the integrated multi model oil spill prediction service with a unique access Web portal, with different subsystems and user profiles, multi-model data access and online interactive capabilities.

MEDESS-4MS does not aim at developing new elementary service chains but will integrate and consolidate the existing ones, based on the experience gained through the interaction with operational response agencies, REMPEC and EMSA, during real oil spill incidents in the region and the demonstrations and inter-calibration exercises carried out in the framework of EC projects.

The proposal consists of 6 Work Packages (WP): WP1 Project Management; WP2 Information and awareness raising; WP3 Capitalisation and long lasting effect; WP4 To improve the evaluation and the monitoring of risks; WP5 To strengthen common analytical and planning tools; WP6 To compare and strengthen operational intervention systems.

All the activities in MEDESS4MS will be carried out in terms of establishing a sustainable integrated multi model oil spill prediction service. Consortium and partner's expertise, operational response agencies, international and European organizations and areas of responsibilities are well established to reach the project objectives. Six of the project partners have been operating forecasting centres for the last 10 years, while six partners are providing individually oil spill predictions at local and sub-regional level, in close cooperation with their national operational response agencies.

The proposal did not pass the evaluation procedure due to few formal problems and it will be submitted in the 2011 call MED Programme – Call for Strategic Projects launched on 1st April 2011 (Programme co-financed by the European Regional Development Fund) under the objective "Maritime Risks Prevention and Maritime Safety".

5.2 On going joint projects

No on going joint funded projects are implemented at the present time (April 2011).

6 Additional products

MOON has provided REMPEC with additional products such as:

- Map of surface ocean currents climatology;
- Map on bathymetry and distance from the coast in the Mediterranean Sea for ballast waters related activities (Figure 8).

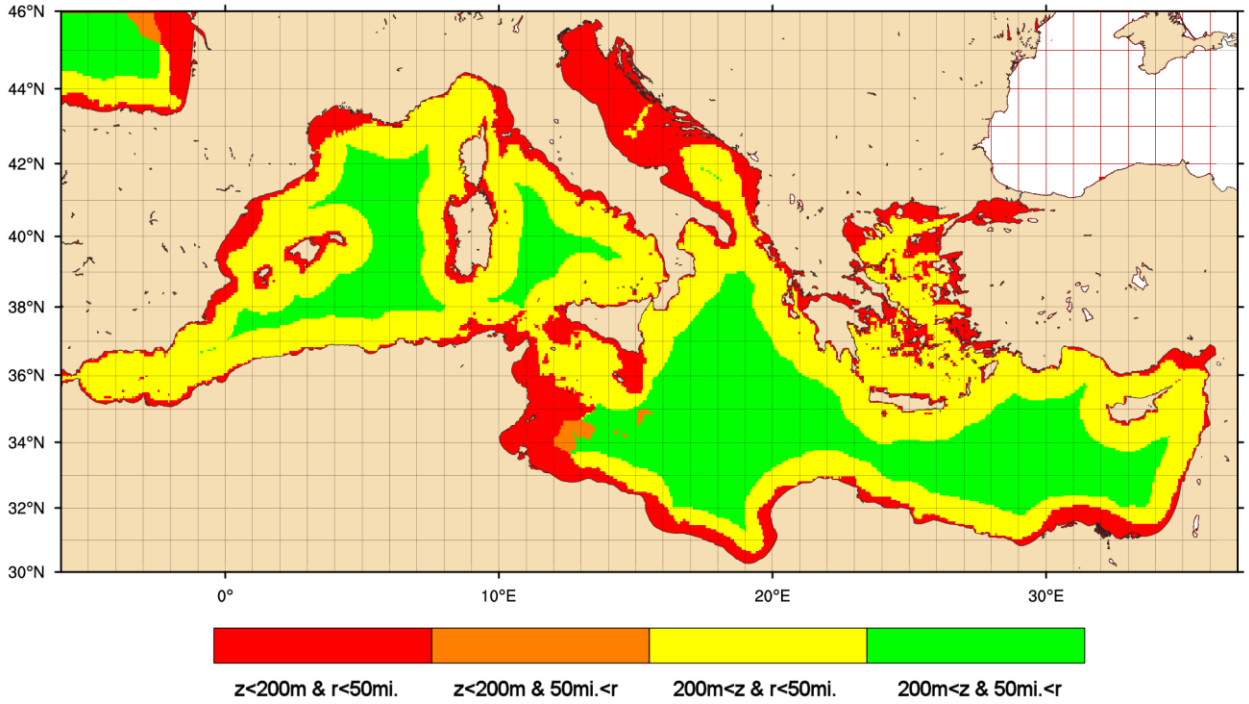

Figure 8: Classification of the Med sea in the following areas:
red: depth (z) lower than 200m and distance from coast (r) less then 50 miles
orange: depth (z) lower than 200m and distance from coast (r) higher then 50 miles
yellow: depth (z) higher than 200m and distance from coast (r) less then 50 miles
green: red depth (z) higher than 200m and distance from coast (r) higher then 50 miles

7 Challenges encountered

Year 2010 has seen the consolidation of MOON-REMPEC agreement and partners have faced several challenges:

- MOON community has continued the strategic planning by drawing the possible future service in MEDESS-4MS;
- ERO experts are continuing to improve ERO procedures;
- ERO manager was substituted by Leonidas Perivoliotis and George Zodiatis during holiday period and other commitment;
- ERO experts have started to draft the ERO web structure that will support the ERO experts and REMPEC in the communication and preparation of the ERO bulletins;
- ERO has ensured the provision of oceanographic and oil spill forecasts to REMPEC and local authorities during one accident in 2010. This success is built upon the MOON expertises and previous experiences but underline the growing capability of coordination among ERO experts;
- REMPEC has contributed with success to 3 exercises, 2 of them with no notice in advance.

8 Joint meetings, conferences and dissemination/awareness activities

The 2010 ERO meeting was organized in Istanbul 3-5 March during the MOON Assembly.

MOON-REMPEC cooperation was presented at the 1st Adriatic Oil Spill Conference held in Opatja on 12-14 May 2010.

MOON-REMPEC cooperation was presented at the Italian National Group of Operational Oceanography Conference held in Cesenatico, Italy on 28 June 2010.

9 Joint publications

A joint (INF) paper regarding the cooperation between REMPEC and MOON was presented at the IMO OPRC-HNS Technical Group meeting held in London on 24-25 September 2011.

ERO partners submitted a paper describing ERO for the conference proceeding of the Italian National Group of Operational Oceanography Conference held in Cesenatico, Italy on 28 June 2010.

10 Recommendations and lessons learnt

The ERO procedures and communication protocols have been improved but need to be more and more standardized. The different oil spill and oceanographic forecasts outputs should be homogenized for a better understanding by the user (to be done in MEDESS-4MS).

There is a need of model validation and this should be performed also through joint activities such as OSCAR-MED.

The need of developing the ERO-web structure in order to automatize part of the bulletins production

ERO experience pointed out the need of expert knowledge to support the management of emergency situation

ERO network of experts showed to be strongly interconnected and ready to react is real time (2-3 hours delay).

During OSCAR-MED ERO experts met with Italian Coast Guard and SASEMAR, this experience pointed out the importance of collaboration at national level between MOON-ERO partners and the national authorities.

After this experience INGV has created a stable relationship with Italian Coast Guard (signed agreement; technology transfer).

11 The way forward

There is a need to implement the ERO web structure.

REMPEC will help in the enforcement of the collaboration between MOON-ERO partners and REMPEC national focal points.

Oil spill downstreaming services should be implemented (i.e MEDES4MS).

ERO should support the implementation of the MEDSLIK-II agreement.

MOON and ERO will participate in 2-5 May 2011 to the REMPEC National focal points meeting in Malta.

Annex I "Incident and ERO contribution evaluation sheet"

See attached document.