



EMODnet Sea-basin Checkpoints Tender no MARE/2012/11

EMODNET Oil Platform Leak Bulletin

Date: 11/05/2016

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Executive Summary

In August 2013 an incident occurred during a tanker loading operation at a buoy off the coast of the Sidi Kerir terminal of the Sumed pipeline (LAT:31,130824; LON: 29,75227) with an estimated rate of 5000m³ Brent crude oil spilled during a period of 24 hours starting 8:15 CET on 13/08/2013. The accident went largely unattended in the aftermath of the 2013 Egyptian Coup d'état during a period of unrest and instability.

This Oil Platform Leak (OPL) Bulletin and report has been produced after 24 hours from the DGMARE request with the scope to simulate at best what happened with the oil the days following the incident and the likely hood of impacts on the environment, considering the available forcing data sets for wind and current fields to run a MEDSLIK-II simulation.

The short daily summaries (each morning before 11:00 CET) with few illustrations of the results are provided for informing interested stakeholders.

The EMODNET OPL Bulletin contains the forecast/scenario information on the fate and transport of oil leaks emanating from fixed platforms. The bulletin is built upon Copernicus Marine Environment Monitoring service (CMEMS) products (<http://marine.copernicus.eu/web/69-interactive-catalogue.php>) and the ECMWF surface atmospheric data.

Preface

On May the 10th 2016 at 11.23 DGMARE alerted about the following situation:

"In August 2013 an incident occurred during a tanker loading operation at a buoy off the coast of the Sidi Kerir terminal of the Sumed pipeline (LAT: 31,130824; LON: 29,75227) with an estimated rate of 5000m³ Brent crude oil spilled during a period of 24 hours starting 8:15 CET on 13/08/2013. The accident went largely unattended in the aftermath of the 2013 Egyptian Coup d'état during a period of unrest and instability."



Figure 1: Release point of the oil spill (LAT: 31,130824; LON: 29,75227).

Bulletin Content

- hindcast of currents and wind
- Fate, transport and dispersion of the leaked oil at the surface and on coast during the first 72 hours from the time of the incident

Data and Method

Tab. 1 summarizes the input data used to run the oil spill models.

Tab. 1 Initial assumptions used to run the oil spill models.

INITIAL ASSUMPTIONS	
OIL TYPE	Brent crude oil (API=17)
LEAK POSITION	LAT:31,130824 LON: 29,75227
TIME OF THE LEAK	8:15 CET on 13/08/2013
DURATION OF SPILLAGE	24 hours
RATE OF SPILLAGE	177 Ton/hr
TOTAL AMOUNT OF OIL SPILLED	5000m ³

The production of the OPL-Bulletin relies on the availability of high-resolution meteo-oceanographic forecasts and analyses for the Mediterranean Sea provided through CMEMS (Copernicus Marine Environment Monitoring Service) portal and other national forecasting systems. The necessary input characteristics are:

- Horizontal velocity of the water column (currents)
- Temperature of the water column
- Wind velocity components
- Wave direction (not compulsory)

Two SCENARIOS have been simulated one at INGV and one at OC-UCY and Tab. 2 summarizes the forcing datasets used for the OPL Bulletin in the two systems.

Ocean currents and temperature have been downloaded from the available CMEMS MED-MFC data archive containing daily averages of model analyses. Forecast data are not archived, only the present day forecast for the future 10 days is available. Hourly data are not available as well since CMEMS maintained a 30 days rolling archive. Atmospheric analyses from ECMWF (SCENARIO 1) are available

for the test period. SCENARIO 2 considered 1-hourly SKIRON wind fields and CYCOFOS 3 hourly wave forecast.

Tab. 2 Prediction systems implemented to produce the OPL-Bulletin results.

SCENARIO	1	2
Production Centre	INGV	OC-UCY
Oil spill model	MEDSLIK II	MEDSLIK
WIND	ECMWF	SKIRON
temporal resolution	6 hours	1 hour
spatial resolution	25 km	5 km
update frequency	daily	saily
CURRENTS and SST	CMEMS	CMEMS
temporal resolution	daily means	daily means
spatial resolution	6.5 km	6.5 km
update frequency	daily	daily
WAVES	-	CYCOFOS
temporal resolution	-	3 hours
spatial resolution	-	10km
update frequency	-	daily

Description of the results

Oil spill after 2 hours
13/08/2013 10:15 CET

SCENARIO 1

Sea surface currents are estward (Figure 2) and turn slightly south approaching the coastline. Wind is north-westerly and reaches a velocity of about 6 m/s.

The oil spill 2 hours after the reported incident did not impact the coastal zone.

SCENARIO 2

In the Sidi Kerir terminal the sea surface currents are North-East, while the wind is North-West with low intensity as low as 3.1 m/s.

The oil spill 2 hours after the reported incident was at sea surface 82.9% without any impact at the coastal zone.

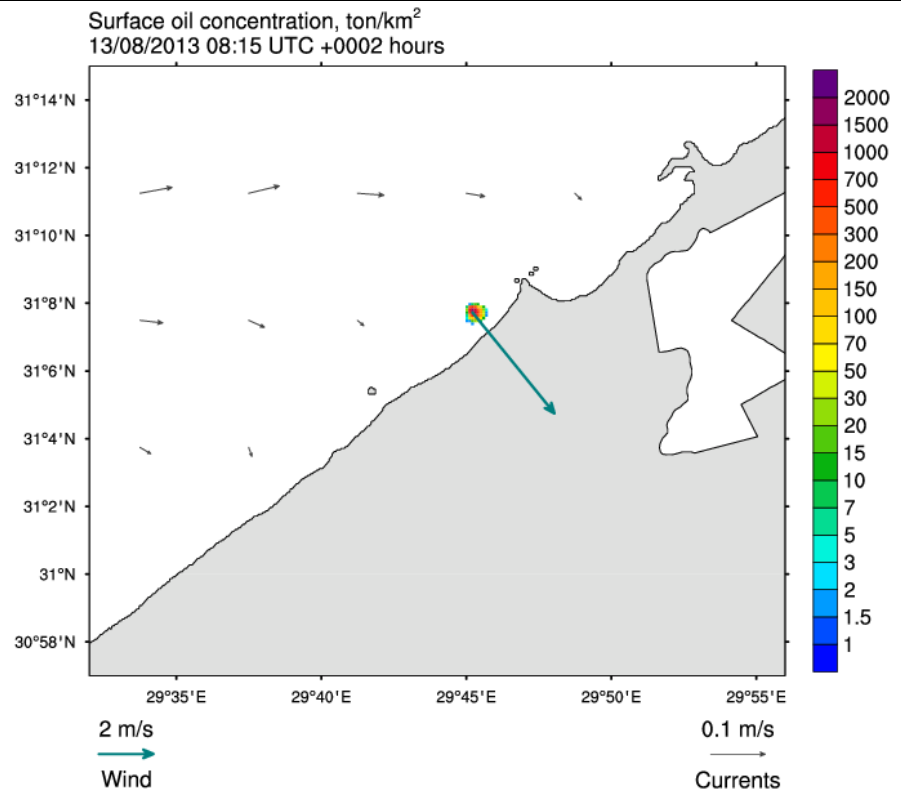


Figure 2: **SCENARIO 1** - Position of the oil slick at 10:15 of 13/08/2013 (oil concentration is given in units of ton/km²) and the corresponding daily surface currents (**black arrows**) and wind (**green arrow**) produced by INGV.

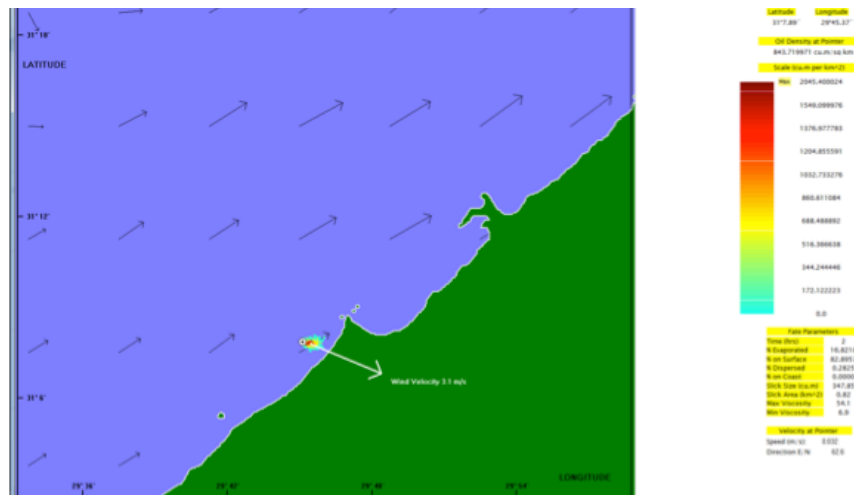


Figure 3: **SCENARIO 2** - Position of the oil slick at 10:15 of 13/08/2013 (oil concentration is given in units of cu.m) and the corresponding daily surface currents (**black arrows**) and wind (**white arrow**) produced by OC-UCY.

**Oil spill after 24 hours
14/08/2013 08:15 CET**

SCENARIO 1

Sea surface currents are south-eastward (Figure 3) and turn south approaching the coastline. Wind is north-westerly and reaches a velocity of about 6 m/s.

The oil spill impacted the coastal zone after 6 hours of simulation (15:15 CET) and there is a progressing beaching of the oil.

SCENARIO 2

The oil started to be beached at the coastal zone of Sidi Kerir terminal 3 hours after the reported time of the incident. After 24 hours of the oil spill incident, the oil on the coast (permanent and potential releasable) constitutes the 43.68% of the total released amount, while 39.20% was evaporated (Figures 4-5)

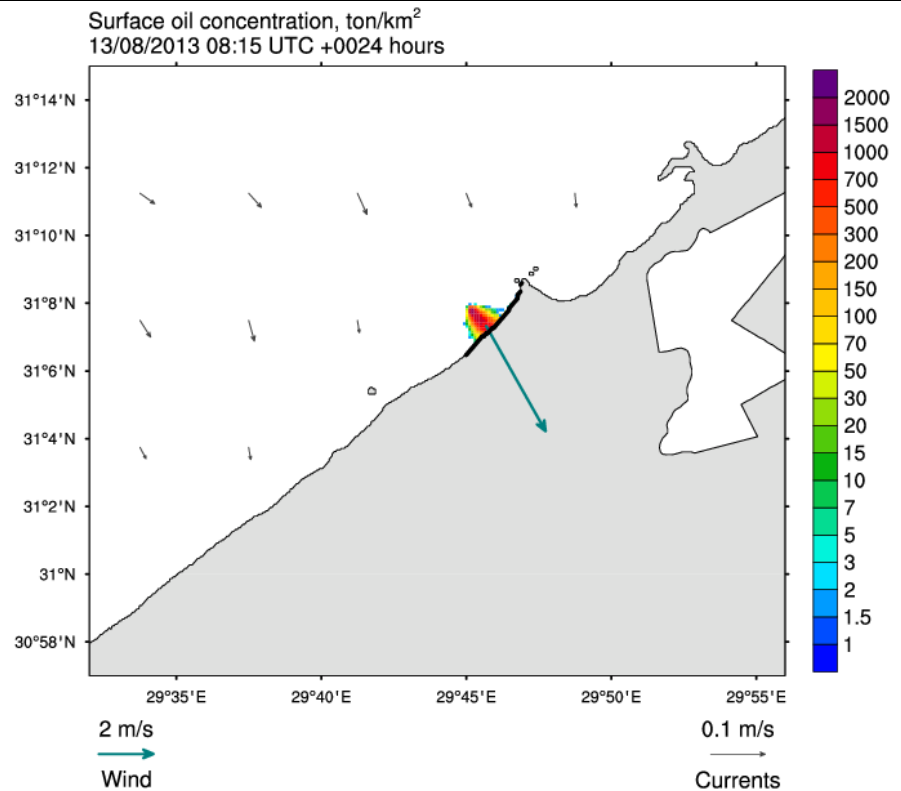


Figure 3: **SCENARIO 1** - Position of the oil slick at 08:15 of 14/08/2013 (oil concentration is given in units of ton/km²) and the corresponding daily surface currents (black arrows) and wind (green arrow) produced by INGV.

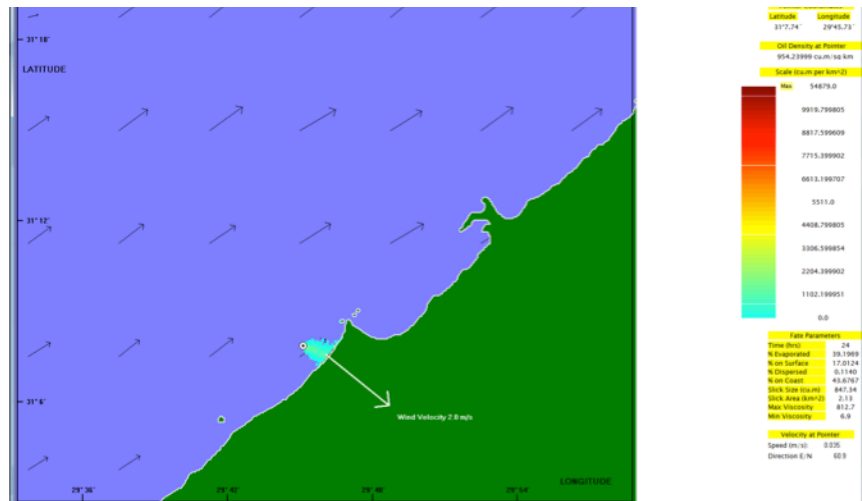
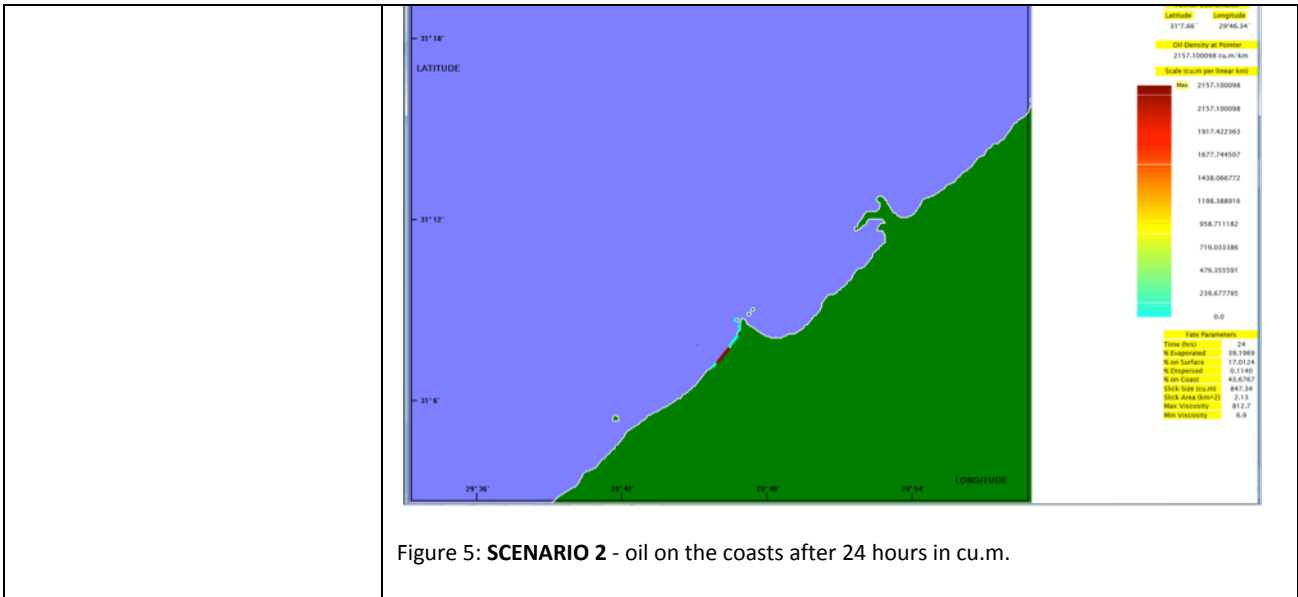


Figure 4: **SCENARIO 2** - Position of the oil slick at 08:15 of 14/08/2013 (oil concentration is given in units of cu.m) and the corresponding daily surface currents (black arrows) and wind (white arrow) produced by OC-UCY.



**Oil spill after 48 hours
15/08/2013 08:15 CET**

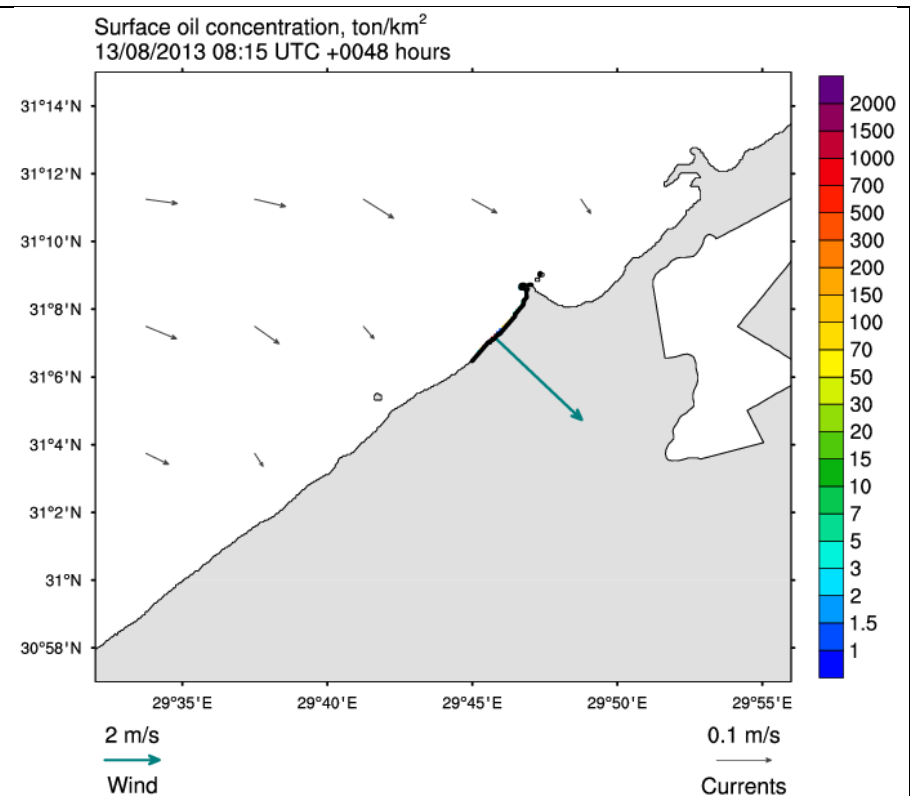
SCENARIO 1

Surface currents are eastward, turning south-eastward and the wind is north-westerly at about 6 m/s. The oil stacks at the coastal zone.

SCENARIO 2

In the Sidi Kerir terminal the sea surface currents continue to be North-East, while the wind is West with low intensity 2.7 m/s.

The oil stacks at the coastal zone (permanent and potential releasable constitutes the 42.64% of the total amount, while 57.33% was evaporated, during the 48 hours of the simulation.



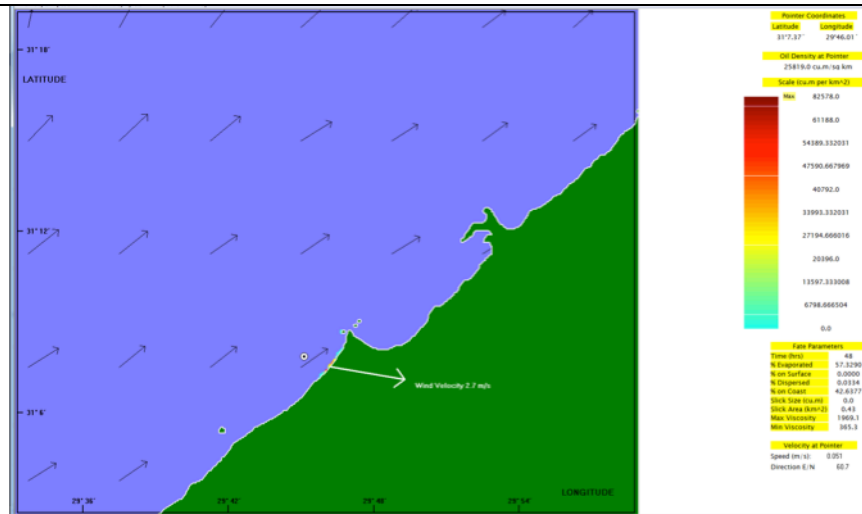


Figure 5: **SCENARIO 2** - Position of the oil slick at 08:15 of 15/08/2013, oil concentration is given in units of cu.m.

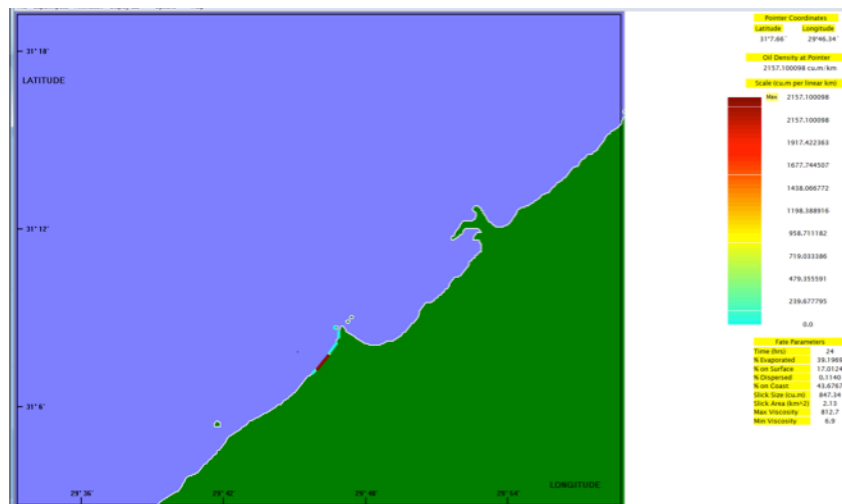


Figure 6: **SCENARIO 2** - oil on the coast after 48 hours in cu.m

**Oil spill after 72 hours
16/08/2013 08:15 CET**

SCENARIO 1

Surface currents are eastward, turning south-eastward and the wind is north-westerly at about 6 m/s. The oil stacks at the coastal zone.

SCENARIO 2

In the Sidi Kerir terminal the sea surface currents are continue to be North-East. The wind is North-West with low intensity as low as 3.2 m/s.

The oil stacks at the coastal zone (permanent and potential releasable) constitutes the 36.14% of the total amount, while 63.86% was evaporated, during the 72 hours of the simulation.

Surface oil concentration, ton/km²
13/08/2013 08:15 UTC +0072 hours

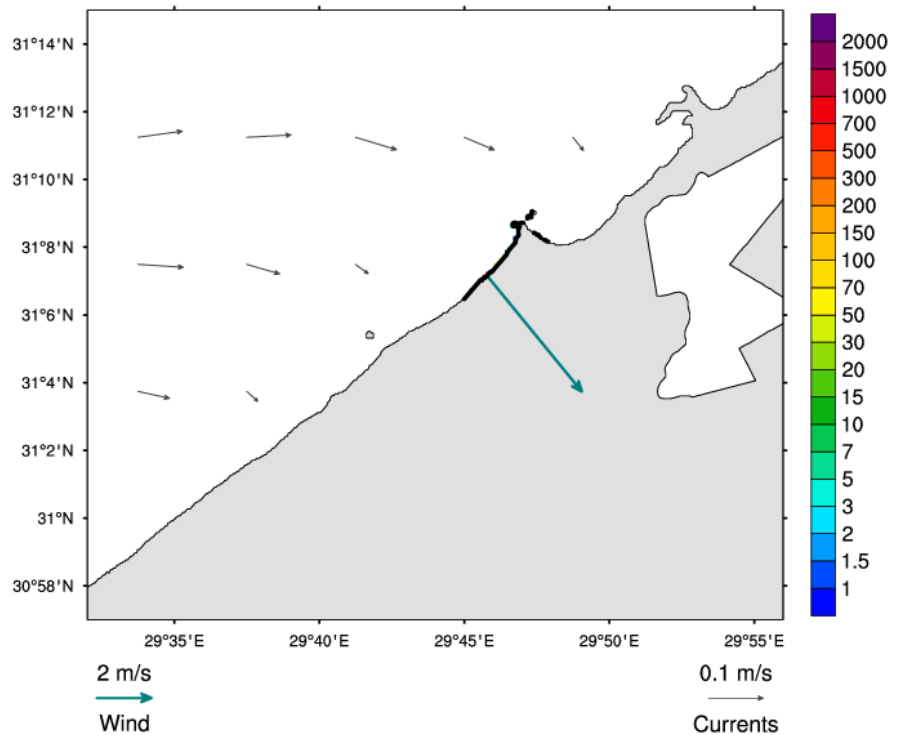


Figure 7: **SCENARIO 1** - oil on the coast in tons/km after 72 hours.

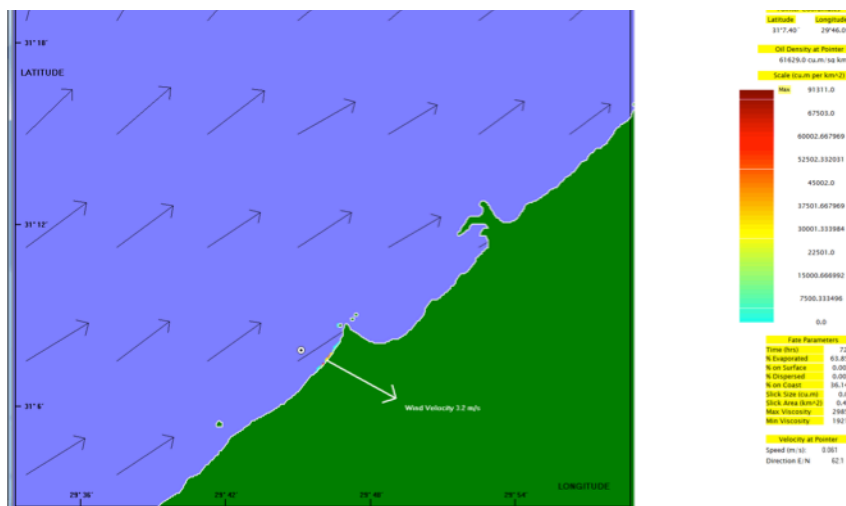
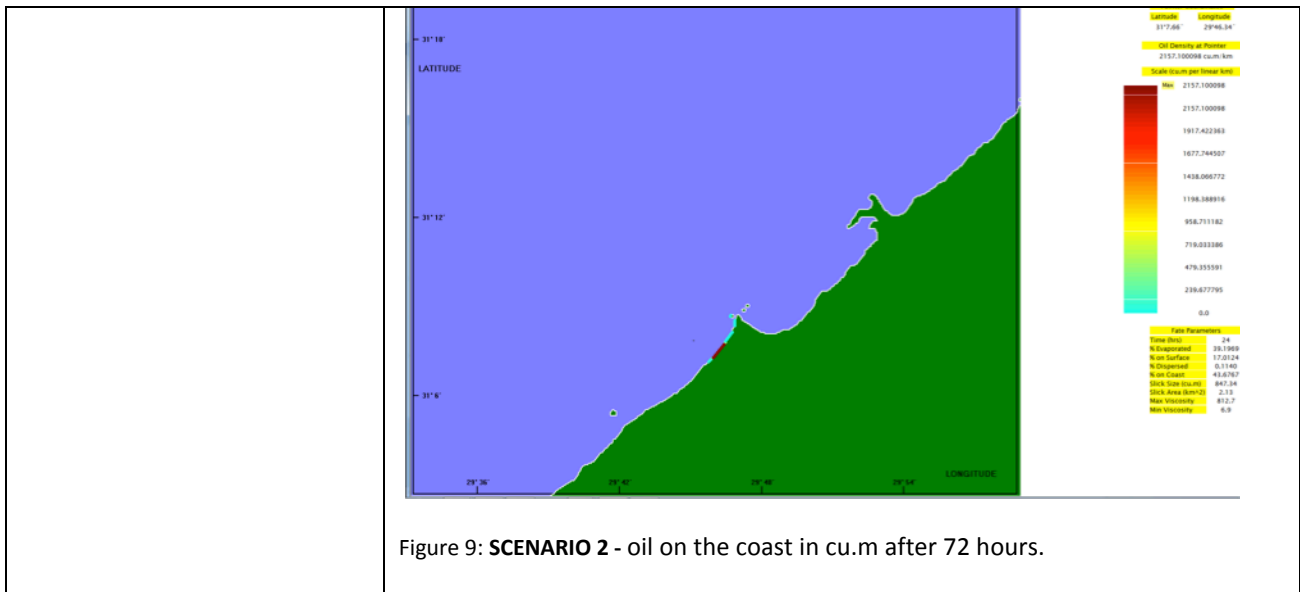


Figure 8: **SCENARIO 2** - Position of the oil slick at 08:15 of 16/08/2013, oil concentration is given in units of cu.m.



Final discussion

The results of both simulated SCENARIOS for this accident showed that after 30-32 hours almost all the released, non-evaporated oil arrived on coast, mainly due to the persistent north-westerly wind. The Figure 11 below illustrates the area average percentage of oil in four categories, evaporated, at the sea surface, dispersed in the water column and at the coasts for SCENARIO 1 and 2.

In SCENARIO 1 about 13% of the oil evaporated in the first few hours and its percentage remains constant during the simulation time. In SCENARIO 2 the evaporated oil reaches 40 % in the first 8 hours of simulation and progressively increases up to 60% after 72 hours. The high percentage of the free oil on coast (potential releasable back to the sea) caused the high percentage of evaporation of the oil. Re-detachment of oil from the coasts is not evident in both cases.

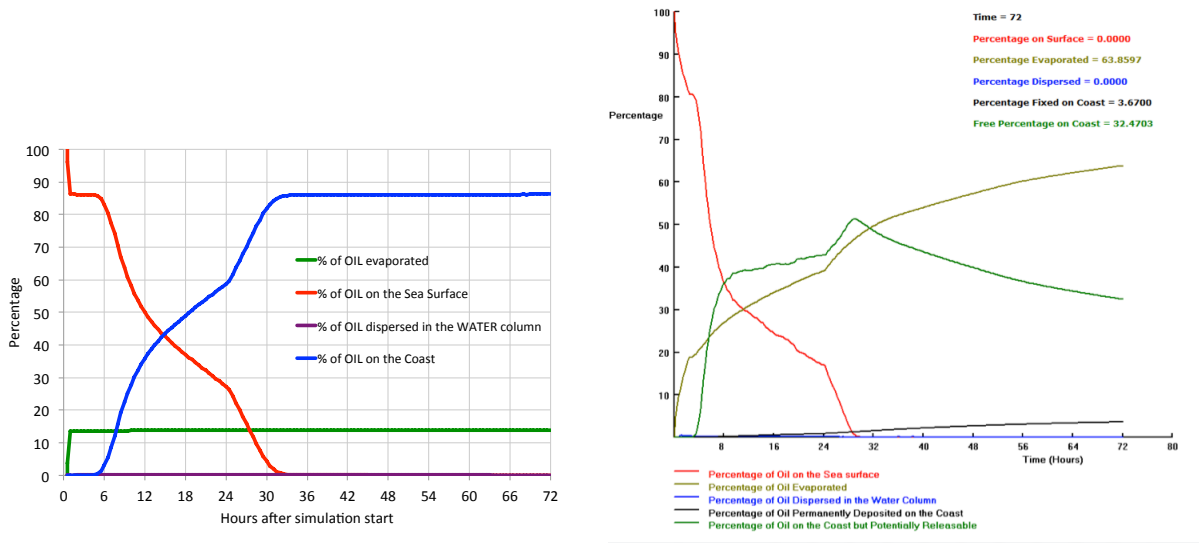


Figure 10: Percentage of the oil on four compartments: at the surface, dispersed in the water column, evaporated and at the coasts as a function of simulation time: (left) SCENARIO 1; (right) SCENARIO 2.