REGIONAL MARINE POLLUTION EMERGENCY
RESPONSE CENTRE FOR THE MEDITERRANEAN SEA (REMPEC)

CENTRE REGIONAL MEDITERRANEEN POUR L'INTERVENTION
D'URGENCE CONTRE LA POLLUTION MARINE ACCIDENTELLE (REMPEC)

MEDITERRANEAN ACTION PLAN
PLAN D'ACTION POUR LA MEDITERRANEE

THE MARCOAST (MARINE & COASTAL ENVIRONMENTAL INFORMATION SERVICES) PROJECT FOR ALGERIA, MOROCCO AND TUNISIA

REPORT

JUNE 2009

While reviewing the present report it was noted that reference is often made to oil spills detected by satellite.

For clarification, the reader should be informed that the oil spills detected on satellite images should always be considered as possible oil spills. A different level of confidence (high, medium or low) is thus given to each detected oil spill according to the probability of these detections being actual pollution.

Detections may be classified as real oil spills only when some means have been sent to ascertain the situation.

I. Background

Following the adoption in 2002 of the Protocol concerning Co-operation in Preventing Pollution from Ships and, in Cases of Emergency, Combating Pollution of the Mediterranean Sea ("Prevention and Emergency" Protocol), and in 2005 of the Regional Strategy for the Prevention of and Response to Marine Pollution from Ships, the involvement of the Centre in monitoring activities aimed at assisting the Contracting Parties in preventing and combating operational pollution from ships in the Mediterranean region significantly increased. In particular, under Specific Objective 6 of the Strategy, the Centre is specifically requested to carry out pilot projects in the field of monitoring and surveillance of illicit discharges from ships.

In addition to surveillance by aircraft and patrol boats, satellite surveillance is fully recognized as a promising option for the detection and the prevention of illicit discharges at sea. Hence, with a view to strengthen the capacities of the Mediterranean coastal States in this field, REMPEC started implementing several projects and activities related to satellite monitoring of sea based oil pollution, paving the way for the development of an operational service in the region.

The present project was implemented taking into account the experience gained by the Centre from previous projects, such as the two EC funded projects, namely VASCO (Value Added provision for Slicks and hazardous Cargoes Operational detection) and CLEOPATRA (ChemicaL Effluent & Oil Pollution Alert and TRAcking), which were carried out in 2003 and 2004-2005 respectively, and AESOP (Aerial & Satellite surveillance of Operational Pollution), which was developed by REMPEC and implemented in the Adriatic Sea in 2005-2006.

II. Introduction

The MarCoast (Marine & Coastal Environmental Information Services) Project was a three year GMES (Global Monitoring for Environment and Security) initiative funded by the European Space Agency (ESA) with the aim of delivering satellite-based services in the field of marine and coastal applications. It was launched in November 2005 providing oil spill, water quality and met-ocean data services for European waters.

In 2006, ESA requested REMPEC to support and facilitate the extension of the MARCOAST oil spill service to the Southern Mediterranean, acting also as a liaison Centre between the

service provider and the relevant countries involved. Hence, the Centre decided to approach Algeria, Morocco and Tunisia, which reacted positively to the initiative and nominated their national Focal Points for the project. The countries were selected taking into account, *inter alia*, the opportunity given by this project to foster and develop a pre-existing framework for cooperation represented by the sub-regional agreement on cooperation with dealing with pollution signed by Algeria, Morocco and Tunisia in June 2005.

The MARCOAST project for Algeria, Morocco and Tunisia was aimed at providing the relevant users with a prompt and reliable service on oil spill detection through remote sensing satellites, addressing in particular operational pollution from ships.
It was launched in July 2007 with a kick off Meeting organized by REMPEC in Tunis, where both roles and duties of all participants to the project were clearly defined. The Meeting was attended by representatives from REMPEC, ESA, Telespazio (operational service provider), Thales Alenia Space (prime contractor) and the relevant organizations of Algeria, Morocco and Tunisia in charge of carrying out the project's activities. In particular, the following competent national authorities were selected to play the role of end users within the project:

- Centre National des Opérations de Surveillance et de Sauvetage en Mer (CNOSS) – Algeria ;
- Le Centre Royal de Télédétection Spatiale – Morocco ;
- L'Observatoire Tunisien de l'Environnement et du Développement Durable – Tunisia.

The project, initially planned to last approximately six months, was extended in 2008 for another period of six months, which resulted in the collection of a significant amount of data.

III. Activities

As a first step for the implementation of the project, end users were requested to define their area of interest (AOI), meaning the sea area they intended to investigate by remote sensing satellites throughout the project. Although all countries selected their whole area of jurisdiction, some of them expressed the wish to be provided with a higher number of satellite images in correspondence of specific areas within their territorial waters where the probability of detecting oil slicks was higher. Tunisia, for instance, selected its northern coast to be investigated with preference.

The project was carried out in two phases as follows:
Phase I: September 2007-February 2008
Phase II: May 2008- October 2008

Tunisia, who joined the project at a later stage, continued receiving satellite images until January 2009. It was agreed to deliver a total of 80 satellite images (40 images per phase) to each country.

On a monthly basis, end users were provided with acquisition plans, prepared by the service provider, reporting all the satellite images related to their area of interest available for the following month, which they were able to choose according to their needs and commitments. An average of six/seven images per month were usually chosen by the users. Furthermore, users were duly informed in advance on any image cancellation or technical problem related to the service which did not consent the regular transmission of the results of satellite image analysis.

Throughout the project, the satellite images analysed for oil spill detection were ENVISAT ASAR (Advanced Synthetic Aperture Radar) images, with a spatial resolution of 150m and a swath width (area of the Earth's surface imaged by the satellite) of 405X405 km. The ASAR, being an advanced version of the SAR that was flown on the earlier ERS-1 and ERS-2 missions and other satellites, was able to detect changes in surface heights with sub-millimetre precision.

Within the project, main concern was given to the improvement of the service, especially in terms of delivery time, as one of the main tasks of the service provider was to transmit the results of satellite image analysis in Near Real Time (NRT), meaning 30-60 minutes from satellite image acquisition. The relevant oil service report, providing information on the slick location, position and extent, time of observation and possible source of pollution (if present), was sent to both users and REMPEC by fax and/or email. To each detected oil spill, a confidence level (high, medium, low) was also given by the operators as part of their oil spill detection service. As a general policy, the operators use a set of rules to confirm the reliability of a detected possible oil pollution, which takes into account information related to some characteristics of the spill signature, wind speed and direction, oil rig/pipeline locations, national territory borders and coastlines.

When a pollution was detected, it was classified as high, medium or low confidence of being actual pollution. A copy of the oil service report is given in **Annex I**.

Although each country was receiving alert messages specifically related to the pollution detected in its own territorial waters, in some particular cases (e.g. whenever an oil spill was detected close to the border of two different areas of jurisdiction) the relevant information was shared among neighboring countries.

In addition to the service provided by Telespazio, the end users were tasked to groundtruth the remote sensing data by verifying on site, through aerial or naval means, the possible oil spills detected within their territorial waters. In particular, they were asked to take action, when possible, as soon as the alert message was received, focusing on those spills detected with high confidence on the satellite image and informing REMPEC on the relevant outcome accordingly. To this end, users were provided with a pollution reporting form (reproduced in **Annex II**). This exercise was performed with the objective of developing and fine-tuning the satellite monitoring service provided.

On the basis of the experience gained through the first phase of MARCOAST, which highlighted a certain difficulty in groundtruthing the relevant satellite data (particularly by naval means), during the second phase of the project, REMPEC called for the assistance of the Mediterranean Operational Oceanography Network (MOON)[1].

This collaboration ensured that, after an oil spill was detected with high confidence on the satellite image, information was rendered available on both meteo-oceanographic forecasting data for the affected area and the drifting of the oil at sea for up to 72 hours. The relevant data was promptly transmitted by REMPEC to the interested users as additional information which could facilitate the location of the oil slick. A copy of a report provided by MOON is shown in **Annex III.**

Throughout the project, REMPEC ensured the smooth running of the activities by playing a coordinating role among end users and ensuring a good linkage with the service provider. In this manner, users were promptly informed regarding any technical problem or modification

[1] MOON is an operational monitoring and forecasting Network, so far including 31 oceanographic Institutes/Agencies of the Mediterranean region, which is coordinating a multiplatform observing system (in situ and remote sensing), a Mediterranean basin scale ocean forecasting system and several higher resolution forecasting systems in the Mediterranean sub-basins and coastal zones. Additional information may be found on MOON's website: www.moon-oceanforecasting.eu

related to the service whereas the service provider was made aware of the relevant requests and/or feedbacks provided by users.

IV. Results

The satellite images delivered during Phase I and Phase II of MARCOAST are reported in **Annex IV (a)** and **(b)** respectively.

For each satellite image several details are given, such as the image acquisition time and the delay occurred in providing the users with the relevant products. The tables clearly show that, in terms of delivery time, the service significantly improved during the second phase of the project, when several technical problems which affected the initial phase of MARCOAST (e.g. conflicts with other projects/activities interested on the same area at the same time) were solved. Some cancellations which occurred during both phases are not reported as the users were given the possibility to replace the cancelled images with other available ones.
As one can notice, during the first phase of the project, Morocco received a higher number of images with respect to Algeria and Tunisia (45 images). In addition to the 40 images planned, Morocco had the opportunity to benefit from those images already purchased for the Spanish user of MARCOAST which covered also part of the Moroccan territorial waters.

- **Oil spills detected within the satellite images**

The total number of possible oil spills detected throughout the project in each participating country is given in Table 1.

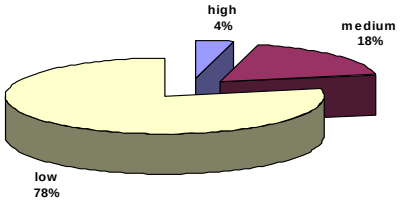
Table 1 – Possible oil spills detected through remote sensing satellites within the MARCOAST project. A total of eighty satellite images per country analysed for oil spill detection were delivered.

		Confidence level		
	Total spills	**high**	**medium**	**low**
Algeria	234	30	73	131
Morocco	50	2	9	39
Tunisia	170	10	57	103

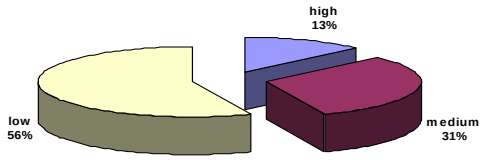
Although some figures may be quite alarming, the results clearly indicate that only a small percentage of the spills were detected with a high level of confidence. Within the images selected by Algeria, for instance, 234 spills were identified. However, only 13% of these

were high confidence oil slicks whereas the majority (56%) were slicks detected with a low confidence level (Fig. 1).

MOROCCO
Possible oil spills detected: 50



ALGERIA
Possible oil spills detected: 234



TUNISIA
Possible oil spills detected: 170

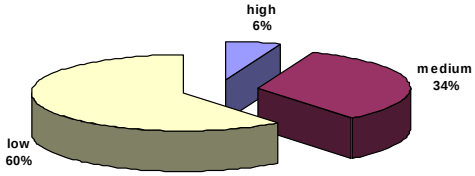


Fig. 1 – Percentage of oil spills detected with high, medium and low confidence for Algeria, Morocco and Tunisia.

Oil spills detected with a high level of confidence throughout the project are represented in **Annex V**. The Algerian coast with no doubt appears to be the most affected by this kind of pollution, particularly in proximity of its major ports. It may be noted that some of the oil spills reported on the map have been detected beyond the territorial waters of Algeria, Morocco and Tunisia. This is mainly due to the swath width of ENVISAT images, which allows the coverage of wide areas of the sea surface.

- **Verification on site of the remote sensing data**

The main constrain of the verification exercise, which was carried out by the end users, was represented by the unavailability of aerial means. As a consequence, this activity was limited to the displacement on site of the available vessels located in the vicinity of the detected oil spills, allowing only a small number of spills to be verified. However, it has to be noted that prior to the commencement of the project, it was agreed that end users would have limited the verification exercise to the oil spills detected with a high level of confidence on the satellite images and, according to the results reported in Table 1, only a small percentage of high confidence spills were detected. Added to that, some of the high confidence spills reported by the satellite monitoring service were detected beyond the countries' territorial waters thus not verified. In the case of Morocco, for instance, the only two oil spills detected with high confidence throughout the project were identified outside the Moroccan territorial waters.

On the other hand, an interesting case was reported by Tunisia. Within the satellite image of 3 October 2008, ten oil slicks were detected by the service provider with medium and low confidence levels within the Tunisian territorial waters. In consideration of their vicinity to the coast, the spills (although not detected with high confidence) were verified on site by the Tunisian authorities, who confirmed the presence of pollution at sea. In particular, one oil slick detected with a medium confidence level on the satellite image was confirmed.

Samples of the oil at sea were also collected for further analysis (Fig. 2).

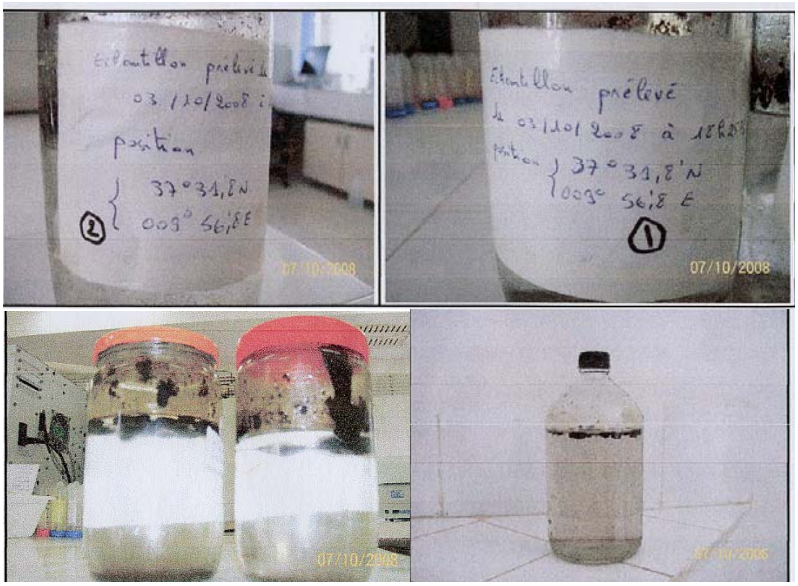


Fig. 2 – Samples of the oil collected in Tunisian territorial waters (03/10/2008)

- **Feedback from End Users**

With a view to improve the satellite monitoring service provided within MARCOAST, great attention was given to the collection of feedback from the end users. To this end, a specific questionnaire was prepared by the service provider and transmitted to the end users through REMPEC at the end of each phase of the project. The questionnaire, as other project documents, was provided in the French language. A copy of it may be found in **Annex VI** to the present report.

All users provided a positive feedback on some general aspects of the monitoring service, such as its capacity of providing useful information for the detection of oil pollution at sea and of ensuring an improved spatial coverage of the sea area under their jurisdiction. The easy access to the information provided, the quality of the products delivered and the good linkage between the service provider and the end user, which was ensured by REMPEC, were also acknowledged.

On the other hand, most of the users reported the need to be provided with additional information regarding the possible source of pollution. With a view to improve the overall value of the service, some users suggested its integration with maritime traffic information, local meteo-oceanographic data and oil spill drifting forecasting data, particularly in consideration of the lapse of time necessary to reach the affected area by vessel. In this respect, it was also noted that false alarm deliveries represent a significant limit of the service, due to the high costs of groundtruthing operations.

Finally, the users highlighted that some technical problems related to the service, such as the cancellation of planned images or the delay in receiving the relevant information, may cause a negative impact on the reliability of the service for potential future end users.

V. Discussion and Conclusions

The results of the MARCOAST project have clearly demonstrated the significant steps forward which have been made in the field of satellite monitoring of sea based oil pollution in the Mediterranean region. In particular, the operational capability of a near real time satellite monitoring service was shown, as most of the results of satellite image analysis were delivered to end users as planned within the project proposal, meaning one hour from satellite image acquisition. Almost all registered delays occurred following some technical problems related to the service which were solved during the second phase of MARCOAST.

Another interesting aspect of this project is that it represented a unique opportunity for three countries of the Maghreb to carry out joint monitoring activities with the common aim of preventing and combating illicit discharges from ships in the Mediterranean Sea. In some occasions, the countries were also sharing the relevant information related to oil spills detected within their territorial waters, paving the way for an improved cooperation in the field of ships related pollution. In this view, the project is a first fundamental step towards the development of sub-regional monitoring systems in the Mediterranean region.

Furthermore, the project enabled the collection of data in an area where there is a lack of a regular surveillance system of sea based oil pollution, assisting in the identification of zones more likely to be affected by oil. As one could have expected, Algeria being the only oil exporting country amongst the three, most of the illicit discharges seem to be concentrated along the Algerian coast, particularly in proximity of major ports, such as Skikda, where a significant number of high confidence oil spills has been registered. However, additional data is needed in order to confirm these preliminary results and identify the main hot spots of operational pollution within the Southern Mediterranean. Thus further investigation in these areas is highly recommended.

Moreover, taking into account the entry into force of the EC Directive on "Ship-source pollution and on the introduction of penalties for infringements" (Directive 2005/35/EC), which intends to ensure that illicit discharges in EU waters are subject to adequate penalties, it would be interesting to assess whether the southern Mediterranean waters, where the Directive does not apply, may consequently be affected by an increasing number of deliberate discharges. In any case, it would be desirable, also on the basis of the results presented, to take some preventive measures also within the southern part of the Mediterranean basin.

Finally, the significant interest demonstrated by the users as well as their involvement in the project should be noted. Besides verifying the slicks detected by satellite, some countries expressed the wish to receive the relevant full resolution satellite images, in order to use their in-house capacity to cross check the results of satellite image analysis. Moreover, the amount of comments and suggestions provided by the users throughout the project was quite significant, highlighting their interest in this kind of monitoring service for the prevention of pollution from ships.

Future exercises should take advantage of the experience gained through the project and take into account the suggestions provided by the users for the improvement of the service.

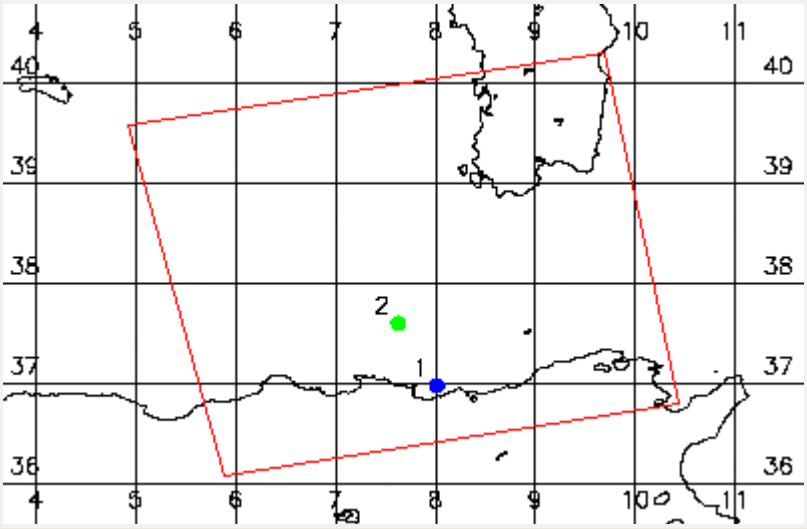
ANNEX I

OIL SERVICE REPORT

MarCoast
a GMES Services Network

OIL SERVICE REPORT

Oil Slick Detected



Satellite	Acquisition Time UTC
ENVISAT	2008-12-14 21:20:40.099
Satellite scene coordinates	
39°35'07"N / 004°55'23"E	40°18'08"N / 009°41'23"E
36°05'29"N / 005°53'44"E	36°48'30"N / 010°26'14"E
Number of detected oil slicks	**Frame ID**
2	N/A
Comments	
N/A	

Oil Slick number	Confidence	Possible sources	Country (EEZ)	
1	MEDIUM	N/A	N/A	Details
2	LOW	N/A	N/A	Details

Oil Slick number 1		Confidence: MEDIUM	
Central Position: 36°59'08"N / 008°01'01"E			
Region affected		**Country associated**	
N/A		N/A	
Area	**Width**	**Length**	**Slick orientation**
1.46 km²	0.19 km	7.55 km	E-W
Possible sources			
N/A			
Characteristics			
Type:	Linear	**Shape:**	Irregular
Contrast:	Medium	**Edges:**	Sharp and Diffuse
Surroundings:	Homogenous		
Criteria for confidence level			
Medium contrast, sharp and diffuse edges, irregular linear shaped slick, fragmented, source: N/A, homogenous surrounding.			
Comments			
N/A			

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Oil Slick number 2		Confidence: LOW	
Central Position: 37°36'28"N / 007°37'41"E			
Region affected		**Country associated**	
N/A		N/A	
Area	**Width**	**Length**	**Slick orientation**
2.25 km²	0.28 km	7.95 km	E-W

Possible sources
N/A

Characteristics			
Type:	Linear	**Shape:**	Irregular
Contrast:	Medium	**Edges:**	Sharp and Diffuse
Surroundings:	Inhomogenous		

Criteria for confidence level
Medium contrast, sharp and diffuse edges, irregular linear shaped slick, fragmented, source: N/A, inhomogenous surrounding
Comments
N/A

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Operator: Fioretti, *Telespazio S.p.A.*
Direct phone: +39 0835 375408 (24h/7d)
Fax: +39 0835 375422
EMail: nrt-matera@tpz-services.it

ANNEX II

POLLUTION REPORTING FORM

POLREP

1. AUTEUR DU RAPPORT:

   a. Etat auteur du rapport: : .....
   b. Observateur (organisation/aéronef/plate-forme) : .....Indicatif.....
   c. Observateur(s)(nom(s) de famille) : 1..... .....2.....

2. DATE ET HEURE:

   a. Date (an,mm,jj) b. Heure de l'observation (UTC) : Date..... Heure.....UTC

3. LIEU DE LA POLLUTION:

   a. Position de la pollution (Lat/Long) : Début.....N, ...O/E
      : Fin.....N, ...O/E
   b. A l'intérieur/à l'extérieur des eaux territoriales : O A l'intérieur.....O A l'extérieur.....

4. DESCRIPTION DE LA POLLUTION:

   a. Type du substance rejetée :.....
   b. Quantité estimée :.....m^3
   c. Longeur (km) d. Largeur (km) e. Zone mazoutée Longeur.....km Largeur.....km Zone mazouté... .(km^2)
   f. Pourcentage de la zone mazoutée, en fonction de l'apparence (%) 1:.....% 4:.....%
      1=Reflet 2=Arc-en-ciel 3=Métallique 2:.....% 5:.....%
      4=Vraie couleur discontinue 5=Vraie Couleur 3:.....% Autres:.....%

5. METHODE DE DETECTION ET D'INVESTIGATION:

   a. Détection (Visuel, SLAR, IR, UV, Vidéo, MW : O Visuel O SLAR O IR O UV O Vidéo O MW,
      LFS, Caméra d'identification, Autres) : O LFS O Vidéo O Cam d'ident. O Autres
   b. Déversement observé c. Photographies prises : Observé: Oui/Non Photos: Oui/Non
   d. Echantillons prélevés e. Doit être combattue : Echantillons: Oui/Non Combat: Oui/Non
   f. Autres navires/plates-formes à proximité (Noms) : .....

6. CONDITIONS METEOROLOGIQUES ET ETAT DE LA MER:

   a. Direction du vent b. Vitesse du vent c. Visibilité : Direction.....Degré Force.....Bft/Kts Vis.....kms
   d. Couverture nuageuse e. Hauteur des vagues : Nuages.....Octa Hauteur des vagues .....m
   f. Sens du courant : Sens du courant Degré

ANNEX III

MOON REPORT

Bologna 30.06.2008

Executive Summary:

Following the request from REMPEC asking support in the framework of the MARCOAST Project, GNOO-INGV has produced the simulation related to the oil spills detected with high confidence in the Algerian waters.
Here below the main characteristics of the spills are listed:
Spill Data (the identification number of the spills is related to the image ENVISAT ORBIT 33099 UTC 2008-06-29 09:45):
Time of the detection= 29.06.2008 at 09:45 UTC.

Spill N°	Surface (Km^2)	Lat	Lon
5	7.01	39°4.62' N	8°1.92'
6	0.74	39°24.96' N	5°5.1'
7	1.01	38°10.98' N	7°4.5'
10	5.84	38°1.68' N	3°44.04'
12	6.78	38°2.34' N	4°48.6'
14	2.21	37°25.26' N	6°41.1'

GNOO-INGV has produced simulations related to oil spill drift using MFS forecasting system coupled with MEDSLIK oil spill model. Ancillary data such as wind stress and surface marine currents are delivered together with the oil drift simulation.

GNOO-INGV SIMULATION RESULTS:
20080629: Wind stress, surface marine currents and oil slick position (Images 1-2-3)
20080630: Wind stress, surface marine currents and oil slick position (Images 4-5-6)
20080701: Wind stress, surface marine currents and oil slick position (Images 7-8-9)

Wind Stress (Images 1-4-7) and surface marine currents (Images 2-5-8) are the last forecast of the MFS Forecasting System (http://gnoo.bo.ingv.it/mfs).

The simulation of the oil slick evolution (Images 3-6-9) are done with the advection due to the current fields coming from an ocean circulation model with approximately 6.5 km of horizontal resolution (Mediterranean Forecasting System, MFS http://www.bo.ingv.it/mfs), and considering the weathering of the oil.

Spill Data:

- Time of the detection: 29.06.2008 at 09:45 UTC
- Target: Presumed oil spills

Spill N°	Surface (Km^2)	Lat	Lon	Default thickness of the spill (mm)	Default density of the oil ($tons/m^3$)	Estimated volume of oil (tons)
5	7.01	39°4.62' N	8°1.92'	0.01	0.865	48
6	0.74	39°24.96' N	5°5.1'	0.01	0.865	5
7	1.01	38°10.98' N	7°4.5'	0.01	0.865	7
10	5.84	38°1.68' N	3°44.04'	0.01	0.865	40
12	6.78	38°2.34' N	4°48.6'	0.01	0.865	46
14	2.21	37°25.26' N	6°41.1'	0.01	0.865	15

References:

- Nadia Pinardi: n.pinardi@sincem.unibo.it
  Tel: 335 5248908
- Marina Tonani: tonani@bo.ingv.it
  Tel: 328 4128902; 051 3782638
- Michela De Dominicis : dedominicis@bo.ingv.it
  Tel: 339 3315176; 051 3782648
- Giovanni Coppini : coppini@bo.ingv.it
  Tel: 347 7702866; 051 3782641
- Antonio Guarnieri: guarnieri@bo.ingv.it
  Tel: 328 4172571; 051 3782643

Wind stress, surface currents and oil spill simulation for the day 29th June 2008

MEAN WIND STRESS from 12:00 200800629 to 12:00 200800630

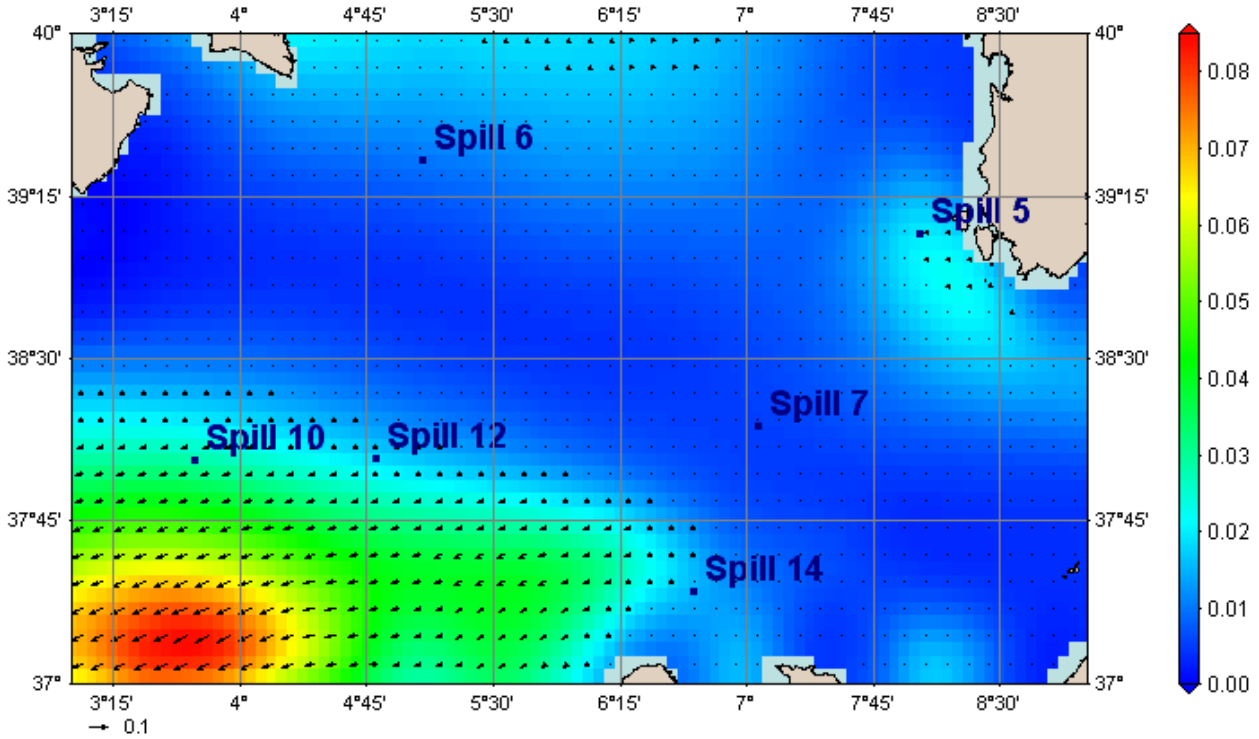

Figura 1: Wind Stress (dyne/cm2) mean field from 12:00 200800629 to 12:00 20080630.

MEAN OCEAN CURRENT AT SURFACE from 12:00 20080629 to 12:00 20080630

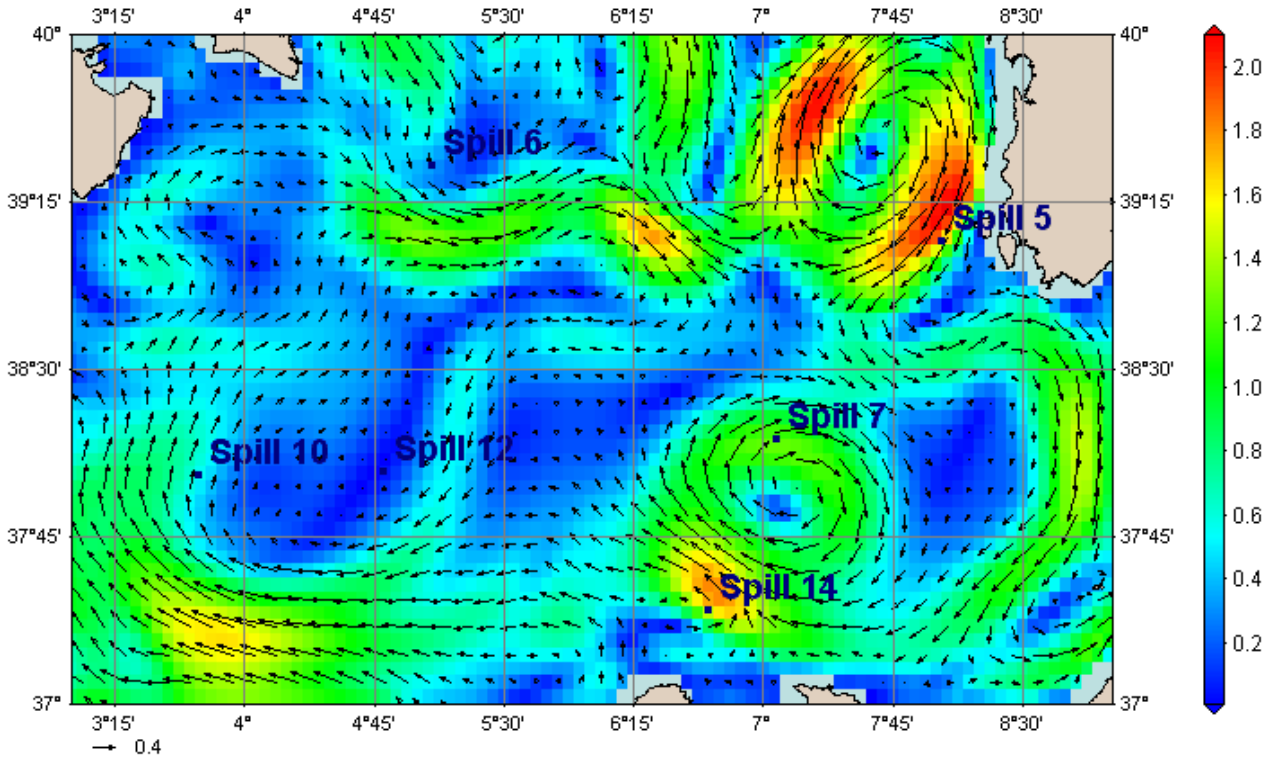

Figura 2: Current (knots) mean field at the surface from 12:00 20080629 to 12:00 20080630.

OIL SLICK DRIFT at 20080630 09:45 UTC

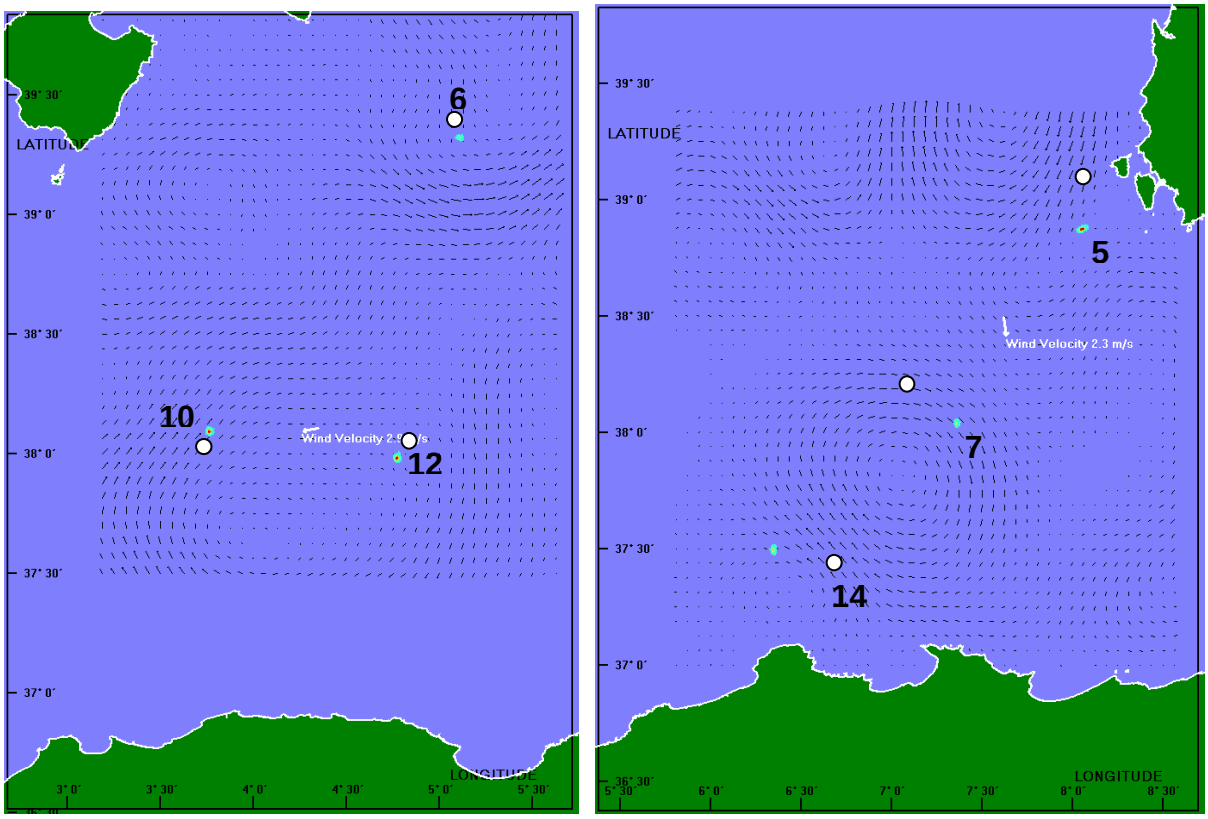

Figura 3: Oil Slick position at 20080630. The black arrows represent the currents intensity and directions, the white arrow represents the wind intensity and direction. The white circles show the initial position of the slick.

Wind stress, surface currents and oil spill simulation for the day 30th June 2008

MEAN WIND STRESS from 12:00 200800630 to 12:00 20080701

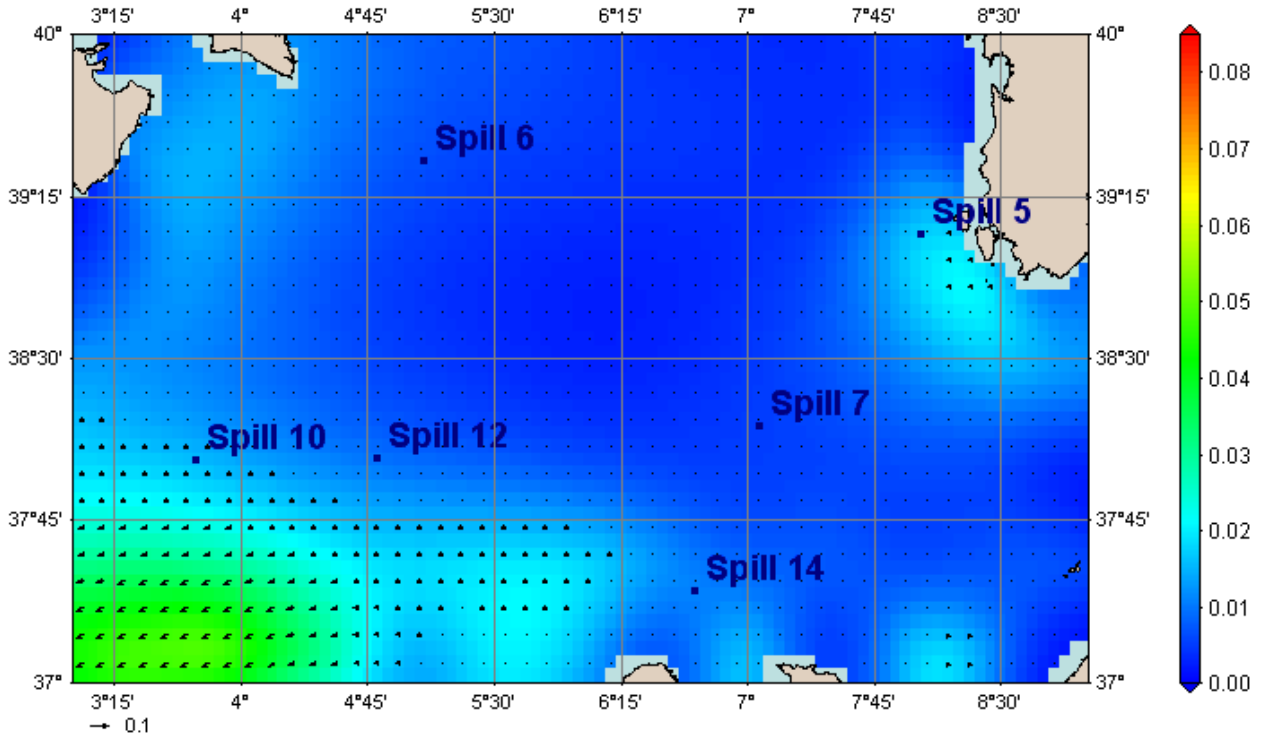

Figura 4: Wind Stress (dyne/cm2) mean field from 12:00 20080630 to 12:00 20080701.

MEAN OCEAN CURRENT AT SURFACE from 12:00 20080630 to 12:00 20080701

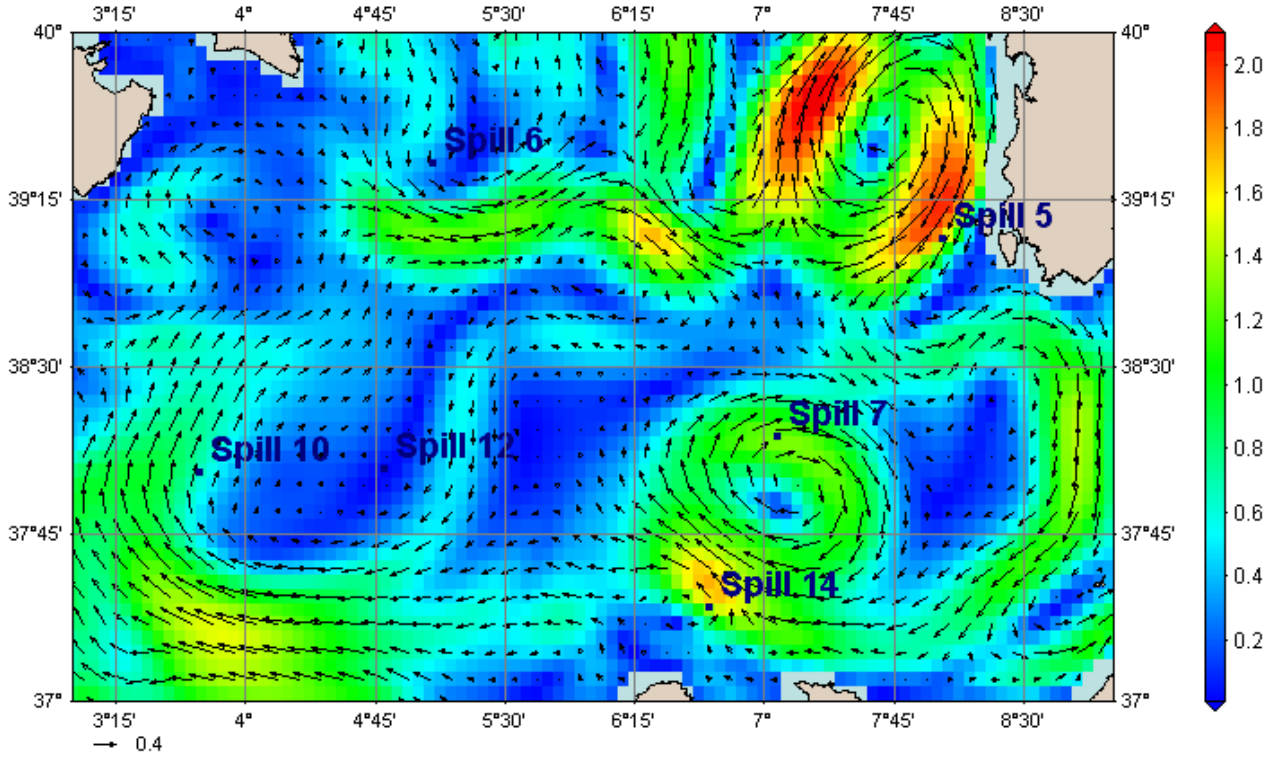

Figura 5: Current (knots) mean field at the surface from 12:00 20080630 to 12:00 20080701.

OIL SLICK DRIFT at 20080701 09:45 UTC

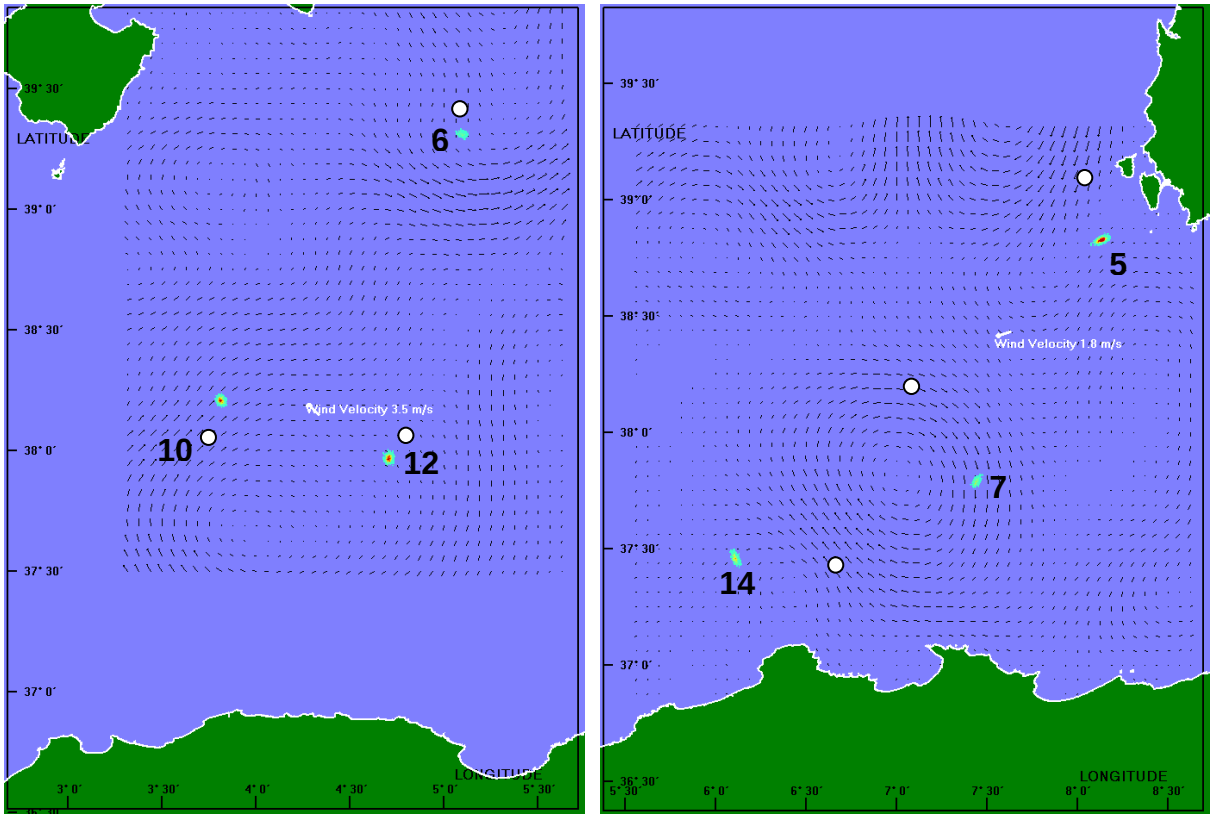

Figura 6: Oil Slick position at 20080701. The black arrows represent the currents intensity and directions, the white arrow represents the wind intensity and direction. The white circles show the initial position of the slick.

Wind stress, surface currents and oil spill simulation for the day 1st July 2008

MEAN WIND STRESS from 12:00 20080701 to 12:00 20080702

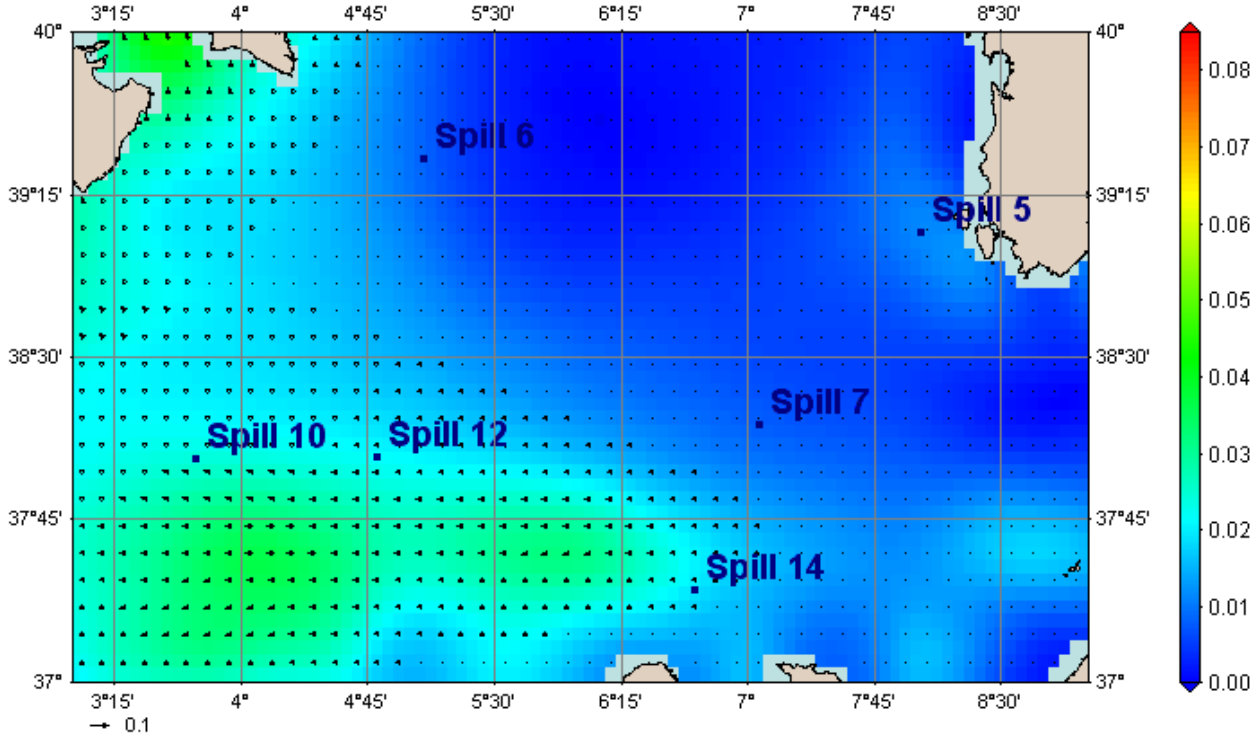

Figura 7: Wind Stress (dyne/cm2) mean field from 12:00 20080701 to 12:00 200800702.

MEAN OCEAN CURRENT AT SURFACE from 12:00 20080701 to 12:00 20080702

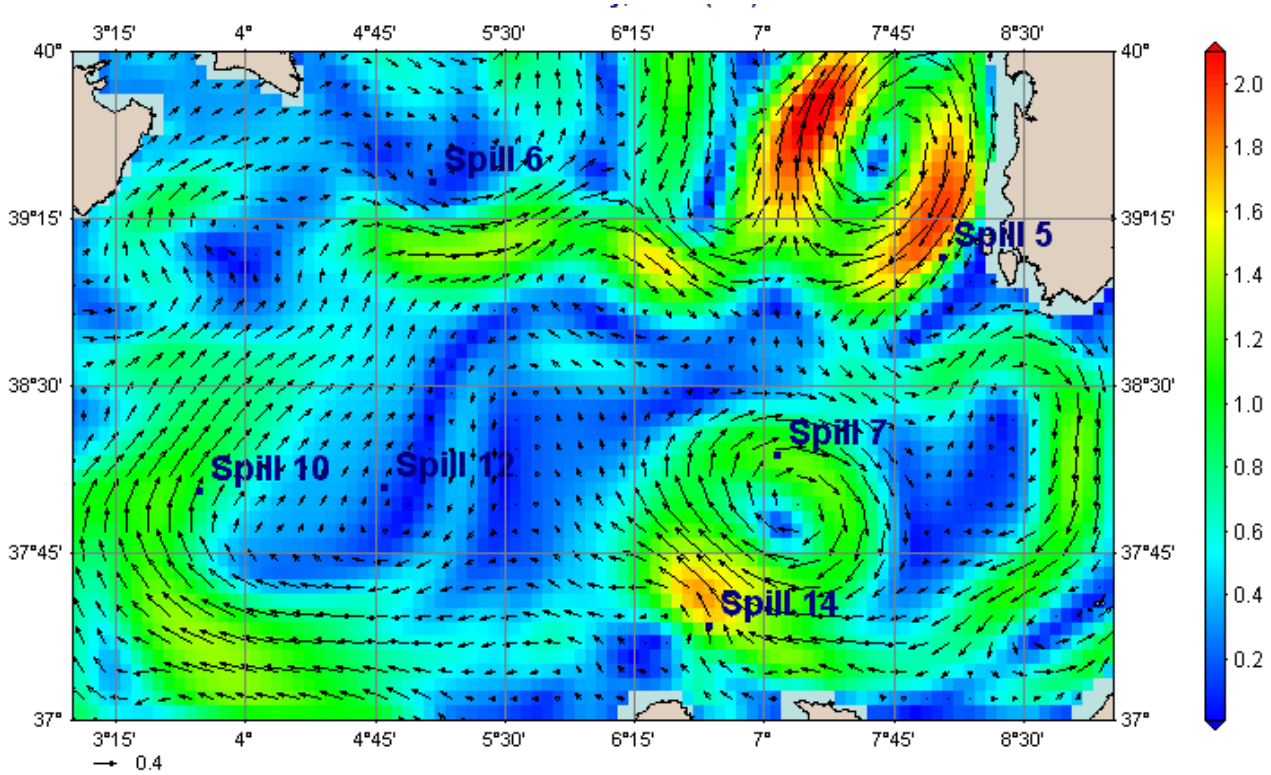

Figura 8: Current (knots) mean field at the surface from 12:00 200800701 to 12:00 20080702.

OIL SLICK DRIFT at 20080702 09:45 UTC

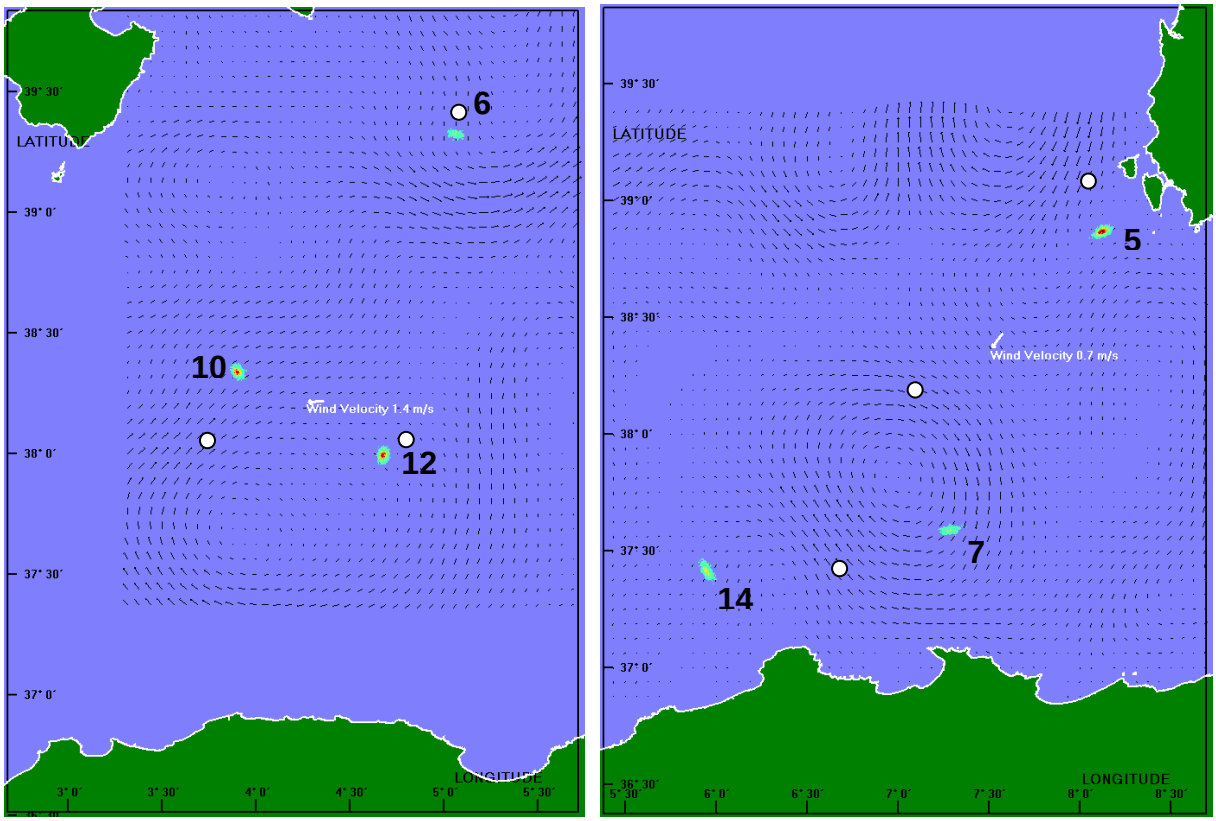

Figura 9: Oil Slick position at 20080702. The black arrows represent the currents intensity and directions, the white arrow represents the wind intensity and direction. The white circles show the initial position of the slick.

ANNEX IV (a)

SATELLITE IMAGES DELIVERED DURING PHASE I OF MARCOAST

Satellite	Orbit	Acq Date & Time (UTC)	Email Delivery time (UTC)	Delay time	End User
ENVISAT	29957	22/11/2007 21:13:55	22/11/2007 22:03:00	0:49:05	Tunisia
ENVISAT	29964	23/11/2007 09:28:50	23/11/2007 10:29:00	1:00:10	Tunisia
ENVISAT	30007	26/11/2007 09:34:11	27/11/2007 10:50:10	25.15.59	Tunisia
ENVISAT	30107	03/12/2007 09:14:24	03/12/2007 09:58:00	0:43:36	Tunisia
ENVISAT	30143	05/12/2007 21:05:49	05/12/2007 21:32:00	0:26:11	Tunisia
ENVISAT	30229	11/12/2007 21:16:47	11/12/2007 21:37:00	0:20:13	Tunisia
ENVISAT	30236	12/12/2007 21:31:39	12/12/2007 21:49:00	0:17:21	Tunisia
ENVISAT	30372	21/12/2007 21:02:52	21/12/2007 21:21:00	0:18:08	Tunisia
ENVISAT	30415	24/12/2007 21:08:41	24/12/2007 22:05:00	0:56:19	Tunisia
ENVISAT	30422	25/12/2007 09:22:52	25/12/2007 11:10:00	1:47:08	Tunisia
ENVISAT	30458	27/12/2007 21:14:01	27/12/2007 21:33:00	0:18:59	Tunisia
ENVISAT	30465	28/12/2007 09:28:46	28/12/2007 09:50:00	0:21:14	Tunisia
ENVISAT	30508	31/12/2007 09:34:15	31/12/2007 10:17:00	0:42:45	Tunisia
ENVISAT	30966	01/02/2008 09:28:50	01/02/2008 10:16:00	0:47:10	Tunisia
ENVISAT	31009	04/02/2008 09:34:13	04/02/2008 10:01:00	0:26:47	Tunisia
ENVISAT	31109	11/02/2008 09:14:55	11/02/2008 09:49:00	0:34:05	Tunisia
ENVISAT	31145	13/02/2008 21:05:31	13/02/2008 21:38:00	0:32:29	Tunisia
ENVISAT	31231	19/02/2008 21:16:28	19/02/2008 21:47:00	0:30:32	Tunisia
ENVISAT	31238	20/02/2008 09:31:40	20/02/2008 10:03:00	0:31:20	Tunisia
ENVISAT	31374	29/02/2008 21:02:35	29/02/2008 21:30:00	0:27:25	Tunisia
ENVISAT	31467	07/03/2008 09:28:52	07/03/2008 09:56:00	0:27:08	Tunisia
ENVISAT	31503	09/03/2008 21:19:39	09/03/2008 21:38:00	0:18:21	Tunisia
ENVISAT	31510	10/03/2008 09:34:32	10/03/2008 10:06:00	0:31:28	Tunisia
ENVISAT	31646	19/03/2008 21:05:24	19/03/2008 21:26:00	0:20:36	Tunisia
ENVISAT	31653	20/03/2008 09:20:31	20/03/2008 09:42:00	0:21:29	Tunisia
ENVISAT	31689	22/03/2008 21:11:02	22/03/2008 21:52:00	0:40:58	Tunisia
ENVISAT	31696	23/03/2008 09:26:14	23/03/2008 10:19:00	0:52:46	Tunisia
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ENVISAT	31739	26/03/2008 09:31:39	26/03/2008 09:51:00	0:19:21	Tunisia
ENVISAT	31775	28/03/2008 21:22:45	28/03/2008 21:39:00	0:16:15	Tunisia
ENVISAT	32147	23/04/2008 21:05:41	23/04/2008 22:23:00	1:17:19	Tunisia
ENVISAT	32154	24/04/2008 09:20:10	24/04/2008 10:02:00	0:41:50	Tunisia
ENVISAT	32190	26/04/2008 21:11:01	26/04/2008 22:02:00	0:50:59	Tunisia
ENVISAT	32197	27/04/2008 09:26:16	27/04/2008 09:57:00	0:30:44	Tunisia
ENVISAT	32240	30/04/2008 09:31:39	30/04/2008 10:21:00	0:49:21	Tunisia
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ENVISAT	32462	15/05/2008 21:13:57	15/05/2008 21:51:00	0:37:03	Tunisia
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ENVISAT	32741	04/06/2008 09:31:09	04/06/2008 10:06:00	0:34:51	Tunisia
ENVISAT	33199	06/07/2008 09:25:24	06/07/2008 10:01:00	0:35:36	Tunisia
ENVISAT	33242	09/07/2008 09:31:09	09/07/2008 10:02:00	0:30:51	Tunisia
ENVISAT	28905	10/09/2007 09:54:22	N/A	N/A	Algeria
ENVISAT	28991	16/09/2007 10:06:03	N/A	N/A	Algeria
ENVISAT	29027	18/09/2007 21:57:32	18/09/2007 22:20:56	0:23:24	Algeria

ENVISAT	29091	23/09/2007 09:45:31	23/09/2007 10:58:00	1:12:29	Algeria
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ENVISAT	29492	21/10/2007 10:06:09	21/10/2007 10:55:00	0:48:51	Algeria
ENVISAT	29528	23/10/2007 21:57:33	23/10/2007 23:01:00	1:03:27	Algeria
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ENVISAT	29306	08/10/2007 10:15:17	08/10/2007 10:41:00	0:25:43	Morocco
ENVISAT	29342	10/10/2007 22:05:38	10/10/2007 23:48:00	1:42:22	Morocco
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ENVISAT	29428	16/10/2007 22:17:12	16/10/2007 23:33:00	1:15:48	Morocco
ENVISAT	29435	17/10/2007 10:32:21	17/10/2007 11:16:00	0:43:39	Morocco
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ENVISAT	30036	28/11/2007 10:12:24	28/11/2007 10:50:00	0:37:36	Morocco
ENVISAT	30072	30/11/2007 22:03:03	30/11/2007 22:53:00	0:49:57	Morocco
ENVISAT	30079	01/12/2007 10:18:09	01/12/2007 10:37:00	0:18:51	Morocco
ENVISAT	30115	03/12/2007 22:08:32	N/A	N/A	Morocco
ENVISAT	30122	04/12/2007 10:23:54	04/12/2007 10:36:00	0:12:06	Morocco
ENVISAT	30158	06/12/2007 22:14:17	06/12/2007 22:35:00	0:20:43	Morocco
ENVISAT	30165	07/12/2007 10:29:26	07/12/2007 10:53:00	0:23:34	Morocco
ENVISAT	30201	09/12/2007 22:20:02	09/12/2007 23:10:00	0:49:58	Morocco
ENVISAT	30344	19/12/2007 22:05:39	19/12/2007 22:23:00	0:17:21	Morocco
ENVISAT	30351	20/12/2007 20:21:01	20/12/2007 20:21:01	0:00:00	Morocco
ENVISAT	30387	22/12/2007 22:11:24	22/12/2007 23:11:00	0:59:36	Morocco
ENVISAT	30394	23/12/2007 10:26:34	23/12/2007 11:10:00	0:43:26	Morocco
ENVISAT	30430	25/12/2007 22:17:10	26/12/2007 00:31:00	2:13:50	Morocco
ENVISAT	30473	28/12/2007 22:23:18	28/12/2007 22:35:00	0:11:42	Morocco
ENVISAT	30895	27/01/2008 10:26:27	27/01/2008 11:04:00	0:37:33	Morocco
ENVISAT	30931	29/01/2008 22:17:21	29/01/2008 22:43:00	0:25:39	Morocco
ENVISAT	30938	30/01/2008 10:32:19	30/01/2008 11:20:00	0:47:41	Morocco
ENVISAT	31124	12/02/2008 10:23:54	12/02/2008 11:20:00	0:56:06	Morocco
ENVISAT	31160	14/02/2008 22:14:17	14/02/2008 22:32:00	0:17:43	Morocco
ENVISAT	31167	15/02/2008 10:29:23	15/02/2008 10:56:00	0:26:37	Morocco
ENVISAT	31203	17/02/2008 22:20:25	17/02/2008 22:45:00	0:24:35	Morocco
ENVISAT	31346	27/02/2008 22:05:39	27/02/2008 22:23:00	0:17:21	Morocco
ENVISAT	31353	28/02/2008 10:21:02	28/02/2008 10:47:00	0:25:58	Morocco

ANNEX IV (b)

SATELLITE IMAGES DELIVERED DURING PHASE II OF MARCOAST

Satellite	Orbit	Acq Date & Time (UTC)	Email Delivery time	Delay	End User
ENVISAT	32326	06/05/2008 09:42:40	06/05/2008 10:06:00	0:23:20	Algeria
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ENVISAT	32512	19/05/2008 09:34:02	19/05/2008 09:53:00	0:18:58	Algeria
ENVISAT	32734	03/06/2008 21:17:48	03/06/2008 22:01:00	0:43:12	Algeria
ENVISAT	32763	05/06/2008 21:54:08	05/06/2008 22:13:00	0:18:52	Algeria
ENVISAT	32770	06/06/2008 10:09:32	06/06/2008 10:27:00	0:17:28	Algeria
ENVISAT	32913	16/06/2008 09:54:09	16/06/2008 10:54:00	0:59:51	Algeria
ENVISAT	33035	24/06/2008 21:57:02	24/06/2008 22:09:00	0:11:58	Algeria
ENVISAT	33056	26/06/2008 09:39:47	26/06/2008 10:14:00	0:34:13	Algeria
ENVISAT	33099	29/06/2008 09:45:31	29/06/2008 10:13:00	0:27:29	Algeria
ENVISAT	33271	11/07/2008 10:09:32	11/07/2008 10:25:00	0:15:28	Algeria
ENVISAT	33328	15/07/2008 09:42:39	15/07/2008 10:02:00	0:19:21	Algeria
ENVISAT	33371	18/07/2008 09:48:24	18/07/2008 10:13:00	0:24:36	Algeria
ENVISAT	33414	21/07/2008 09:54:09	21/07/2008 10:17:00	0:22:51	Algeria
ENVISAT	33507	27/07/2008 21:20:40	27/07/2008 21:50:00	0:29:20	Algeria
ENVISAT	33514	28/07/2008 09:34:02	28/07/2008 10:09:00	0:34:58	Algeria
ENVISAT	33536	29/07/2008 21:57:01	29/07/2008 22:17:00	0:19:59	Algeria
ENVISAT	33550	30/07/2008 21:26:25	30/07/2008 21:54:00	0:27:35	Algeria
ENVISAT	33557	31/07/2008 09:39:47	31/07/2008 10:18:00	0:38:13	Algeria
ENVISAT	33643	06/08/2008 09:51:17	06/08/2008 10:52:00	1:00:43	Algeria
ENVISAT	33686	09/08/2008 09:57:01	09/08/2008 10:14:00	0:16:59	Algeria
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ENVISAT	33786	16/08/2008 09:36:54	16/08/2008 10:20:00	0:43:06	Algeria
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ENVISAT	33872	22/08/2008 09:48:24	22/08/2008 10:32:00	0:43:36	Algeria
ENVISAT	33915	25/08/2008 09:54:08	25/08/2008 10:14:00	0:19:52	Algeria
ENVISAT	34001	31/08/2008 10:06:39	31/08/2008 10:20:00	0:13:21	Algeria
ENVISAT	34101	07/09/2008 09:45:32	07/09/2008 10:12:00	0:26:28	Algeria
ENVISAT	34187	13/09/2008 09:57:22	13/09/2008 10:14:00	0:16:38	Algeria
ENVISAT	34273	19/09/2008 10:09:02	19/09/2008 10:30:00	0:20:58	Algeria
ENVISAT	34330	23/09/2008 09:42:39	23/09/2008 10:04:00	0:21:21	Algeria
ENVISAT	34373	26/09/2008 09:48:34	26/09/2008 10:11:00	0:22:26	Algeria
ENVISAT	34459	02/10/2008 10:00:15	02/10/2008 10:40:00	0:39:45	Algeria
ENVISAT	34502	05/10/2008 10:06:10	05/10/2008 10:24:00	0:17:50	Algeria
ENVISAT	34645	15/10/2008 09:51:29	15/10/2008 10:15:00	0:23:31	Algeria
ENVISAT	34731	21/10/2008 10:03:16	21/10/2008 10:28:00	0:24:44	Algeria
ENVISAT	34831	28/10/2008 09:42:51	28/10/2008 10:11:00	0:28:09	Algeria
ENVISAT	34874	31/10/2008 09:48:37	31/10/2008 10:10:00	0:21:23	Algeria
ENVISAT	35189	22/11/2008 09:57:19	22/11/2008 10:15:00	0:17:41	Algeria
ENVISAT	35232	25/11/2008 10:03:17	25/11/2008 10:19:00	0:15:43	Algeria
ENVISAT	32312	07/05/2008 22:05:38	07/05/2008 22:26:00	0:20:22	Morocco
ENVISAT	32441	14/05/2008 10:32:31	14/05/2008 11:14:00	0:41:29	Morocco
ENVISAT	32484	17/05/2008 10:38:17	17/05/2008 11:08:00	0:29:43	Morocco
ENVISAT	32620	26/05/2008 22:08:31	26/05/2008 22:27:00	0:18:29	Morocco
ENVISAT	32663	29/05/2008 22:14:15	29/05/2008 23:00:00	0:45:45	Morocco
ENVISAT	32813	09/06/2008 10:15:16	09/06/2008 10:33:00	0:17:44	Morocco
ENVISAT	32849	11/06/2008 22:05:38	11/06/2008 22:23:00	0:17:22	Morocco
ENVISAT	33042	25/06/2008 10:12:25	25/06/2008 10:32:00	0:19:35	Morocco
ENVISAT	33171	04/07/2008 10:29:39	04/07/2008 11:15:00	0:45:21	Morocco
ENVISAT	33207	06/07/2008 22:20:07	06/07/2008 22:38:00	0:17:53	Morocco
ENVISAT	33307	13/07/2008 21:59:54	13/07/2008 22:14:00	0:14:06	Morocco

ENVISAT	33350	16/07/2008 22:05:38	16/07/2008 22:20:00	0:14:22	Morocco
ENVISAT	33393	19/07/2008 22:11:23	19/07/2008 22:26:00	0:14:37	Morocco
ENVISAT	33543	30/07/2008 10:12:24	30/07/2008 10:42:00	0:29:36	Morocco
ENVISAT	33629	05/08/2008 10:23:55	05/08/2008 11:49:00	1:25:05	Morocco
ENVISAT	33665	07/08/2008 22:14:16	07/08/2008 22:32:00	0:17:44	Morocco
ENVISAT	33815	18/08/2008 10:15:16	18/08/2008 10:38:00	0:22:44	Morocco
ENVISAT	33894	23/08/2008 22:11:24	23/08/2008 22:34:00	0:22:36	Morocco
ENVISAT	33901	24/08/2008 10:26:32	24/08/2008 11:09:00	0:42:28	Morocco
ENVISAT	33944	27/08/2008 10:32:14	27/08/2008 10:52:00	0:19:46	Morocco
ENVISAT	34080	05/09/2008 22:02:46	05/09/2008 22:16:00	0:13:14	Morocco
ENVISAT	34087	06/09/2008 10:18:10	06/09/2008 10:31:00	0:12:50	Morocco
ENVISAT	34130	09/09/2008 10:23:53	09/09/2008 10:46:00	0:22:07	Morocco
ENVISAT	34166	11/09/2008 22:14:15	11/09/2008 22:31:00	0:16:45	Morocco
ENVISAT	34316	22/09/2008 10:15:16	22/09/2008 10:33:00	0:17:44	Morocco
ENVISAT	34395	27/09/2008 22:11:23	27/09/2008 22:27:00	0:15:37	Morocco
ENVISAT	34402	28/09/2008 10:26:42	28/09/2008 10:46:00	0:19:18	Morocco
ENVISAT	34438	30/09/2008 22:17:10	30/09/2008 22:39:00	0:21:50	Morocco
ENVISAT	34545	08/10/2008 10:12:25	08/10/2008 10:34:00	0:21:35	Morocco
ENVISAT	34588	11/10/2008 10:18:10	11/10/2008 11:26:00	1:07:50	Morocco
ENVISAT	34624	13/10/2008 22:08:32	13/10/2008 22:46:00	0:37:28	Morocco
ENVISAT	34631	14/10/2008 10:23:55	14/10/2008 10:59:00	0:35:05	Morocco
ENVISAT	34674	17/10/2008 10:29:40	17/10/2008 11:28:00	0:58:20	Morocco
ENVISAT	34817	27/10/2008 10:15:17	27/10/2008 10:32:00	0:16:43	Morocco
ENVISAT	34853	29/10/2008 22:05:38	29/10/2008 22:22:00	0:16:22	Morocco
ENVISAT	34860	30/10/2008 10:21:02	30/10/2008 10:41:00	0:19:58	Morocco
ENVISAT	34903	02/11/2008 10:26:47	02/11/2008 11:37:00	1:10:13	Morocco
ENVISAT	35046	12/11/2008 10:12:25	12/11/2008 10:28:00	0:15:35	Morocco
ENVISAT	35132	18/11/2008 10:23:55	18/11/2008 10:40:00	0:16:05	Morocco
ENVISAT	35361	04/12/2008 10:21:02	04/12/2008 10:40:00	0:18:58	Morocco
ENVISAT	33471	25/07/2008 09:28:18	25/07/2008 10:05:00	0:36:42	Tunisia
ENVISAT	33650	06/08/2008 21:05:54	06/08/2008 21:36:00	0:30:06	Tunisia
ENVISAT	33693	09/08/2008 21:11:33	09/08/2008 21:32:00	0:20:27	Tunisia
ENVISAT	33736	12/08/2008 21:17:17	12/08/2008 21:46:00	0:28:43	Tunisia
ENVISAT	33879	22/08/2008 21:02:54	22/08/2008 21:25:00	0:22:06	Tunisia
ENVISAT	33922	25/08/2008 21:08:40	25/08/2008 21:40:00	0:31:20	Tunisia
ENVISAT	33972	29/08/2008 09:29:17	29/08/2008 09:46:00	0:16:43	Tunisia
ENVISAT	34158	11/09/2008 09:19:40	11/09/2008 09:39:00	0:19:20	Tunisia
ENVISAT	34201	14/09/2008 09:25:24	14/09/2008 09:56:00	0:30:36	Tunisia
ENVISAT	34201	14/09/2008 09:26:25	14/09/2008 10:09:00	0:42:35	Tunisia
ENVISAT	34244	17/09/2008 09:31:21	17/09/2008 09:58:00	0:26:39	Tunisia
ENVISAT	34466	02/10/2008 21:14:25	02/10/2008 21:51:00	0:36:35	Tunisia
ENVISAT	34473	03/10/2008 09:28:17	03/10/2008 10:02:00	0:33:43	Tunisia
ENVISAT	34473	03/10/2008 09:29:18	03/10/2008 10:15:00	0:45:42	Tunisia
ENVISAT	34516	06/10/2008 09:34:02	06/10/2008 09:57:00	0:22:58	Tunisia
ENVISAT	34652	15/10/2008 21:05:51	15/10/2008 21:42:00	0:36:09	Tunisia
ENVISAT	34695	18/10/2008 21:11:32	18/10/2008 21:33:00	0:21:28	Tunisia
ENVISAT	34738	21/10/2008 21:17:17	21/10/2008 21:48:00	0:30:43	Tunisia
ENVISAT	34745	22/10/2008 09:31:29	22/10/2008 09:54:00	0:22:31	Tunisia
ENVISAT	34845	29/10/2008 09:11:30	29/10/2008 09:46:00	0:34:30	Tunisia
ENVISAT	34881	31/10/2008 21:03:03	31/10/2008 22:24:00	1:20:57	Tunisia
ENVISAT	34924	03/11/2008 21:08:36	03/11/2008 21:24:00	0:15:24	Tunisia
ENVISAT	34967	06/11/2008 21:14:20	06/11/2008 21:34:00	0:19:40	Tunisia

ENVISAT	34974	07/11/2008 09:28:17	07/11/2008 09:52:00	0:23:43	Tunisia
ENVISAT	34974	07/11/2008 09:29:18	07/11/2008 09:58:00	0:28:42	Tunisia
ENVISAT	35017	10/11/2008 09:34:02	10/11/2008 12:12:00	2:37:58	Tunisia
ENVISAT	35110	16/11/2008 21:00:03	16/11/2008 21:26:00	0:25:57	Tunisia
ENVISAT	35117	17/11/2008 09:14:15	17/11/2008 10:25:00	1:10:45	Tunisia
ENVISAT	35203	23/11/2008 09:25:25	23/11/2008 09:46:00	0:20:35	Tunisia
ENVISAT	35203	23/11/2008 09:26:26	23/11/2008 09:26:26	0:00:00	Tunisia
ENVISAT	35239	25/11/2008 21:17:18	25/11/2008 21:36:00	0:18:42	Tunisia
ENVISAT	35246	26/11/2008 09:31:34	26/11/2008 09:49:00	0:17:26	Tunisia
ENVISAT	35289	29/11/2008 09:36:54	29/11/2008 10:01:00	0:24:06	Tunisia
ENVISAT	35382	05/12/2008 21:02:25	05/12/2008 21:21:00	0:18:35	Tunisia
ENVISAT	35468	11/12/2008 21:14:25	11/12/2008 21:43:00	0:28:35	Tunisia
ENVISAT	35475	12/12/2008 09:28:17	12/12/2008 10:37:00	1:08:43	Tunisia
ENVISAT	35475	12/12/2008 09:29:18	12/12/2008 10:45:00	1:15:42	Tunisia
ENVISAT	35511	14/12/2008 21:20:40	14/12/2008 21:44:00	0:23:20	Tunisia
ENVISAT	35518	15/12/2008 09:34:01	15/12/2008 09:55:00	0:20:59	Tunisia
ENVISAT	35890	10/01/2009 09:16:47	10/01/2009 10:47:00	1:30:13	Tunisia

ANNEX V

POSSIBLE OIL SPILLS DETECTED WITH A HIGH LEVEL OF CONFIDENCE


France
Milano
Otok Cres
Sarajevo
Serbia
Bulgaria
Bosnia and Herzegovina
Otok Ugljan
Pristina
San Marino
Otok Brac
Podgorica
Skopje
Adriatic Sea
Monaco
Ligurian Sea
Italy
Tiranë
Albania
Isola d'Elba
Holy See (Vatican)
Bay of Biscay
Corse (Corsica)
Isola d'Ischia
Kerkyra
Greece
Andorra
Andorra la Vella
Isola Maddalena
Ionian Sea
Barcelona
Tyrrhenian Sea
Zakynthos (Zante)
Castilla y León
Sardegna (Sardinia)
Isola di Ustica
Isola Lipari
Madrid
Balearic Sea
Mallorca
Isola Favignana
Castilla-La Mancha
Portugal
Eivissa (Ibiza)
Isola di Pantelleria
Mediterranean S
Lisboa
Tunis
Gozo
Valletta
Skikda
Andalucía
El-Jazair
Gibraltar
Tanger
Alboran Sea
Tunisia
Tarabulus
Rabat
Dar-el-Beida
Morocco
Libya
© 2008 Basarsoft
© 2008 Europa Technologies
© 2008 Tele Atlas
Image NASA
©2007 Google™
Pointer 37°06'33.82" N 5°52'16.56" E
Streaming 100%
Eye alt 1433.88 mi

ANNEX VI

USERS QUESTIONNAIRE

MarCoast
a GMES Services Network

MARINE AND COASTAL ENVIRONMENTAL INFORMATION SERVICES

SERVICES D'INFORMATION DE L'ENVIRONNEMENT MARIN ET DU LITTORAL

MarCoast Questionnaire destiné utilisateur :

[Nom du service et du produit]
[Numéro WP]

Contribution by Service Providers and Core User(s) to Deliverable No. C6

	Nom, Email (Institut)	Responsabilité	Signature
Préparé par	**[Veuillez compléter]**	**Prestataire(s) de service**	**[Veuillez signer]**
Contributions de	**[Veuillez compléter]**	**Utilisateur(s) Principal(ux)**	-----
			-----

2. ACTIVITES DE VALIDATION PAR L' UTILISATEUR

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2.1 QUESTIONNAIRE DESTINE AUX UTILISATEURS

Les questions aux utilisateurs principaux ayant contribués aux activités de validation sont regroupées sous trois catégories:

1. Besoins des utilisateurs (chapitre 2.1.2)
2. Besoins techniques (chapitre 2.1.3)
3. Validation (chapitre 2.1.4)

2.1.1 Information sur l'utilisateur

Utilisateur:

Organisation:

Adresse:

Téléphone:

Email:

2.1.2 Besoins des utilisateurs

Tous services

1. *Veuillez évaluer le service (cochez la case correspondante):*
   a. *Possibilités d'accès aux informations fournies*

Très efficace ☐ ☐ ☐ ☐ ☐ Inefficace

   b. *Communication entre le prestataire de service et l'utilisateur final*

Très efficace ☐ ☐ ☐ ☐ ☐ Inefficace

   c. *Mécanismes généraux de feedback sur les services fournis*

Très efficace ☐ ☐ ☐ ☐ ☐ Inefficace

2. *La présentation des informations sur le produit est-elle satisfaisante ? Convient-elle aux besoins de l'utilisateur final ?*

[Si non, commentez SVP.]

3. *Le service est-il avantageux pour votre travail en cours (cochez la case correspondante) ?*

	Je ne suis pas du tout d'accord	Je ne suis pas d'accord	Je suis partiellement d'accord	Je suis d'accord	Je suis entièrement d'accord
Réduction des coûts					
Couverture spatiale améliorée					
Couverture temporelle améliorée					
Optimisation des dépenses in-situ					
Autres (préciser SVP)					

4. *Quels besoins des utilisateurs le service satisfait-il/ne satisfait-il pas ?*

5. *Quelles améliorations de produit ont été suggérées au prestataire de service (veuillez lister)?*

6. *Niveau de mise en place réussie pour ces suggestions (cochez la case correspondante)*

0 %			50%			100 %
	☐	☐	☐	☐	☐	

7. *Veuillez lister d'autres améliorations importantes à mettre en œuvre:*

8. *La couverture spatiale/temporelle du produit est-elle suffisante? Si non, quels sont vos besoins en couvertures ?*

9. *(Facultatif) Commentaires généraux concernant les besoins utilisateurs.*

Services concernant les déversements d'hydrocarbures (S1 & S2)

10. *Le service apporte des informations utiles pour la détection et la surveillance des pollutions en hydrocarbures en mer (cochez case correspondante avec "x").*

Je ne suis pas du tout d'accord	Je ne suis pas d'accord	Je suis partiellement d'accord	Je suis d'accord	Je suis entièrement d'accord
☐	☐	☐	☐	☐

11. *Le service optimise la planification des procédures de surveillance opérationnelle de déversement d'hydrocarbures (cochez case correspondante avec "x").*

Je ne suis pas du tout d'accord	Je ne suis pas d'accord	Je suis partiellement d'accord	Je suis d'accord	Je suis entièrement d'accord
☐	☐	☐	☐	☐

12. *Le niveau de fiabilité appliqué est-il utile pour planifier le suivi des procédures? Avez-vous des suggestions en ce sens?*

13. *Quelle information un service satellite doit-il produire pour assurer un ensemble de preuves ?*

2.1.3 Validation Générale

Tous services

1. *Les produits du service sont-ils documentés de manière complète et transparente?*

2. *Les conditions selon lesquelles le service est fourni sont elles clairement identifiées? Les limites dues à des facteurs externes sont elles expliquées?*

[Si non, commentez]

3. *Information locale/régionale:*
   a. *Le service utilise-t-il des informations locales/régionales qui pourraient améliorer le produit final?*

   [*Si non, précisez si vous en avez besoin.***]**

   b. *Les algorithmes et autres procédures (e.g. détection de déversement d'hydrocarbures) ont-ils été mis au point sur les conditions locales (si nécessaire)?*

   [*Si non, précisez si vous en avez besoin.***]**

4. *Le service apporte-t-il des renseignements opportuns?*

[*Si non, commentez.***]**

5. *Quels défauts existent et à quelle fréquence se produisent-ils?*

[*Formulez les raisons et fréquences pour chaque cas, i.e. le nombre de jours d'indisponibilité par mois.****]***

6. *Si cela s'applique, les défauts de service ont-ils été expliqués?*

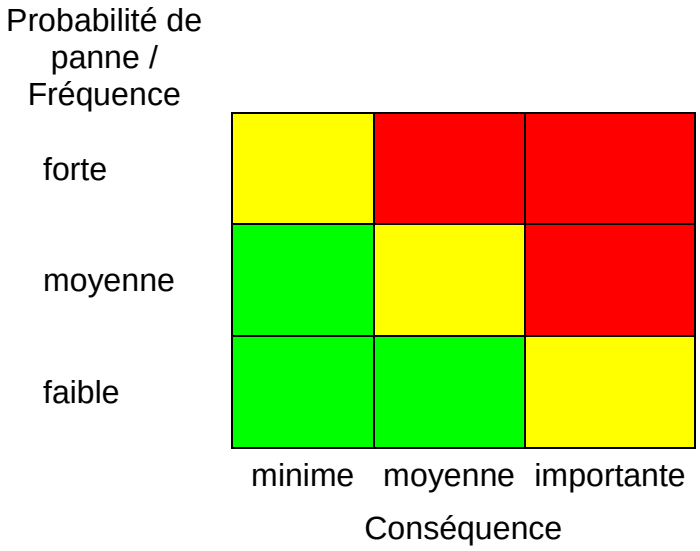
7. *Des perturbations ou non-conformités temporaires du service se sont-elles produites ? Si oui, à quelle fréquence ?*

[*Si oui, commentez, e g. établissez une fréquence.***]**

8. *Quels sont les risques liés aux perturbations et non-conformités temporaires du service ?*

[Décrivez les risques potentiels (e.g. pas d'édition de rapport possible, coûts dus à une fausse alerte) et évaluez pour chaque risque, la probabilité d'erreur correspondante (faible, moyenne, ou forte). De plus, quantifiez les conséquences de chaque erreur comme minime, moyenne ou importante.

Cochez chaque risque dans la matrice suivante, en fonction de la valeur du risque (minime=non critique, moyenne= critique, importante=très critique) et les fréquences d'erreur (basse=rarement, moyenne=modéré, haute=souvent), si plusieurs risques ont été listés utilisez les nombres respectifs.]



9. *(Facultatif) Commentaires généraux concernant les besoins utilisateurs.*

2.1.4 Validation à l'aide de données indépendantes

Tous services

1. *La qualité et la validité du produit sont elles en accord avec les spécifications et besoins utilisateurs?*

[Décrivez les cas de non-conformité et évaluez chaque cas en fonction de la fréquence et des conséquences.]

2. *Evaluez les possibilités de réactions disponibles pour l'apport de données indépendantes pour la validation du produit :*

Très suffisant ☐ ☐ ☐ ☐ ☐ Insuffisant

3. *Listez les suggestions à intégrer dans les possibilités de feedback:*

4. *(Facultatif) Commentaires généraux concernant les activités de validation*

Services concernant les déversements d'hydrocarbures (S1 & S2)

5. *Quels types de produits additionnels (e.g. données optiques) seraient utiles pour compléter la détection des déversements d'hydrocarbures par SAR (Radar à Ouverture Synthétique) ?*

6. *Les données indépendantes disponibles appuient-elles les niveaux de fiabilité attribués par le service ?*

[Si non, commentez.]

7. *En dehors de la détection par SAR – quelle autre méthode de surveillance de déversements d'hydrocarbures utilisez-vous ?*

Méthode de surveillance	**Détecteurs**	**Disponibilité (région / temps)**	**Temps d'arrivée moyen à la nappe d'hydrocarbures**	**Autres critères**
Navire de surveillance				
Aéronef				
Hélicoptère				
Navire de Récupération				
Autres				

2.2 (FACULTATIF) CONTRIBUTIONS D'UTILISATEUR ADDITIONNELS AUX RESULTATS DE VALIDATION

FIN DU DOCUMENT