EMODnet Sea-basin Checkpoints
Tender no MARE/2014/09-Lot3

EMODNET Oil Platform Leak Bulletin

(24hour report)

Date: 11/05/2016

The European Marine Observation and Data Network (EMODnet) is financed by the European Union under Regulation (EU) No. 1255/2011 of the European Parliament and of the Council of 30 November 2011 establishing a Programme to support the further development of an Integrated Maritime Policy.

Executive Summary

An oil spill case was issued by EMODNET in 11:30CET in 10/5/2016. The request for prediction and impact assessment was sent to BSCP coordinator. BSCP oil spill task team, led by SMHI, react quickly. Within 24 hours, the general environment (e.g. Marine Protected Areas in Natura2000 and other human activities) in the accident area was investigated. The weather and sea state conditions are diagnosed for potential oil spill combatting. Tow operational oil drift forecasting systems (SMHI SEATRACKWEB and DMI BSHdmod) were started to generate the forecasts in the afternoon. The results were summarized into this report.

Due to the calm weather condition, the oil does not drift too far from the incident site. The results show that during the first day, the oil drifts less than 10km, and at 96h after the spill, the oil will drift away about 60km. Based on the forecasts made by DMI and SMHI, there will be no oil landing on the coast, and no impacts on the SPA areas in Natura2000.

1. The oil spill case description

At 8:15 CET this morning (10/05/2016), a borehole located at (55,39974N ; 18,72303E) started to leak oil at a rate of 2500 barrels/day for a period of 3 days (1BBL=159L), which is equivalent to about 15tons/hour.

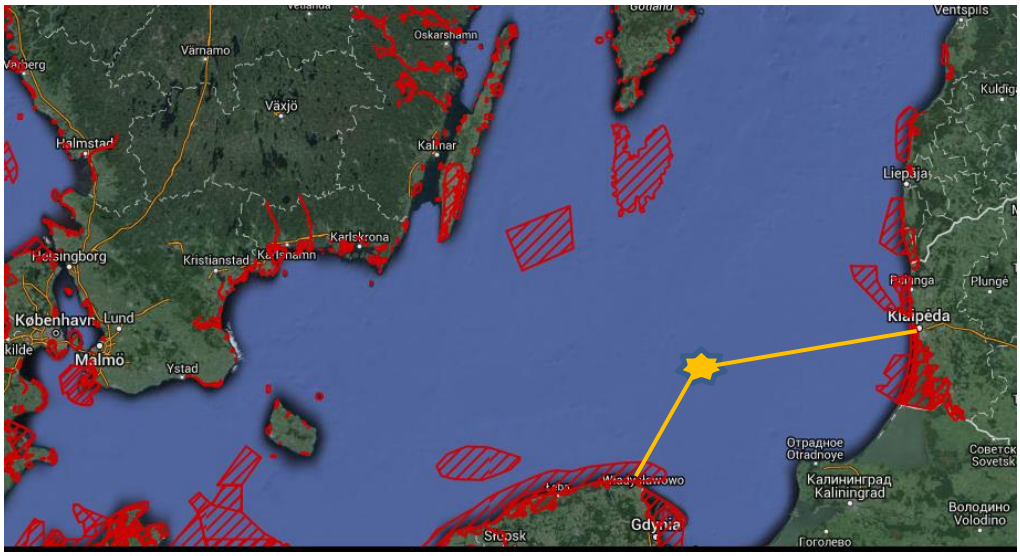

Figure 1. The location of the oil spill event (the location of the yellow star). The Natura2000 Areas (e.g., SPA) are marked with shadows.

The accident area is about 119 km northeast of Polish coast (Wladyslawowo) and 153 km west of Klaipeda, where there are Spatial Protected Areas in Natura2000.
The oil spill site has a water depth of about 86 meters.

2. The methods used

Two operational oil spill system are used for this case study. A continuous release of crude oil at the bottom of the sea is assumed in this event.

SMHI uses Seatrack Web (https://stw.smhi.se/) system to predict the drift of the oil spill. The system is developed by SMHI. HIROMB, is used as the ocean model, and the meteorological data is from the HIRLAM (HIgh Resoluted Limited Area weather Model), 2 days ahead with the horizontal grid resolution of 1 nautical miles, and ECMWF (the European Centre for Medium-Range Weather Forecasts), 5 days ahead with the horizontal grid resolution of 3 nautical miles.

DMI uses BSHdmod calculates oil drift and weathering. BSHdmod is an add-on module to the hydro-dynamical model HBM, and was also developed at the Bundesamt für Seeschiffahrt und Hydrographie, Hamburg, Germany, specifically for the North Sea - Baltic Sea. DMI has generalised BSHdmod, to it may be combined with other ocean models, and used in other regions.

Input data used for the oil drift forecast include wind forecasts from DMI operational forecasting model HIRLAM (hourly, 3km resolution) and currents forecast from HBM (15minutes, 3nm resolution).

3. The impact data

A digital geographical database of the location and nature of bathing beaches and Natura 2000 nature protection sites was obtained from HELCOM Natura 2000 (and is included and available into the EMODnet BSCP data portal - Figure 2, Figure 3)

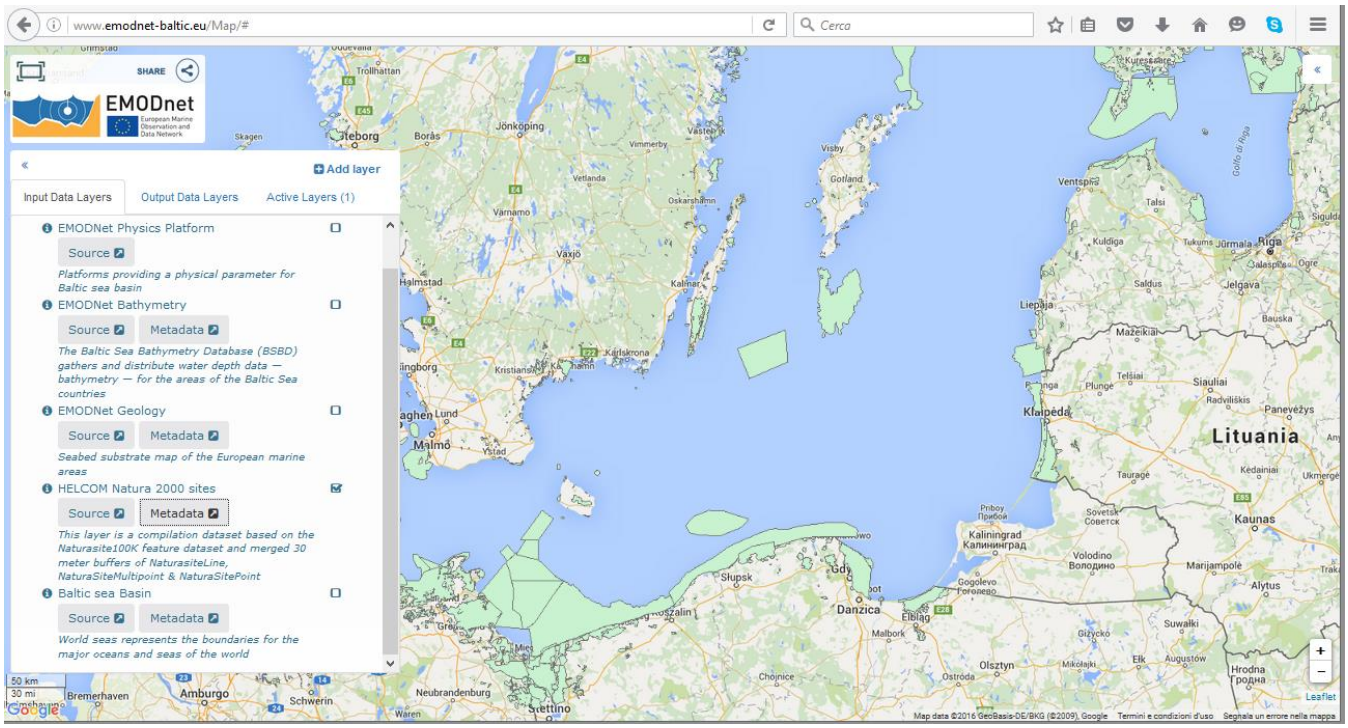

Figure 2. HELCOM Natura 2000 layer in the EMODnet BSCP (http://www.emodnet-baltic.eu/Map/)

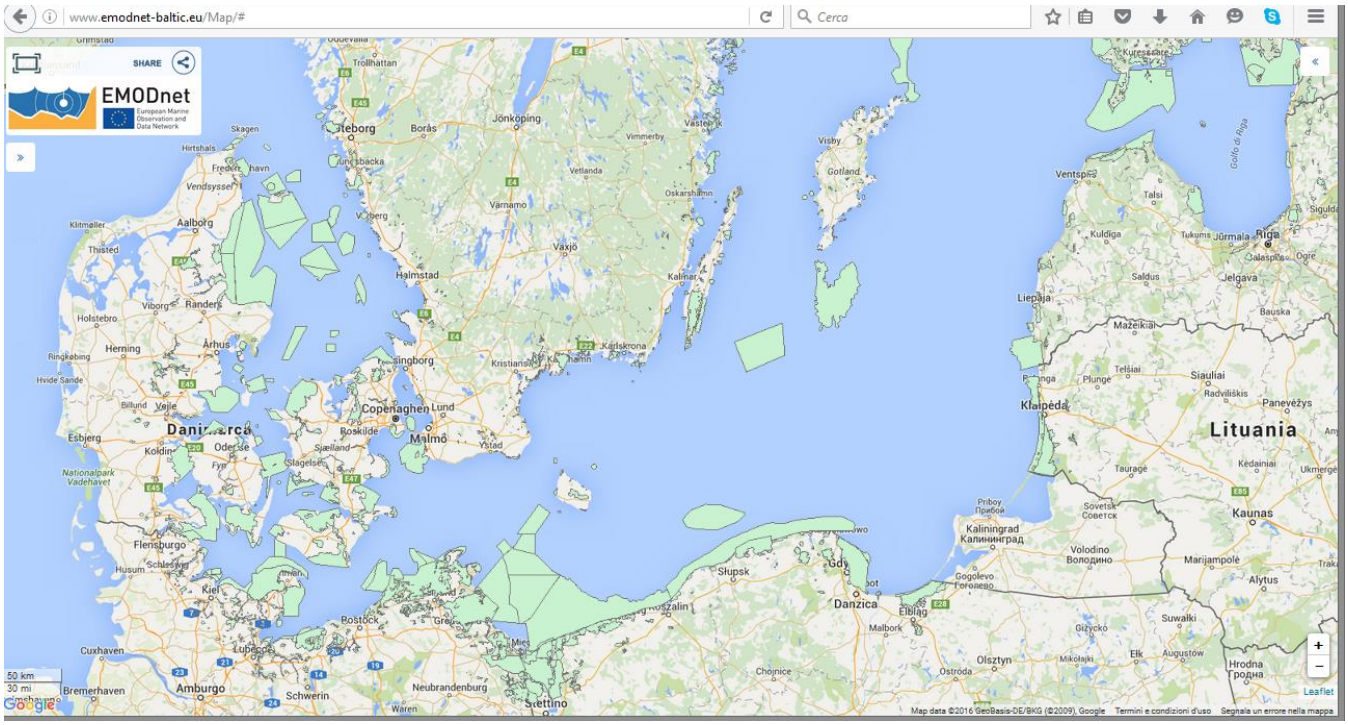

Figure 3. HELCOM Natura 2000 layer in the EMODnet BSCP (http://www.emodnet-baltic.eu/Map/)

The real-time ship traffic can be obtained from https://www.marinetraffic.com/dk/ais/home/centerx:17/centery:56/zoom:10 .
A snapshot in 2016051015CET is shown in Figure 4

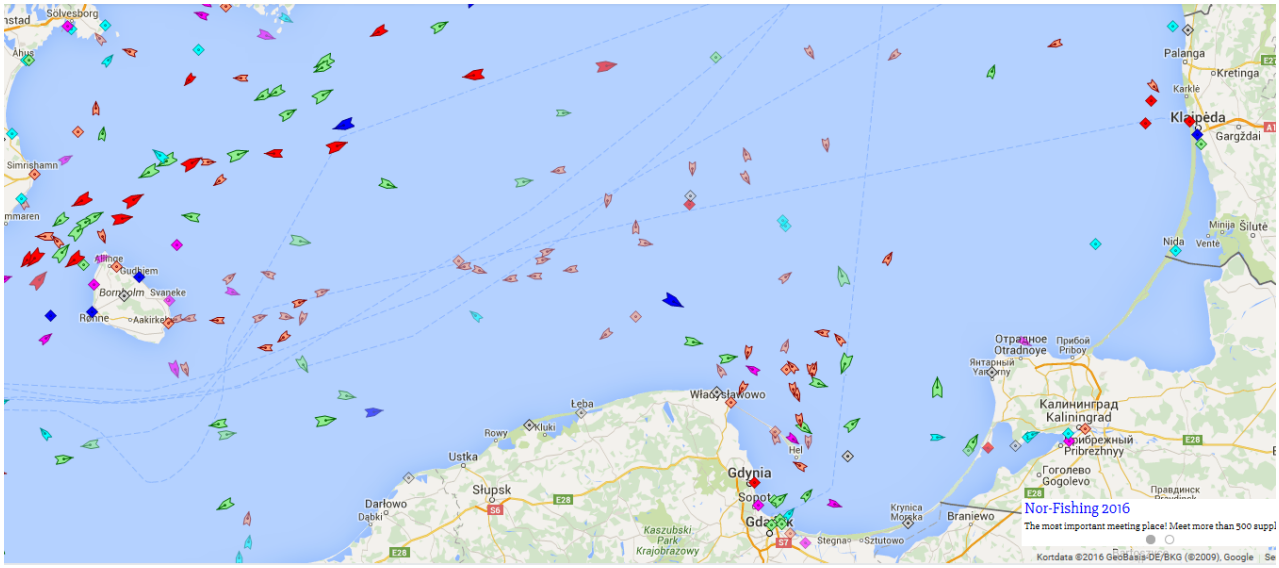

Figure 4. Ship traffic at 2016051015:15CET

4. Results after 24 hours

4.1 Weather and ocean conditions in the area

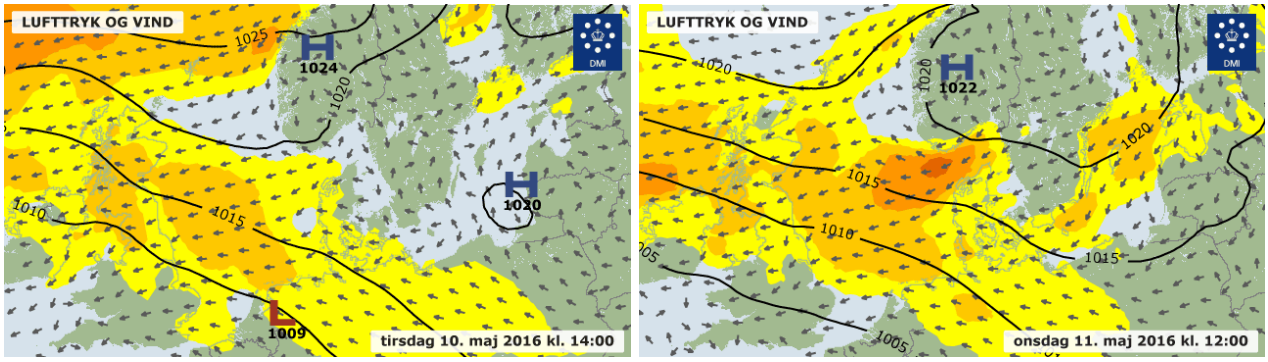

Figure 5. Pressure and wind forecast snap-shorts

The accident area is dominated by a high pressure system in the afternoon of 10 May. Good weather and sea state conditions will last to the noon of 11 May. The winds will then increase up to Scale 6 and waves to 1-2 meters in the Polish waters in the following 24 hours. The weather and sea state conditions are in general good for oil spill combatting activities.

4.2 Fate and transport of the leaked oil

SHMI runned two simulation forecasts: one using ECMWF/HIROMB with a horizontal grid resolution of 3 nautical miles and the other one using HIRLAM/ HIROMB with a horizontal grid resolution is 1 nautical miles. The results can be reached at:

For ECMWF: https://stw.smhi.se/oil/player/?id=5d5b114a-7c7f-45a0-b57d-d5e26af4161b

For HIRLAM: https://stw.smhi.se/oil/player/?id=2f33601c-948e-40e2-8f1d-e56eb4b756de

DMI runned a 96hour forecast by using a mixed HIRLAM and ECMWF weather forcing. Due to the calm weather condition, the oil does not drift too far from the incident site.

4.2.1 SMHI forecast (ECMWF model):

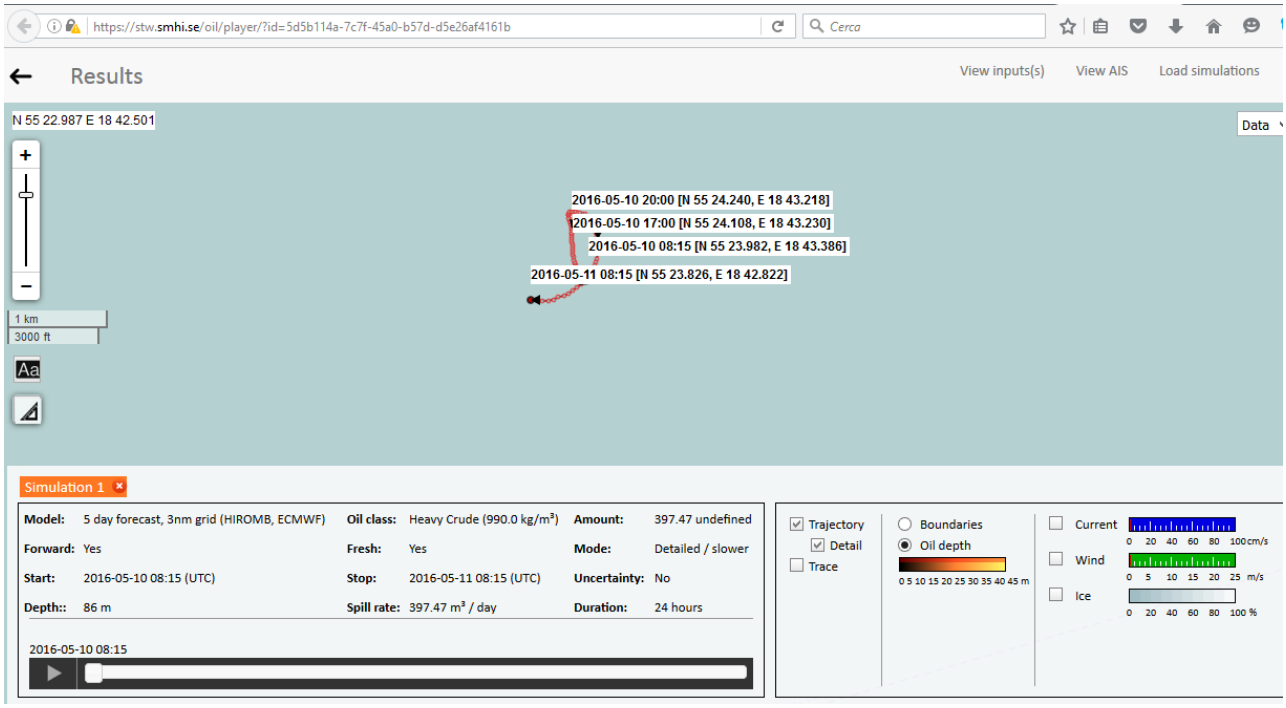

Figure 6. oil leak trajectory in 24h

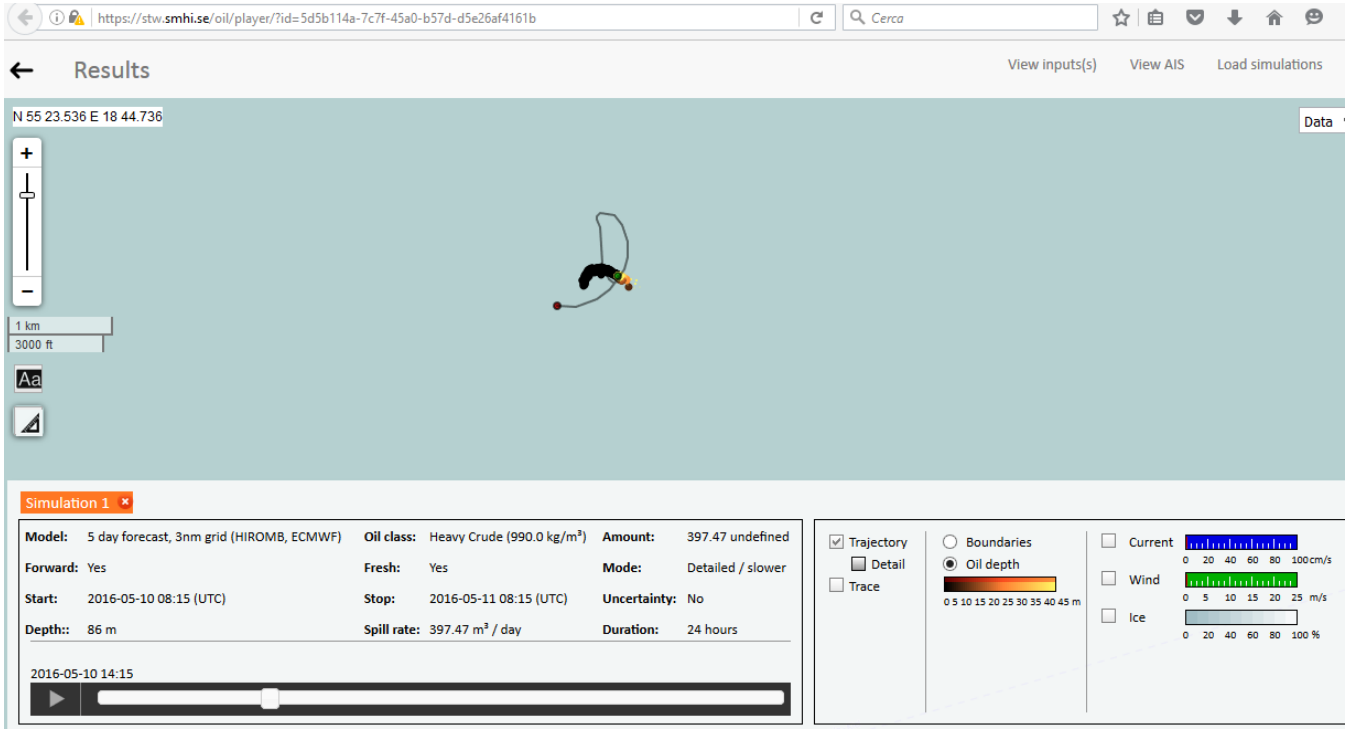

Figure 7. oil leak simulation after 6h 201605101415CET

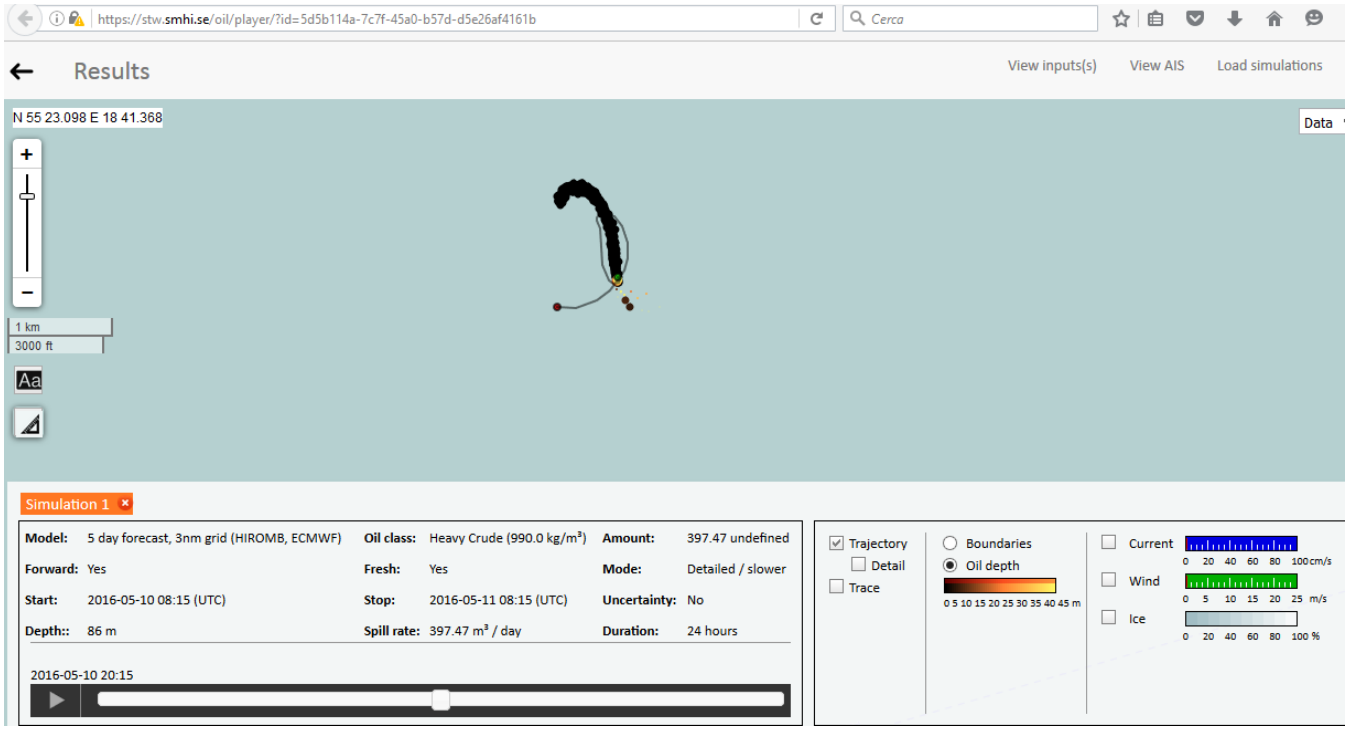

Figure 8. oil leak simulation after 12h 201605102015CET

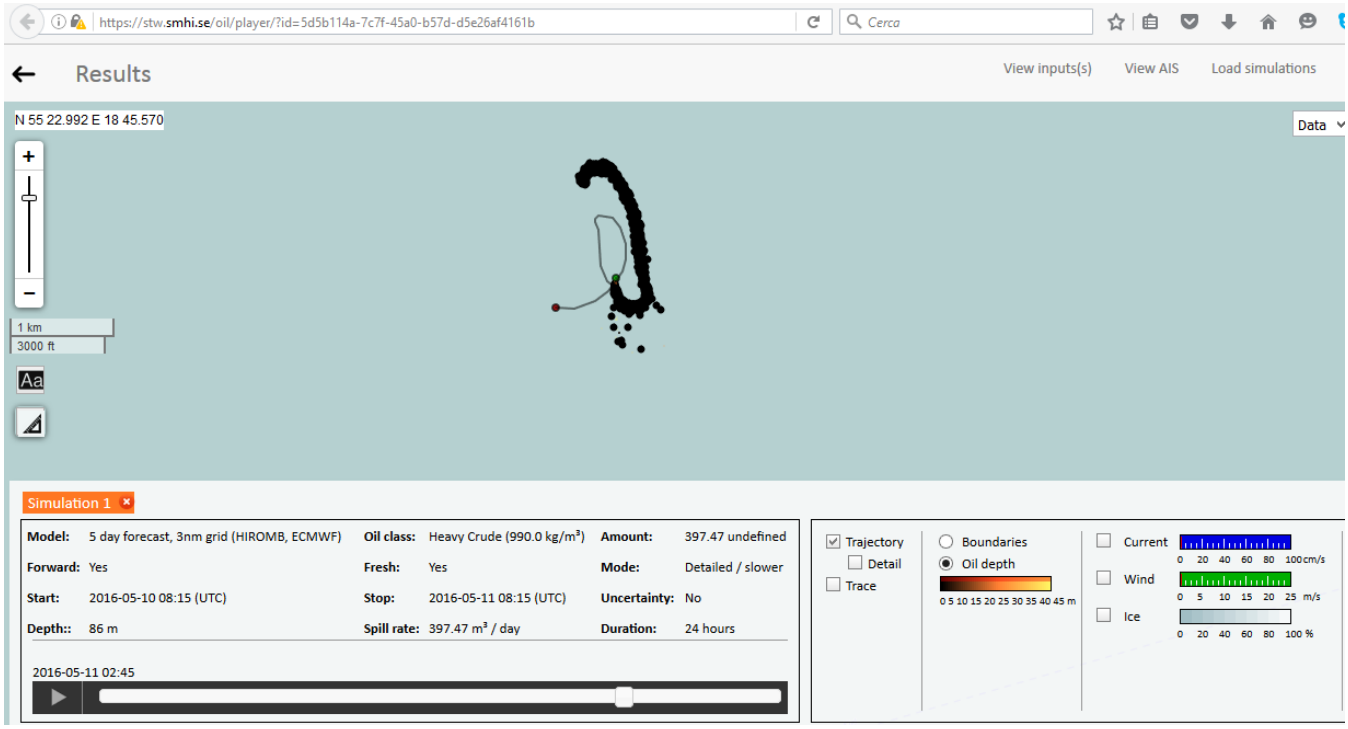

Figure 9. oil leak simulation after 18h 201605110215CET 02.15

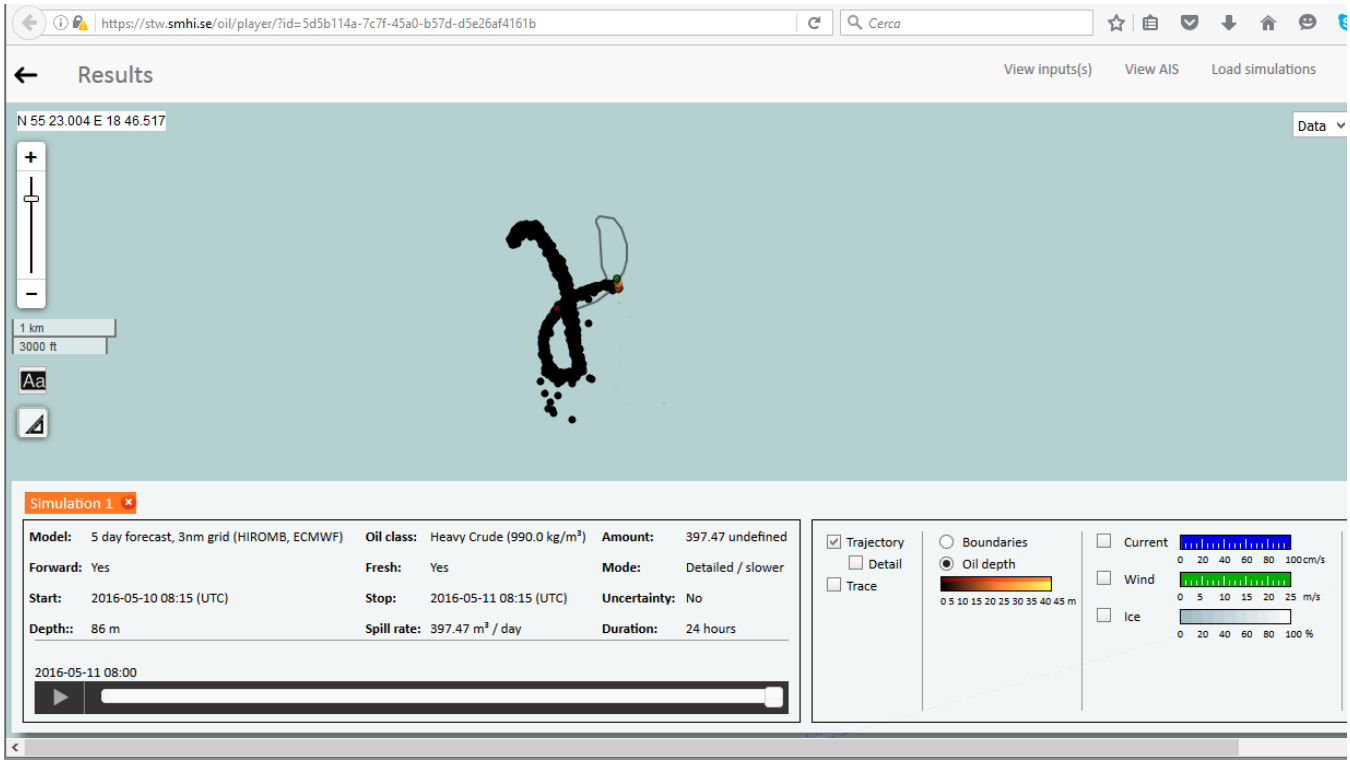

Figure 10. oil leak simulation after 24h 201605110815CET

4.2.2 SMHI forecast (HIRLAM model):

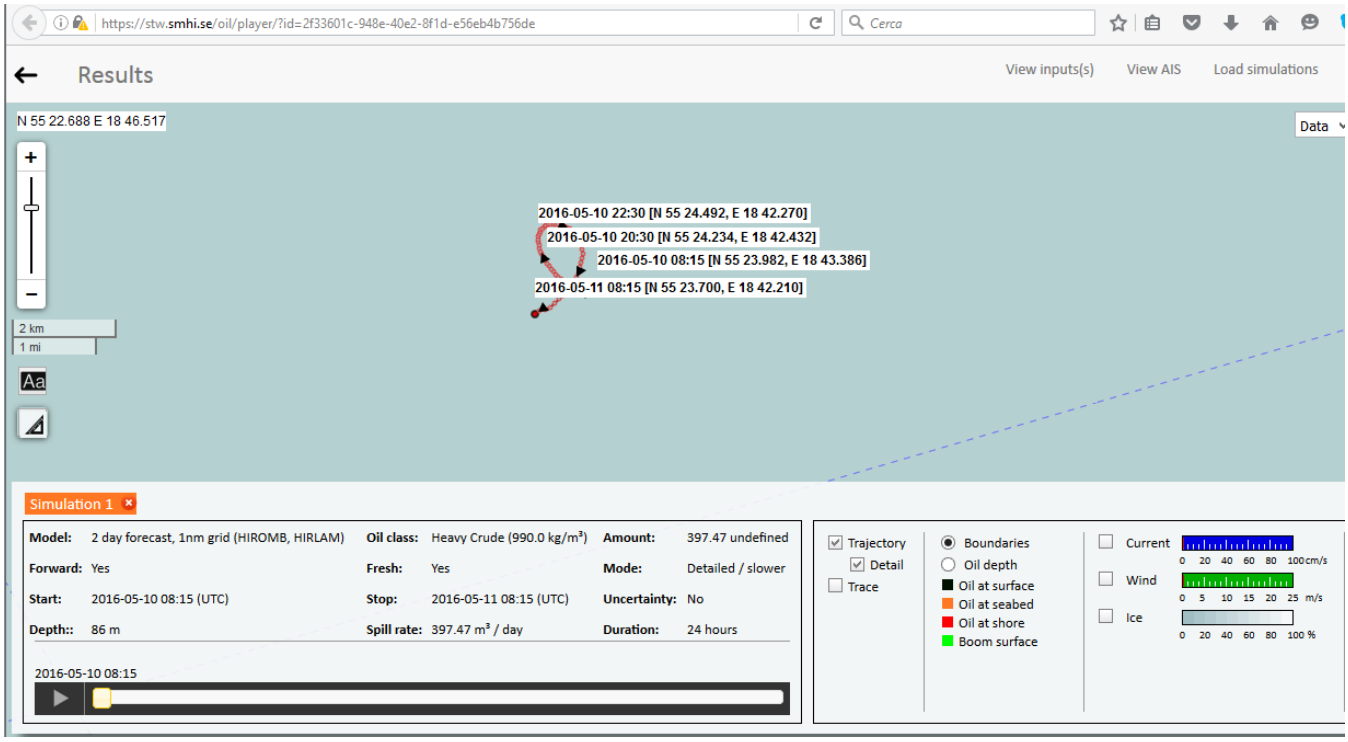

Figure 11. oil leak trajectory in 24h

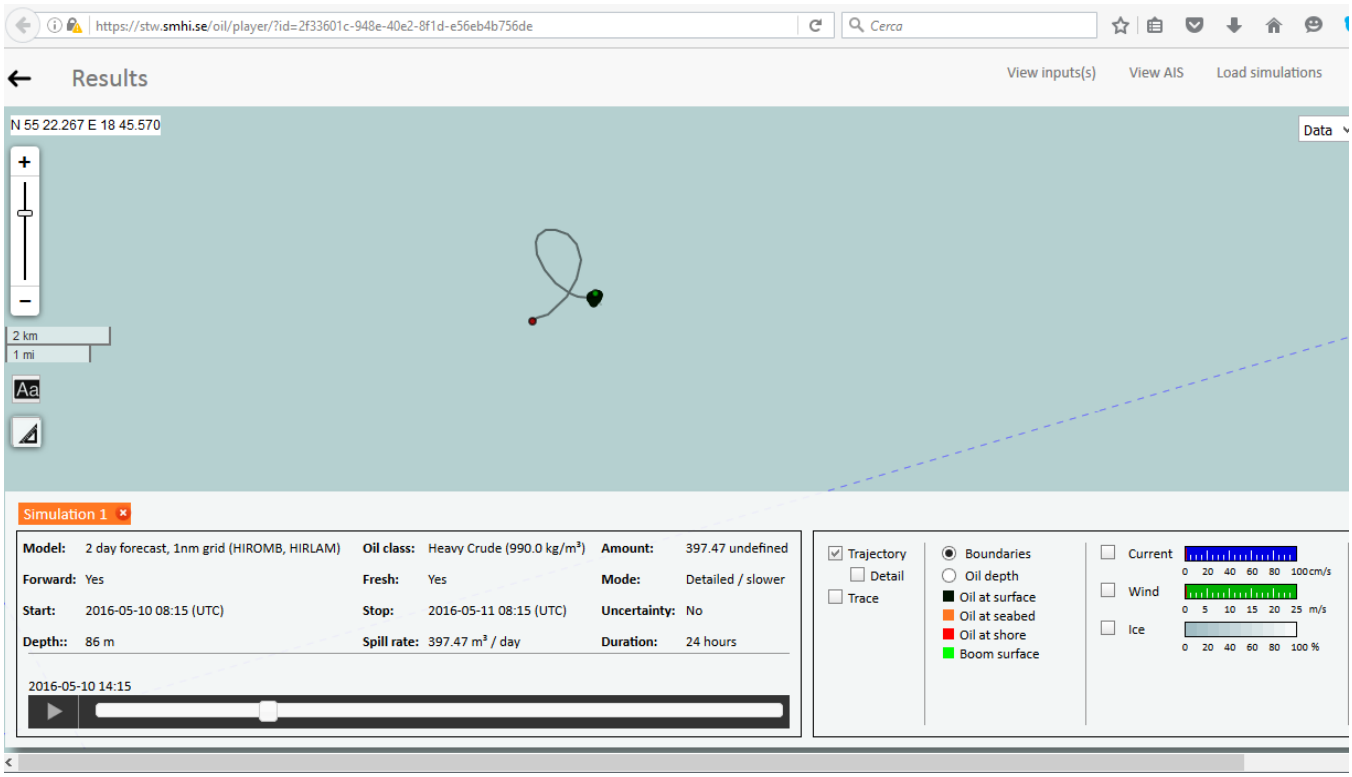

Figure 12. oil leak simulation after 6h 201605101415CET

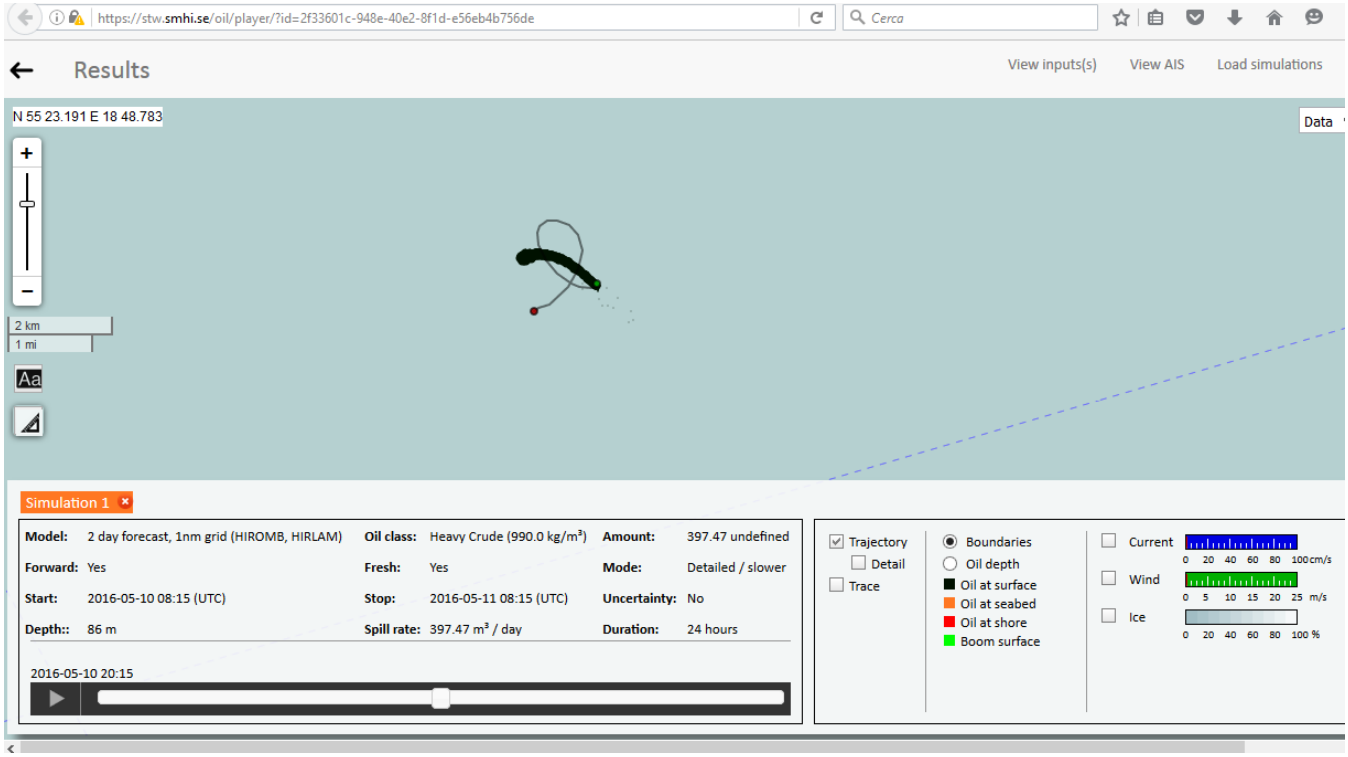

Figure 13. oil leak simulation after 12h 201605102015CET

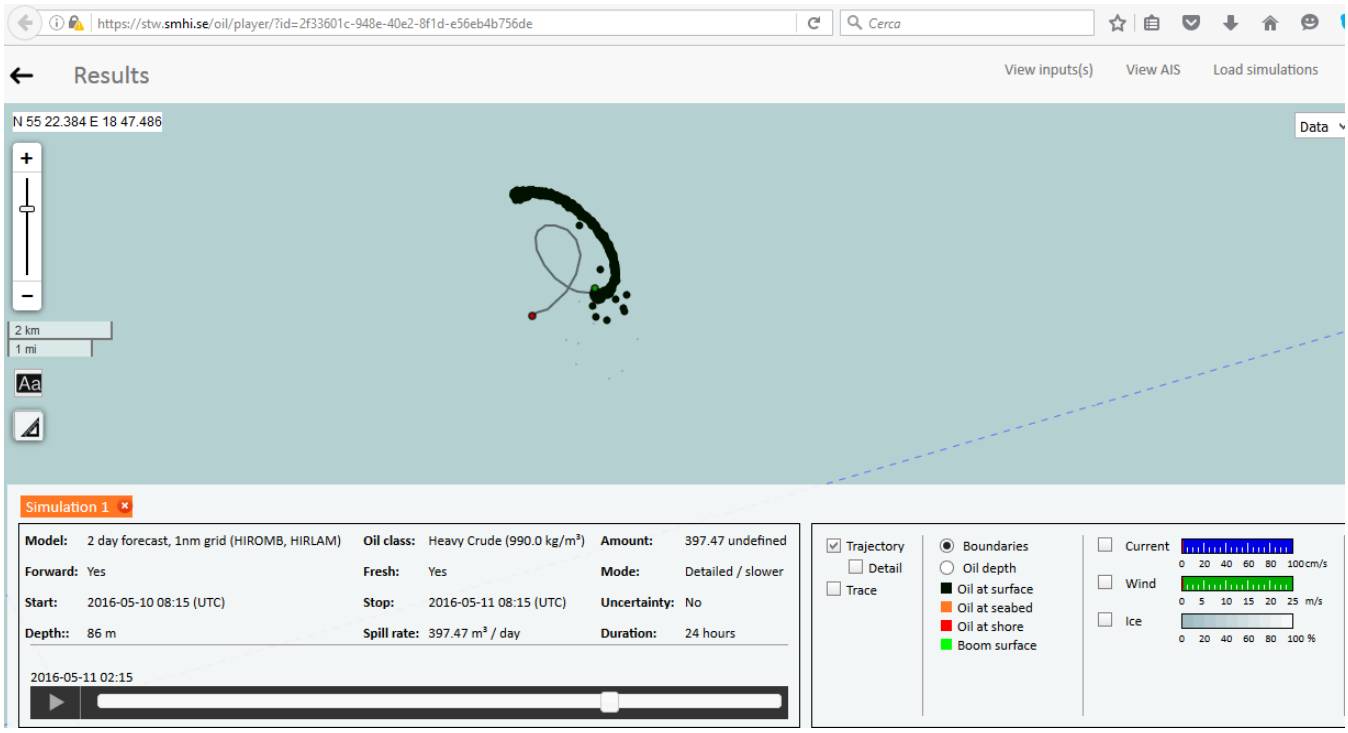

Figure 14. oil leak simulation after 18h 201605110215CET

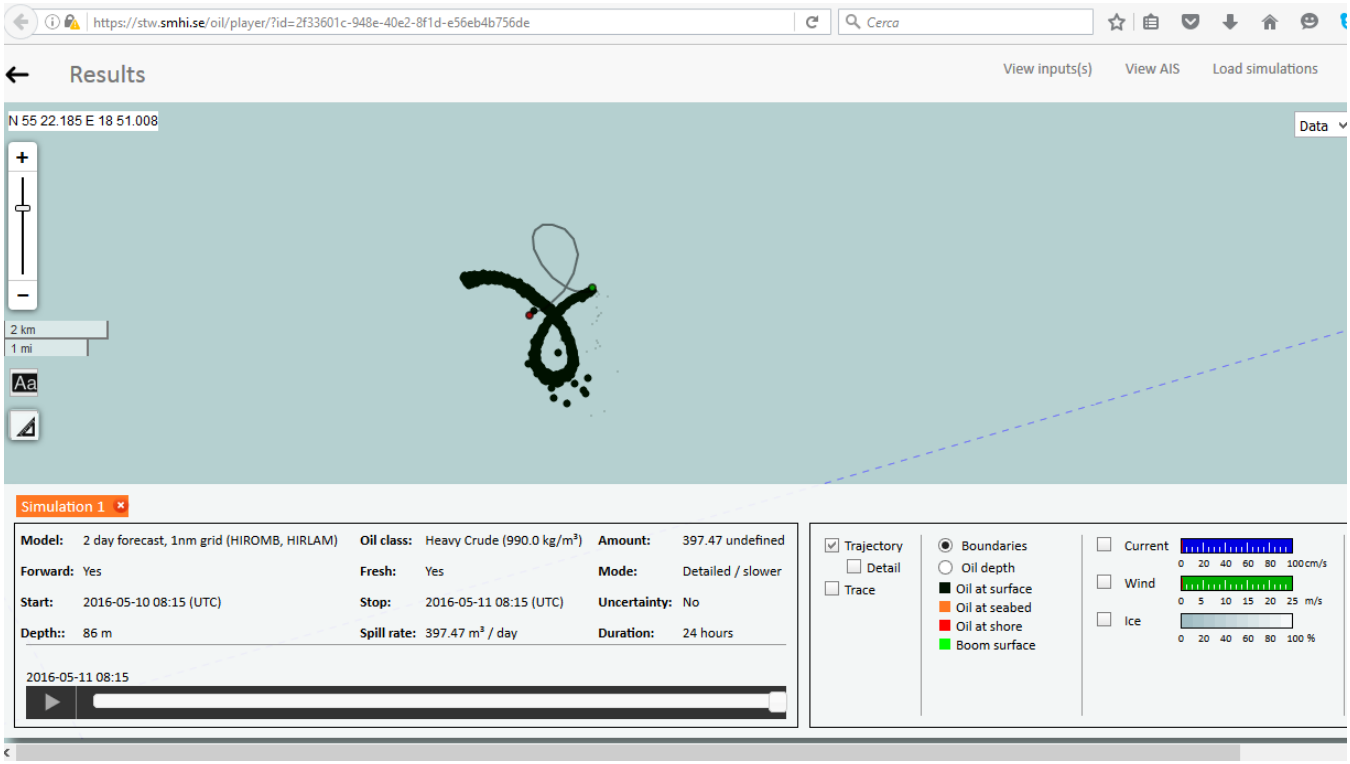

Figure 15. oil leak simulation after 24h 201605110815CET

4.2.3 DMI forecast:

DMI has made a 96hour forecast by using a mixed HIRLAM and ECMWF weather forcing. Due to the calm weather condition, the oil does not drift too far from the incident site. Figure 16shows the drift. The results show that during the first day, the oil drifts less than 10km, and at 96h after the spill, the oil will drift away about 60km.

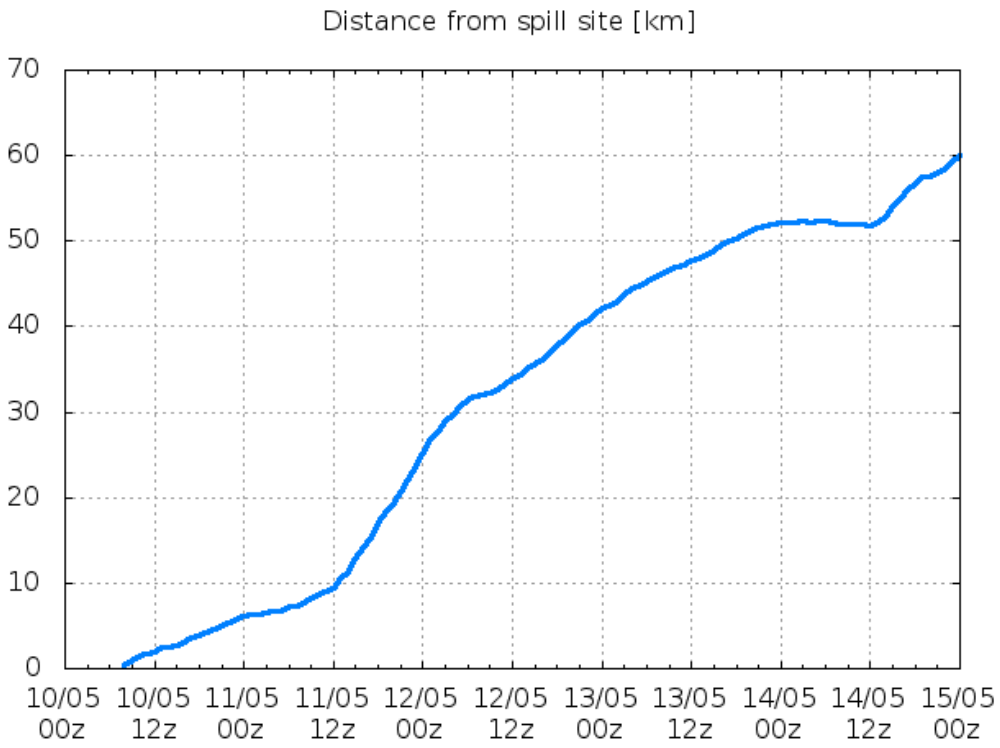

Figure 16. Distance of the oil drifting away from the spill site

The oil trajectories in the 96h forecast is shown Figure 17. The animation of oil spill trajectories can be found in BSCP portal.

Tracking centre of spill

Start time: 10-05-2016 07:15 UTC
End time: 14.05.2016 19:00 UTC
Crude Statfjord

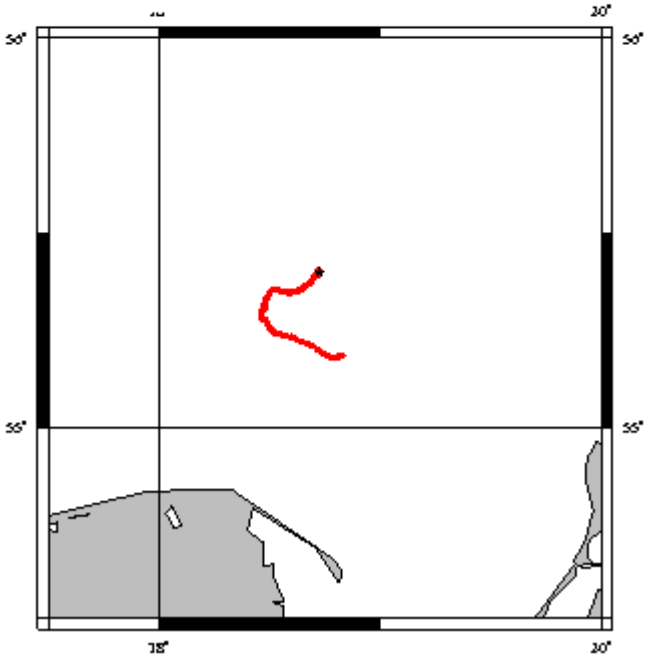

Figure 17. oil leak track

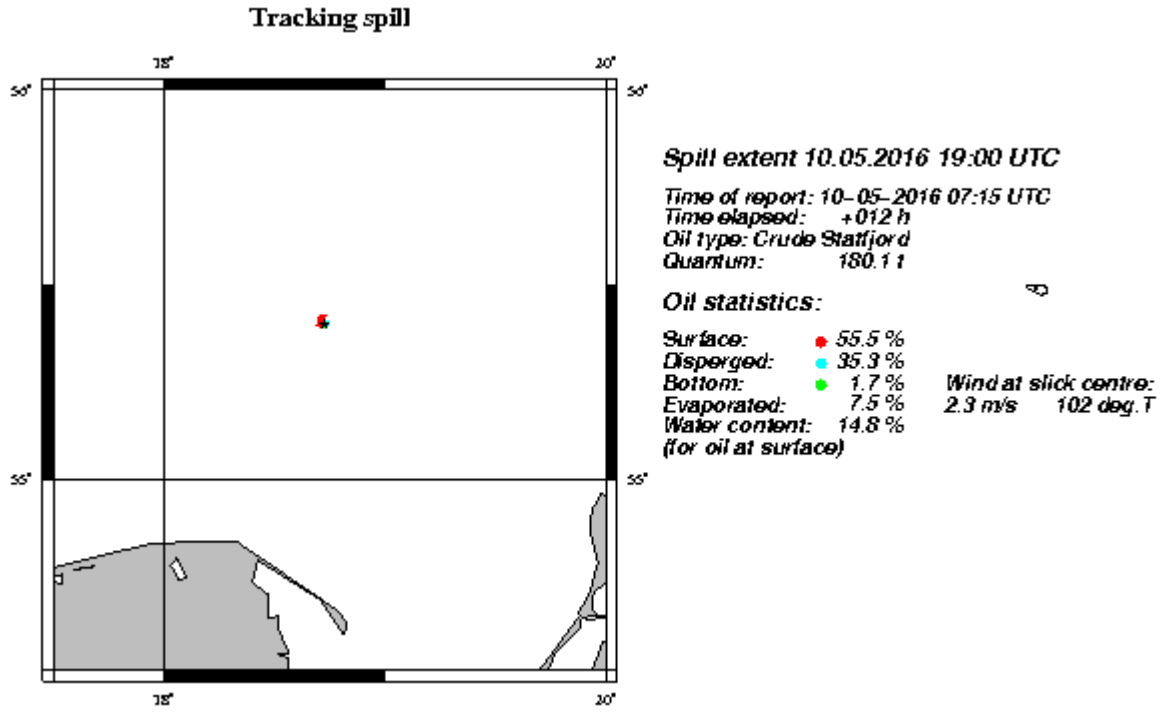

Figure 18. oil leak simulation after 11.45h 201605101900CET

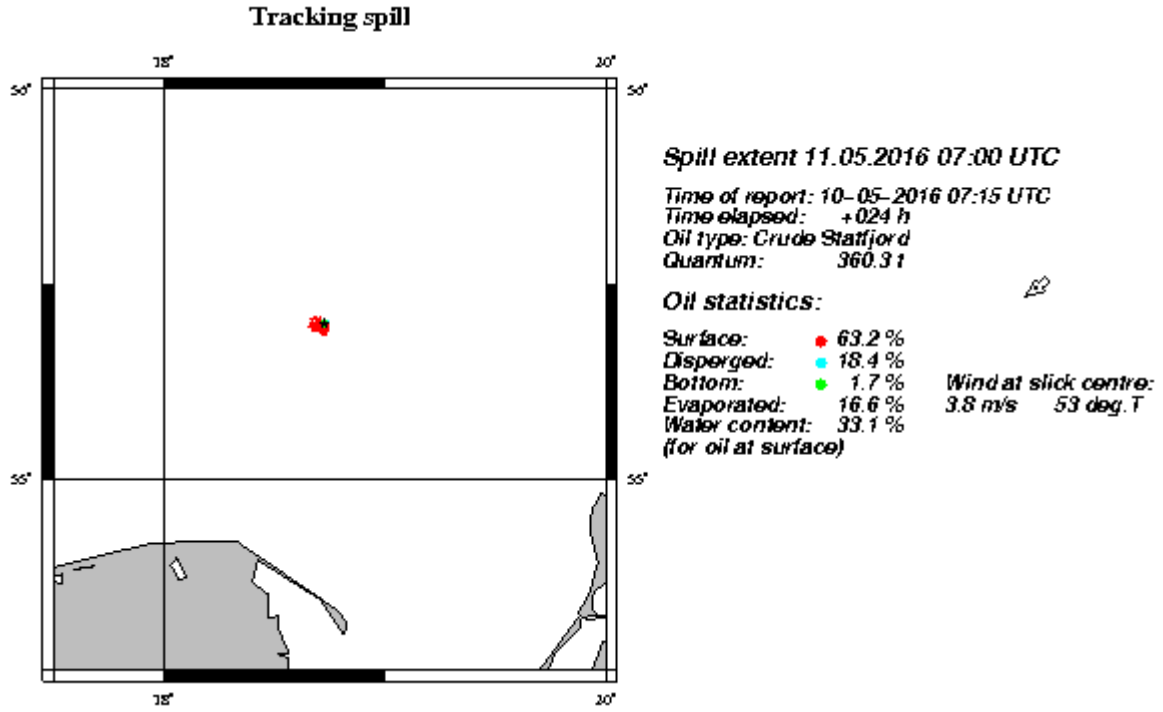

Figure 19. oil leak simulation after 20.45h 201605110700CET

As this is a spill at sea bottom, the vertical movement of the oil is also important. The total percentage of the oil at surface and bottom are shown in Figure 20. It is shown that major amount of oil moving to the surface in the first 24hours.

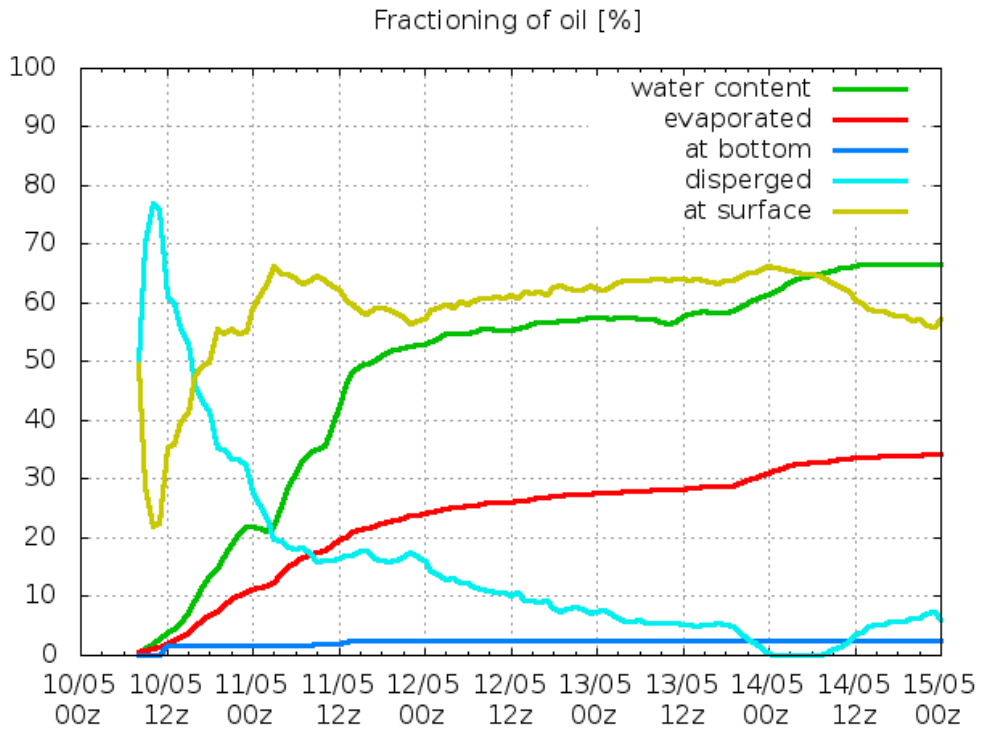

Figure 20. Percentage of oil characters in the 96-hour period after the oil spill

Figure 21 and Figure 22 are showing other oil characters e.g. volume etc.

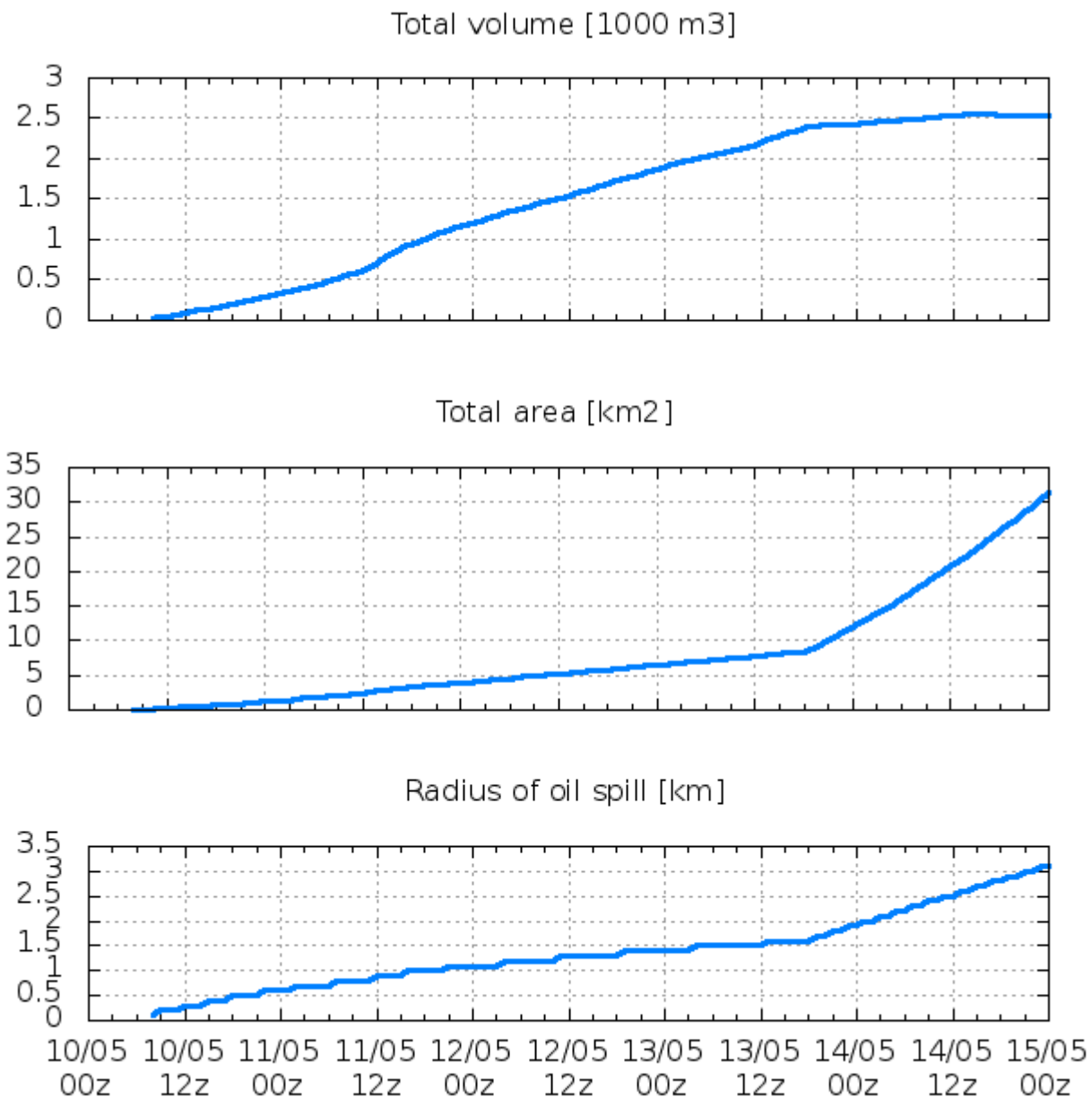

Figure 21. Forecast of Oil characteristics

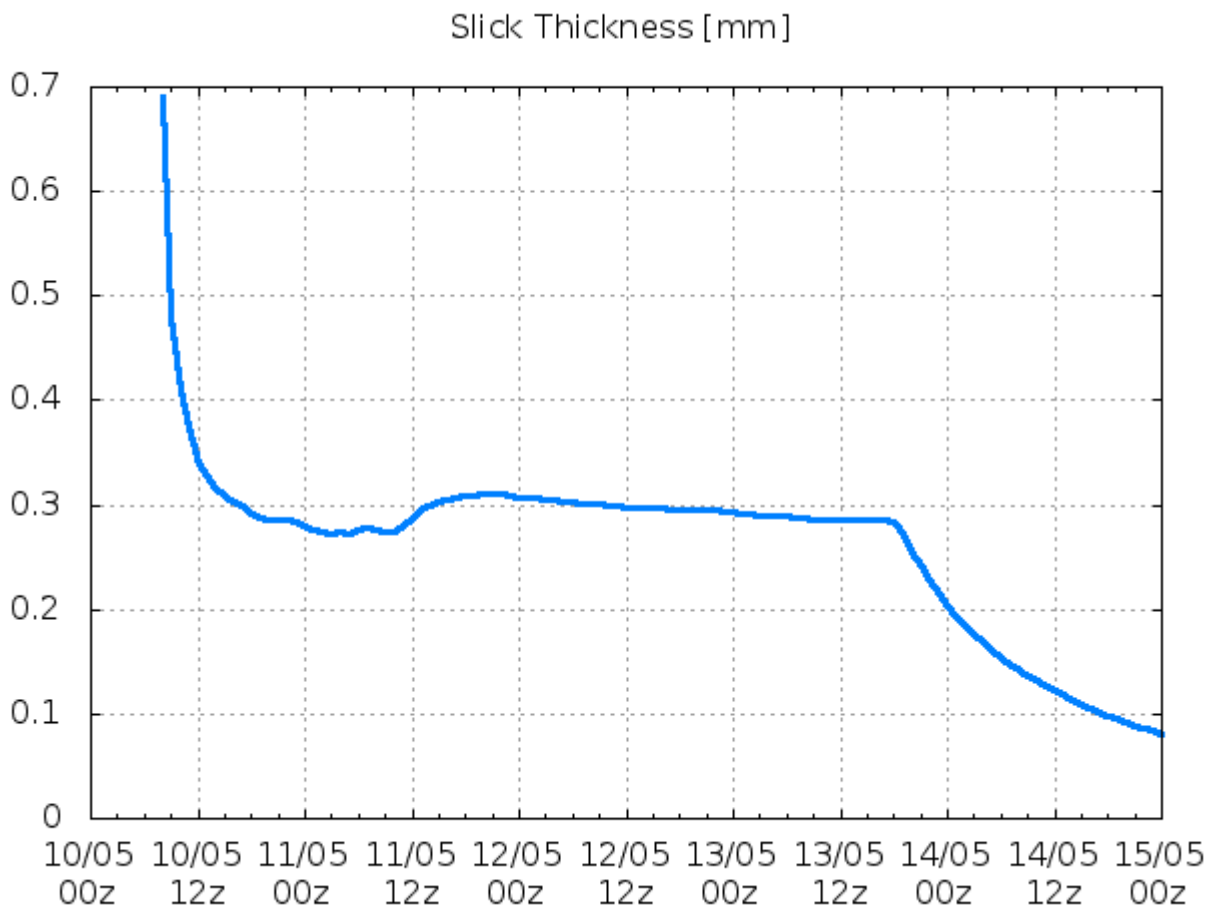

Figure 22. Forecast of Oil characteristics (continue)

4.3 Expected impact on environmental and human activity

Based on the forecasts made by DMI and SMHI, there will be no oil landing on the coast, and no impacts on the SPA areas in Natura2000. However, the impact on the marine ecosystems (especially benthic community and fishery) should be significant, and should be further investigated. The Baltic fishery has experienced a decline in last 30 years, as shown in Fig. 23 (data source, BSCP)

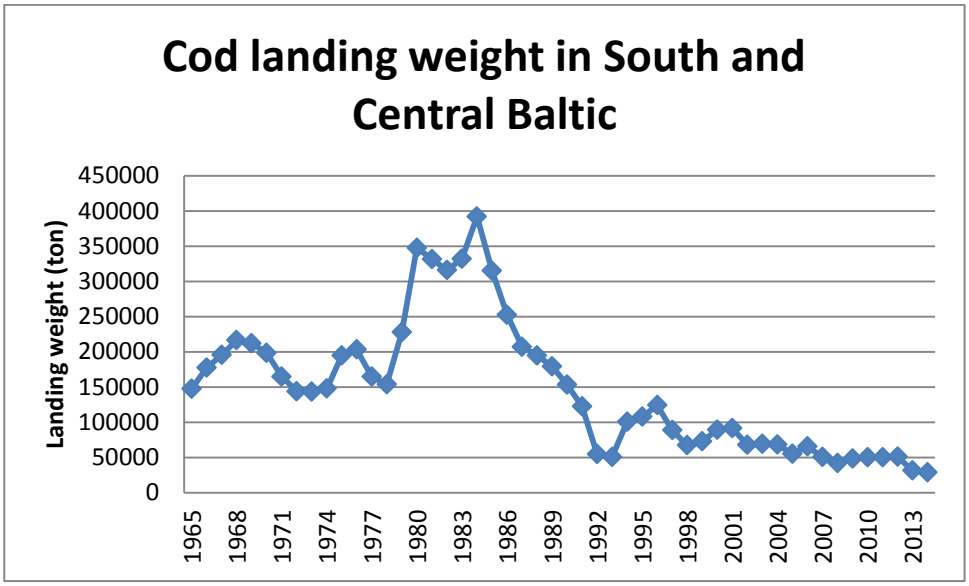

Figure 23 Cord landing weight in central and south Baltic Sea (ICES Subdivisions 25-32)

5. Results after 72hours

5.1 Fate and transport of the leaked oil:

5.2 Expected impact on environmental and human activity

5.3 Assumptions necessary to perform the assessment

5.4 Forecast analysis

To analyse the main factors which have strong influence on the outcomes of the fate and expected impact.

5.5 Bottlenecks and weaknesses

Bottlenecks and weaknesses of the assessment methodology and available tools, the data as well as the services required to perform the assessment: to be written in 72h report

5.6 Recommendations

Recommendations to improve existing data collection and provision services, including the content they offer and the way the service is delivered: to be written in 72h report

Annex X

List in annex if you wish to provide any additional information