SEA BASIN CHECKPOINT
LOT4: BLACK SEA

CHALLENGE 3–Oil Platform Leaks
Expert evaluation of Targeted Products

Total number of pages: 7

Workpakage:	CH03	**Oil Platform Leaks**
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Please use your own judgement to describe for each Targeted product of the assessment of the "fitness for purpose and use". For each Targeted product please comment on the following points:

1. Assign an overall product quality score with respect to scope (fitness for purpose) and explain why, according to the scale in **Error! Reference source not found.1**.
2. Identify the most important characteristic(s) for the Targeted Product quality (if all characteristics are important, please say so).
3. Identify which quality element(s) the most important characteristic(s) affects the Targeted Product quality.
4. Identify the limitations of the quality of the Targeted products due to the input data set used.
5. Explain which of the characteristics "most fails" to meet the scope of the Targeted Product.
6. Provide an expert judgement of the most important **gaps in the input data sets** for each Targeted Product.

SCORE	MEANING
1	EXCELLENT → completely meets the scope of the Targeted Product
2	VERY GOOD → meets more than 70% of the scope of the Targeted Product
3	GOOD → meets less than 50% of the scope of the Targeted Product
4	SUFFICIENT → does not adequately meet the scope but is a starting point
5	INADEQUATE → does not fulfill the scope and is not usable

Table 1. Targeted Products quality scores and their meaning.

Expert evaluation of Target Product quality

BLACKSEA_CH03_Product_1

1) The overall product quality score is **good (3)** for estimating the consequences of an oil spill 24 hours after the incident declared on 10th May 2016 by DG MARE. In order to compute the oil spill forecast in area of the interest and over a given period of time the hydrodynamic model outputs, bathymetry and geomorphology data, and environmental status data must have a rather high level appropriateness indicators as follows: (1) horizontal coverage; (2) temporal coverage; (3) horizontal resolution; (4) temporal resolution, (5) thematic accuracy, and (6) temporal validity. All these relevant indicators show a proper level for the BLACKSEA_CH03_Product_1.

According to the CH03 challenge's aim, the first Oil Platform Leak Bulletin was released on time, within 24 h after the DG MARE request. The bulletin included:

- likely trajectory of the slick at the sea surface,
- distribution of the dispersed oil fraction,
- subsurface behavior of the blowout,
- conclusion that the oil did not reach the coastlines,
- oil mass balance graph showing the distribution of the oil in the environment as a function of time,
- local sea surface currents in the leak area,
- wind speed in the oil mass center.

2) The product is based on the relevant UDs as follows:

- Bathymetry and Elevation | Sea-floor depth (below mean sea level) {bathymetric depth} in the water body by derivation from GEBCO_08 30 arc-second global grid | British Oceanographic Data Centre | General Bathymetry Chart of the Oceans (GEBCO);

- -Horizontal velocity of the water column (currents) | Eastward current velocity in the water body | seamod | SEAMOD.RO - Forecasts for the Black Sea;
- Horizontal velocity of the water column (currents) | Northward current velocity in the water body | Wave height and period statistics | Direction of waves on the water body | Orion | WAM Cycle 4 wave model - Black Sea;
- Temperature of the water column | Temperature of the water body | Seamod | SEAMOD.RO - Forecasts for the Black Sea;
- Wind strength and direction | Eastward wind velocity in the atmosphere | Institute of Accelerating Systems and Applications (IASA-UAT) | SKIRON meteorological model - Black Sea;
- Wind strength and direction | Northward wind velocity in the atmosphere | Institute of Accelerating Systems and Applications (IASA-UAT) | SKIRON meteorological model - Black Sea;
- Wave height and period statistics | Significant height of waves {Hs} on the water body | Orion | WAM Cycle 4 wave model - Black Sea;
- Wave height and period statistics | Average zero crossing period of waves {Tz} on the water body | Orion | WAM Cycle 4 wave model - Black;
- Geological sample density | Oil API | Orion | oilbase.txt;
- Coastal geomorphology | Coast Type | European Marine Observation and Data Network (EMODNET) | EMODnet Seabed substrate;
- Bathymetry and Elevation | Sea-floor depth (below mean sea level) {bathymetric depth} | European Marine Observation and Data Network | EMODnet - Digital Terrain Model (DTM).

3) The crucial elements for the quality of the product are: horizontal resolution of sea currents, SST and waves (~3 km), and temporal resolution of 6 hours for currents and SST, 1 hour for wind fields, and 3 hours for waves.

4) The limitations of the product quality are not described by the appropriateness indicators, and are related to not using the UDs on a full basis, as was planned initially. More specifically, the oil spill forecast was calculated by only one Lagrangian model, MEDSLIK. While MEDSLIK-II supplementary calculation was not conducted due to some technical problems. Additionally, the product did not include the environmental consequence of the spill due to some urgency in first bulletin delivery.

5) The product is based on 6 PO2 (Bathymetry and Elevation, Geological sample density, Horizontal velocity of the water column (currents), Temperature of the water column, Wave height and period statistics, Wind strength and direction) which meet completely the scope of the Targeted product.

6) The most important gap is not using the UDs that was planned for MEDSLIK-II calculations as follows:

- Horizontal velocity of the water column (currents) | Eastward current velocity in the water body | Black Sea Forecasting System - hourly forecast |;
- Horizontal velocity of the water column (currents) | Northward current velocity in the water body | Black Sea Forecasting System - hourly forecast |;
- Wind speed and direction | Eastward wind velocity in the atmosphere | Max Planck Institute for Meteorology (MPI-M) | ECMWF_12.5km_6h forecast |;
- Wind speed and direction | Northward wind velocity in the atmosphere | Max Planck Institute for -Meteorology (MPI-M) | ECMWF_12.5km_6h forecast |;
- Temperature of the water column | Temperature of the water body | Black Sea Forecasting System - hourly forecast.
- Thus, the product score is **GOOD**.

BLACKSEA_CH03_Product_2

1) The overall product quality score with respect to scope is **very good (2)**. Using two model predictions instead of one would have reduced the forecast uncertainties.

According to the CH03 challenge's aim, the second Oil Platform Leak Bulletin was released on time, within 72 h after the DG MARE request. The bulletin included:

- likely trajectory of the slick at the sea surface,
- distribution of the dispersed oil fraction,
- subsurface behavior of the blowout,
- conclusion that the oil did not reach the coastlines,
- oil mass balance graph showing the distribution of the oil in the environment as a function of time,
- local sea surface currents in the leak area,
- wind speed in the oil mass center,
- level of potential impact of the oil slick on the environment and human activity based on bathymetry; coastal and seabed geomorphology; environmental resources and fish stock; shipping lanes; and the European protected areas.

2) The product is based on the relevant UDs as follows:

- Bathymetry and Elevation | Sea-floor depth (below mean sea level) {bathymetric depth} in the water body by derivation from GEBCO_08 30 arc-second global grid | British Oceanographic Data Centre | General Bathymetry Chart of the Oceans (GEBCO);
- Horizontal velocity of the water column (currents) | Eastward current velocity in the water body | seamod | SEAMOD.RO - Forecasts for the Black Sea;
- Horizontal velocity of the water column (currents) | Northward current velocity in the water body | seamod | SEAMOD.RO - Forecasts for the Black Sea;
- Temperature of the water column | Temperature of the water body | Seamod | SEAMOD.RO - Forecasts for the Black Sea;
- Wind strength and direction | Eastward wind velocity in the atmosphere | Institute of Accelerating Systems and Applications (IASA-UAT) | SKIRON meteorological model - Black Sea;
- Wind strength and direction | Northward wind velocity in the atmosphere | Institute of Accelerating Systems and Applications (IASA-UAT) | SKIRON meteorological model - Black Sea;
- Wave height and period statistics | Significant height of waves {Hs} on the water body | Orion | WAM Cycle 4 wave model - Black Sea;
- Wave height and period statistics | Direction of waves on the water body | Orion | WAM Cycle 4 wave model - Black Sea;
- Wave height and period statistics | Average zero crossing period of waves {Tz} on the water body | Orion | WAM Cycle 4 wave model - Black;
- Geological sample density | Oil API | Orion | oilbase.txt;
- Coastal geomorphology | Coast Type | European Marine Observation and Data Network (EMODNET) | EMODnet Seabed substrate;
- Bathymetry and Elevation | Sea-floor depth (below mean sea level) {bathymetric depth} | European Marine Observation and Data Network | EMODnet - Digital Terrain Model (DTM).
- Habitat extent | Marine Protected Areas | European Environment Agency (EEA) | Natura 2000 data - the European network of protected sites;
- Bathymetry and Elevation | Sea-floor depth (below mean sea level) {bathymetric depth} | European Marine Observation and Data Network | EMODnet - Digital Terrain Model (DTM);
- Terrestrial mapping | Coastline | European Environment Agency | EEA coastline for analysis .

3) The crucial elements for the quality of the product are the same: horizontal resolution of sea currents, SST and waves (~3 km), and temporal resolution of 6 hours for currents and SST, 1 hour for wind fields, and 3 hours for waves. Additionally, horizontal coverage of coastal geomorphology, terrestrial mapping, and Habitat extent are also very relevant.

4) The limitations of the product are related again to one model computing instead of two model computing.
5) The product is based on 9 PO2 (Bathymetry and Elevation, Coastal geomorphology, Geological sample density, Habitat extent, Horizontal velocity of the water column (currents), Temperature of the water column, Terrestrial mapping, Wave height and period statistics, Wind strength and direction) which meet completely the scope of the Targeted product.
6) The gap is not using the UDs that was planned for MEDSLIK-II calculations initially.Thus, the product score is **VERY GOOD**.