Towards NOOS-Drift, a multi-models ensemble system to assess and improve drift forecast accuracy

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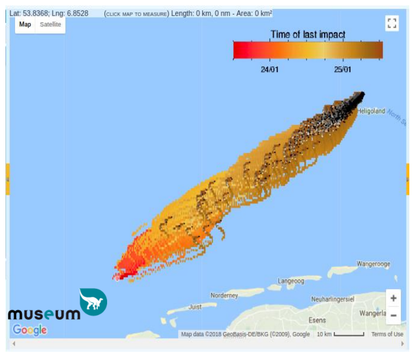
Introduction

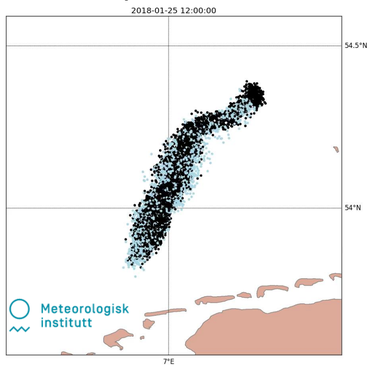
Drift models are multi-purpose tools that can forecast the drift trajectory of any objects, substances or resources that are drifting at the sea surface or in the water column. Typically activated several hundreds to several thousands of times per year and per country, drift models are among the most valuable tools in the day to day management of the coastal and marine environment, marine resources and maritime safety. However, in order to better assess risk and impacts, the end-users benefiting from these drift services also often request to get accurate and reliable estimation of the uncertainty in the drift forecast.

How to estimate drift forecast uncertainty?

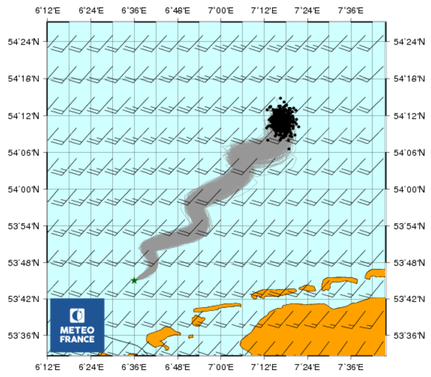
Oserit



OpenDrift



MOTHY



In this example, 3 different state-of-the-art drift models have been run with their standard met-ocean forcing in order to simulate the drift and fate of a hypothetical oil slick (light crude oil, 50m³) observed off the Borkum Island on the 23rd of January 2018 at 12:00 UTC. The met-ocean conditions were rather rough as the wind strengthened in the next hours, raising from 7 Bft (high wind) to 9 Bft (severe gale) and the significant waves height peaked up to 2.5m.

Snapshot of 3 different drift models forecasts of a hypothetical oil slick after 48 hours adrift in gale conditions

- **No unified visualization leads to difficulties to interpret model results.**
- **The multi-models ensemble spread is likely the best proxy to estimate drift forecast uncertainty.**

NOOS-Drift added-value

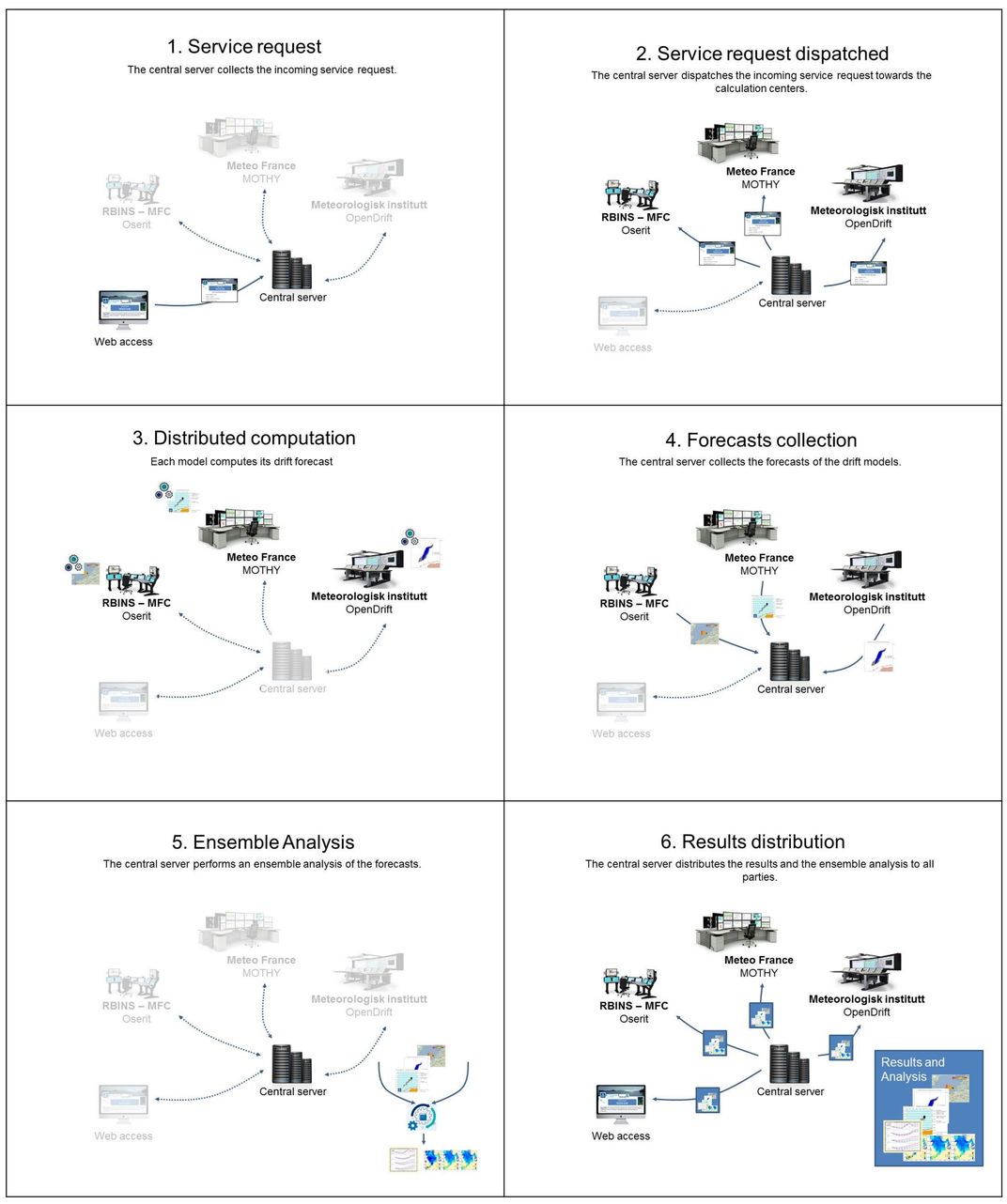
NOOS-Drift aims at developing and operating a transnational multi-models ensemble system that can produce drift forecast on demand.

Service objectives:

- ✓ To develop a set of quantified indicators on drift trajectory accuracy, estimated from the spread of the different drift models forecast connected to NOOS-Drift;
- ✓ To discriminate which differences are due to different trajectory models and which are due to different forcing data;
- ✓ To help identify possible outliers;
- ✓ To improve the end-users trust in the drift model results and help guide them in their decision making process, a real need expressed by users

Service domain :

- ✓ The whole European North West Shelf Seas, with a focus on the territorial waters and exclusive economic zones of Belgium, France and Norway.
- ✓ NOOS members from Denmark, Germany, The Netherlands and Ireland have already expressed interest to join the system once developed and validated.



Acknowledgment This study is being conducted using **E.U. Copernicus Marine Service Information**.

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