

NOOS contribution to operational oil drift and fate operational modelling in North Sea

Sébastien Legrand (MUMM)

and the members of the “NOOS working group on drift”:

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L. de Vries (SMHI), V. Dulière (MUMM), J.R. Hendriks (RWS),
L. Hole (met.no), F. Kleissen (Deltares), J. Mattsson (FCOO),
S. Massmann (BSH), J. Ozer (MUMM), J. Rees (CEFAS).

Contents

accident

Shared status: Shared [UNSHARE]

Start date: 05 Dec 2012 18:30 UTC
Max. End date: 08 Dec 2012 18:30 UTC
Submitted on: 05 Dec 2012 20:46 UTC

OIL 2D F → View all parameters

Controls

GIS layers

Simulation layers

For clarity, you can only select one layer at a time.
Select a model output then any corresponding option(s).

MODEL OUTPUT
Full trajectory

DEPTH
Surface Column Bottom

CONCENTRATION ABOVE
0ppm

ZOOM TO SIMULATION LAYER

OPTOS layers

Date/time: -- CHOOSE --

UPDATE MAP

Download simulation results

Simulation: -- CHOOSE -- Launch visualisation

Lat: 51.6555; Lng: 3.0350 (CLICK ON MAP TO MEASURE) Length: 0 km - Area: 0 km²

Map Satellite

Time of first impact

06/12 07/12 08/12

Naaldwijk Naassluis Hellevoetsluis Ouddorp Hanngvliet Middelhamnis Burgh-Haamstede Oosterschelde Zierkzee Oosterschelde Steenberg Domburg Oosterschelde Middelburg E312 Goes Yerseke 's-Gravenpolder Vlissingen N62 's-Gravenpolder Breskens Terneuzen Axel E34 Beveren Sint-Niklaas E31 E312 A4 A18 A10 A10

Knokke-Heist Oostburg Damme E34 Brugge Maidegem Eeklo Zelzate A11 Stekene Oostende Middelkerke Jabbeke Zedelgem Beemem Koksijde

Western Scheldt Westerschelde

Map data © 2012 GeoBasis-DE/BKG (©2009), Google - Terms of Use

1. NOOS in a glance

2. Oil drift modelling services in North Sea

3. NOOS contributions



NOOS

24 institutes from 9 pays bordering the greater North Sea



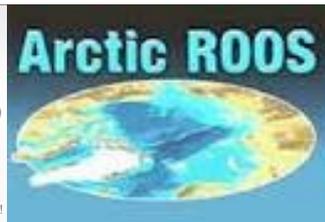
NW Shelf Operational Oceanographic System

www.noos.cc

Objectives :

Coordination, cooperation et co-production

- **Cooperation** focus on improved national and regional services and products
- Regional **coordination** of **observing networks** and data transfer for internal and external usage
- Regional **coordination** of marine **modelling services**
- Development mainly funded by EU projects based on euroGOOS and ROOSs structure.



Organisation:

8 services and 3 working groups

8 services and projects:

- **In-situ observations:**

- Real-time observations of **water level**
- Real-time observations of **waves**
- Observations of **temperature, salinity, bio-geo-chemical** parameters
- Observations of **rivers discharges**
- **Data portal**

- **Model forecast :**

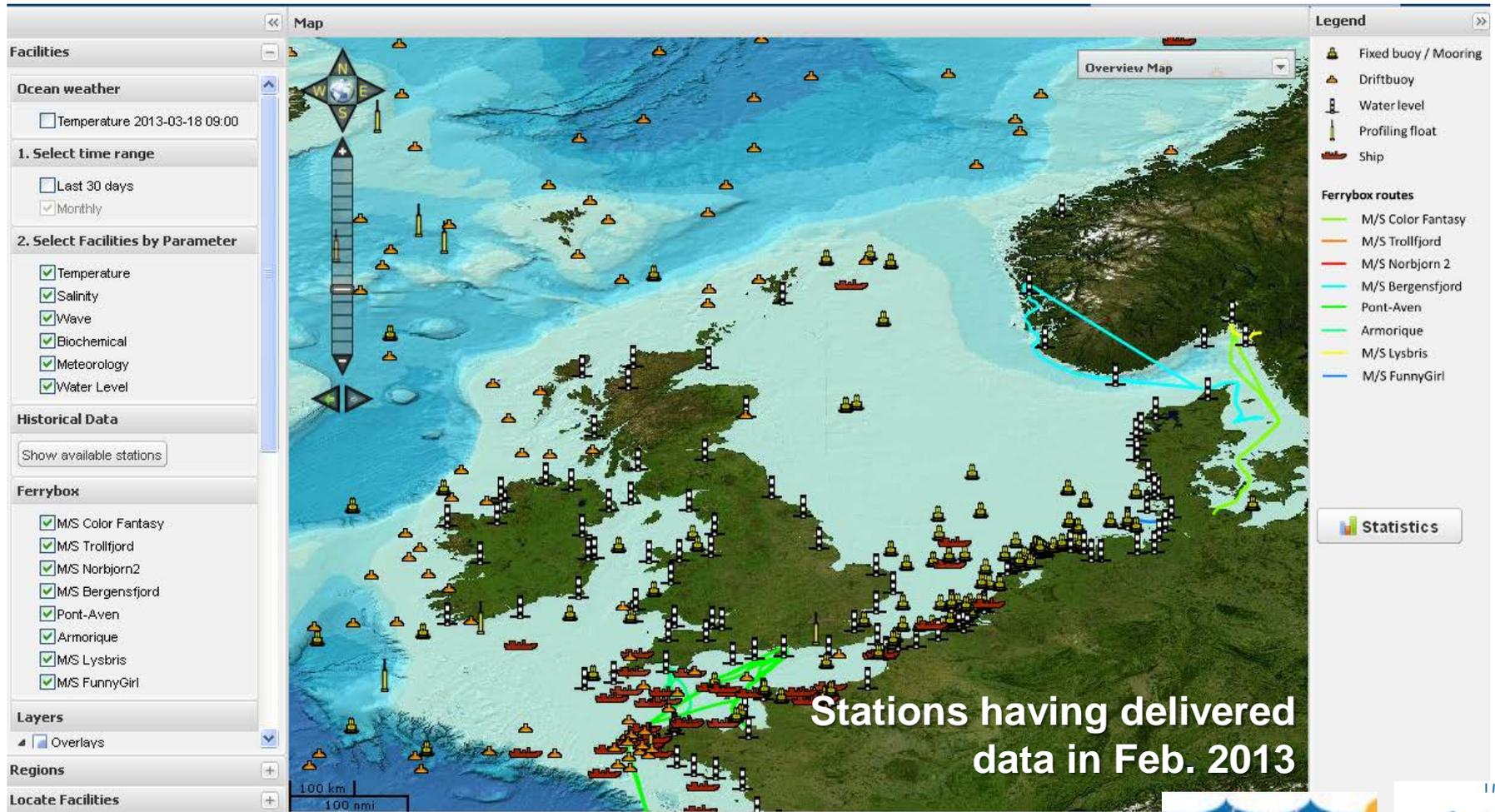
- Storm-surge forecast
- Transport forecast through standardized network of transects
- Multi-model ensemble forecast for SST, SSS and SSC

3 working groups:

- Optimisation of observing networks;
- Hydrodynamic modelling
- Oil drift modelling

NOOS

Exchange of in-situ data in real time



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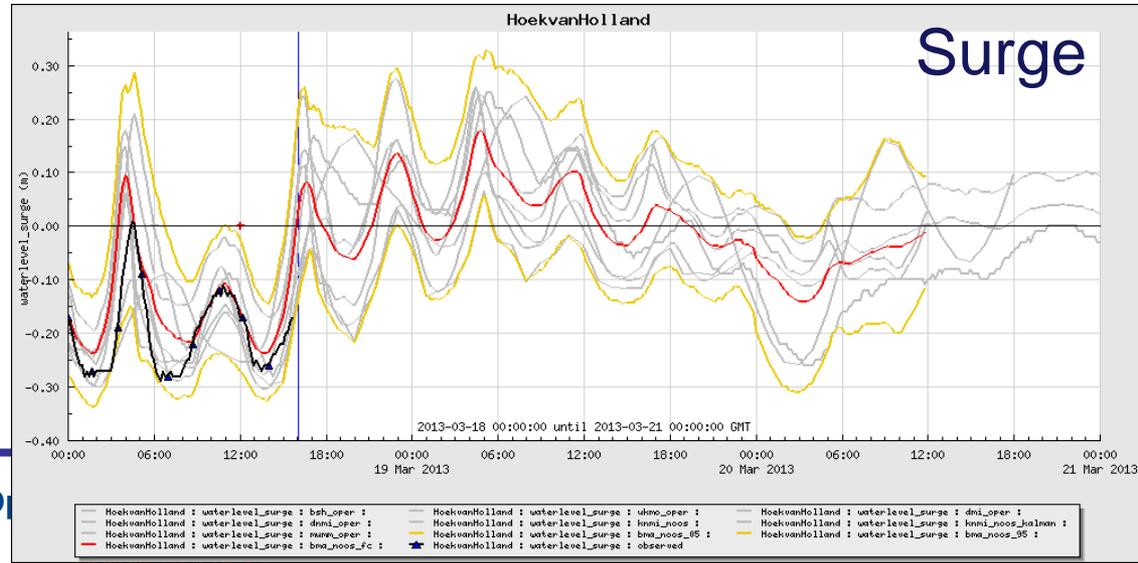
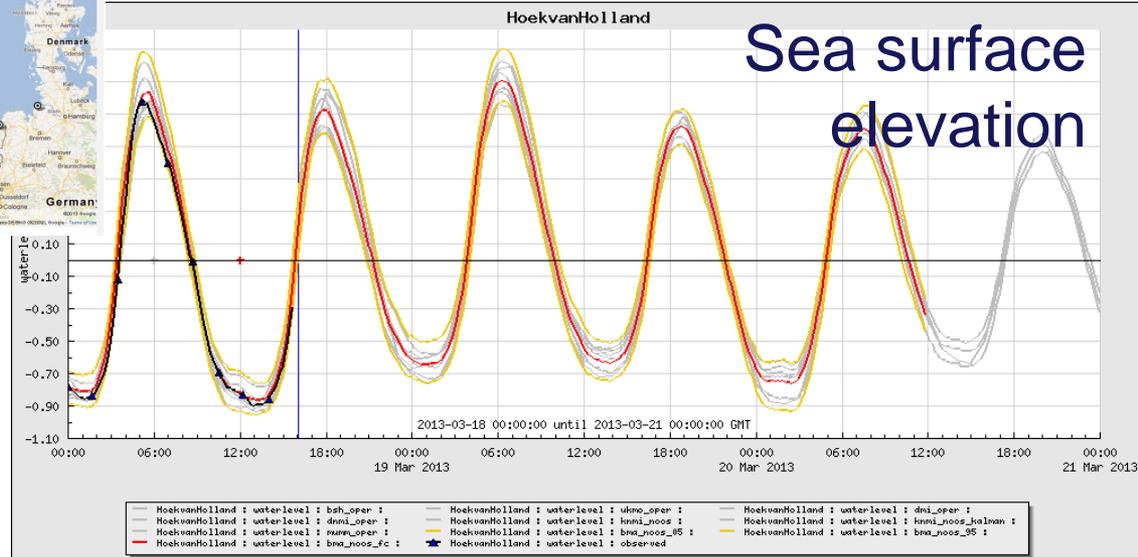
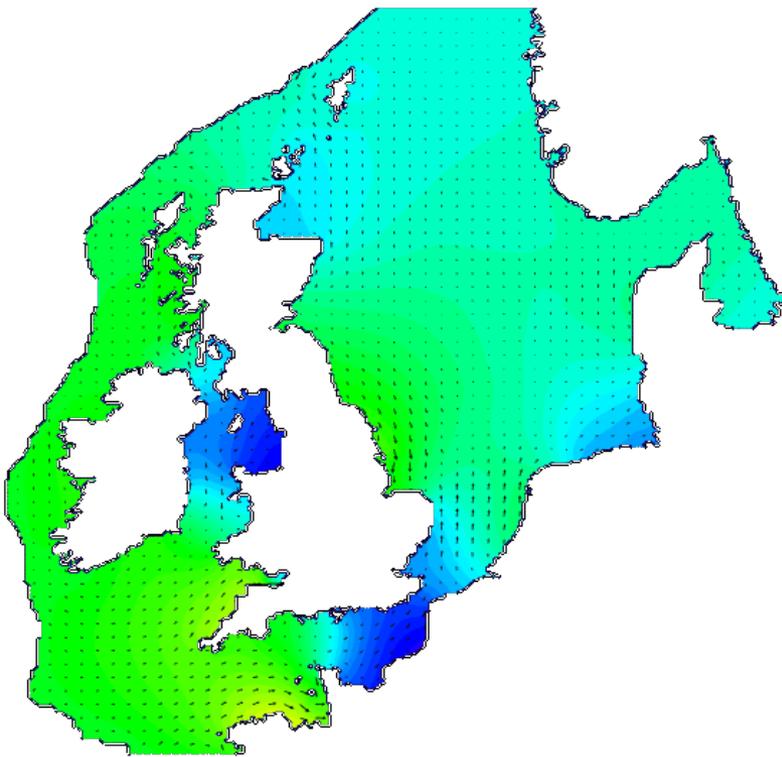
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NOOS

Storm-surge forecast exchange



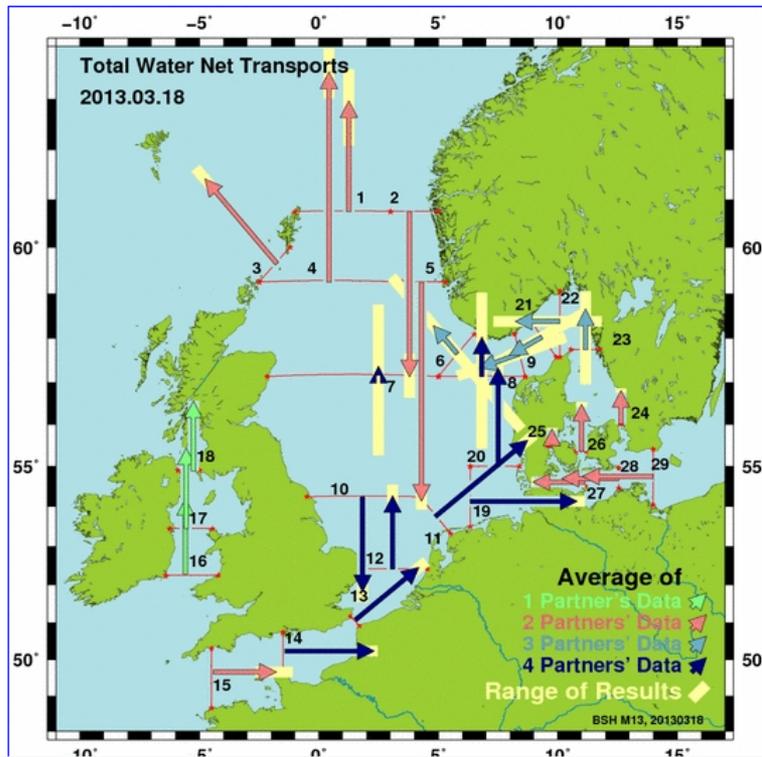
NW Shelf O

Towards multi-models ensemble forecast for all physical parameters

North Sea Transports



Computed Water Transports (Average Results of the BSH, MUMM, DMI and MetOffice Circulation Models)



Current Charts and Transects

- 18.Mar 2013
- 17.Mar 2013
- 16.Mar 2013
- 15.Mar 2013
- 14.Mar 2013
- 13.Mar 2013
- 12.Mar 2013

time series of 4 partners' data

Online Archive:
(Type a Date)

20130318

submit

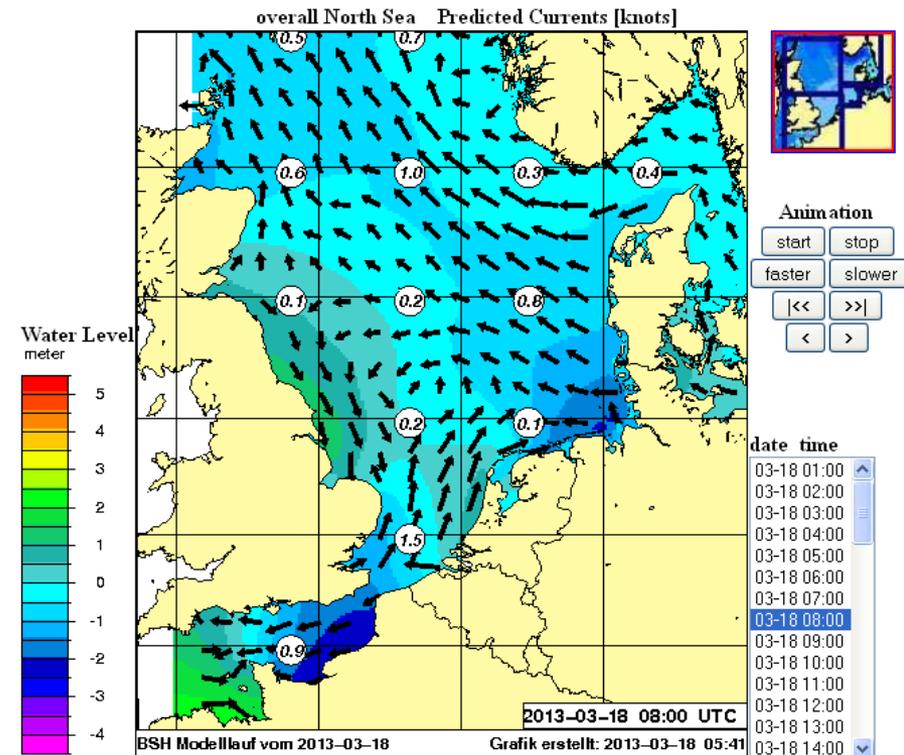
Overview

BSH

MUMM

DMI

MetOffice



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- **Oil drift modelling**

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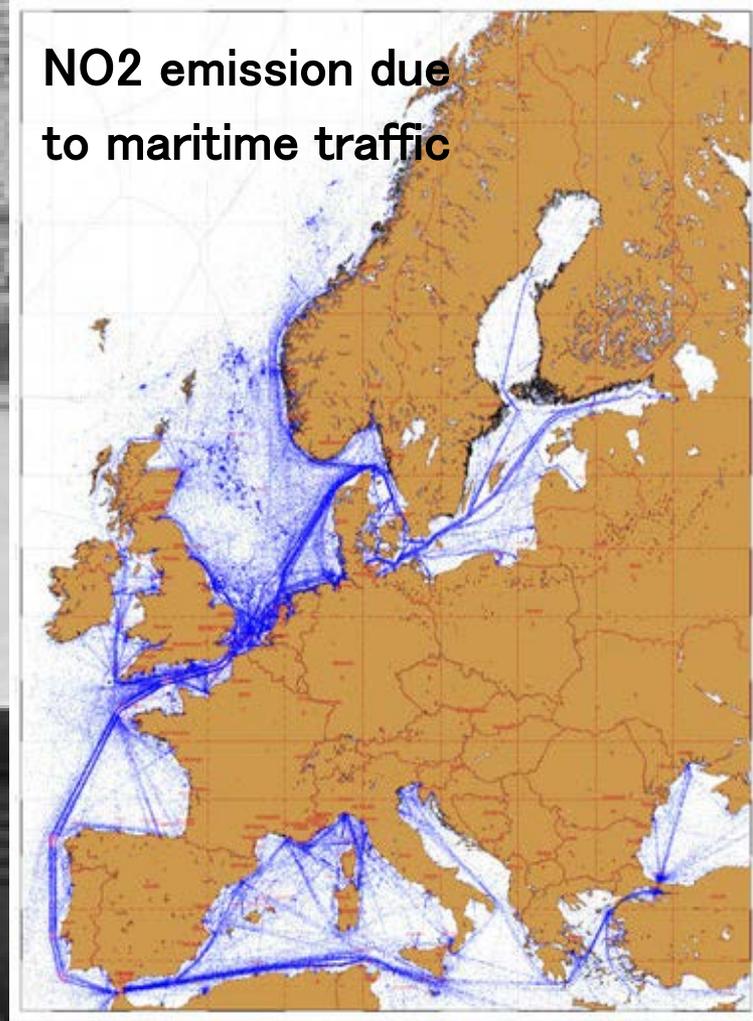
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Drift models as a support tool for coast guards



(CLS - ESA)

Drift models

as a support tool for coast guards

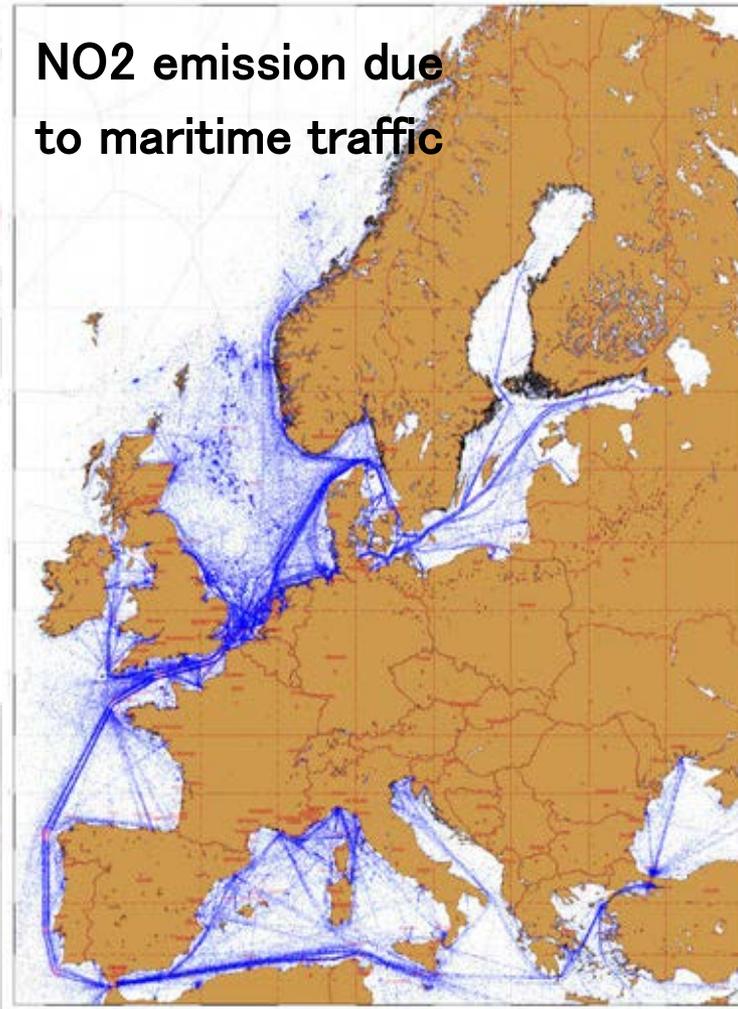
Evaluation:

- What will be the oil trajectory?
- Is there a risk of beaching?
- What are the environmental impacts?
- Who is the polluter?

Response:

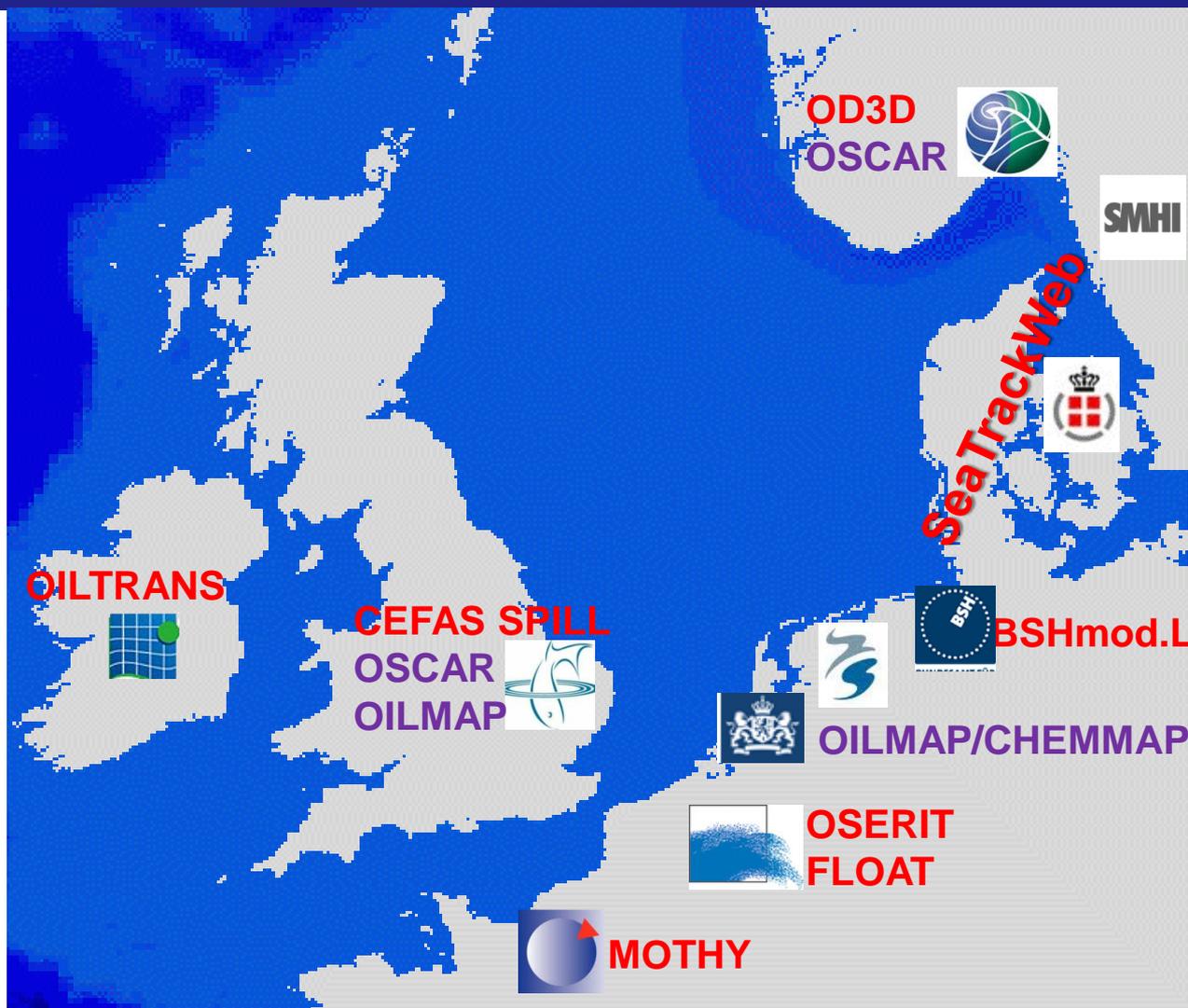
- Where to locate combatting teams?
- Can booms be deployed?
Where? By when?
- Can dispersants be sprayed?

NO2 emission due
to maritime traffic



(CLS – ESA)

12 operational oil drift models around the North Sea



— « In-house » models

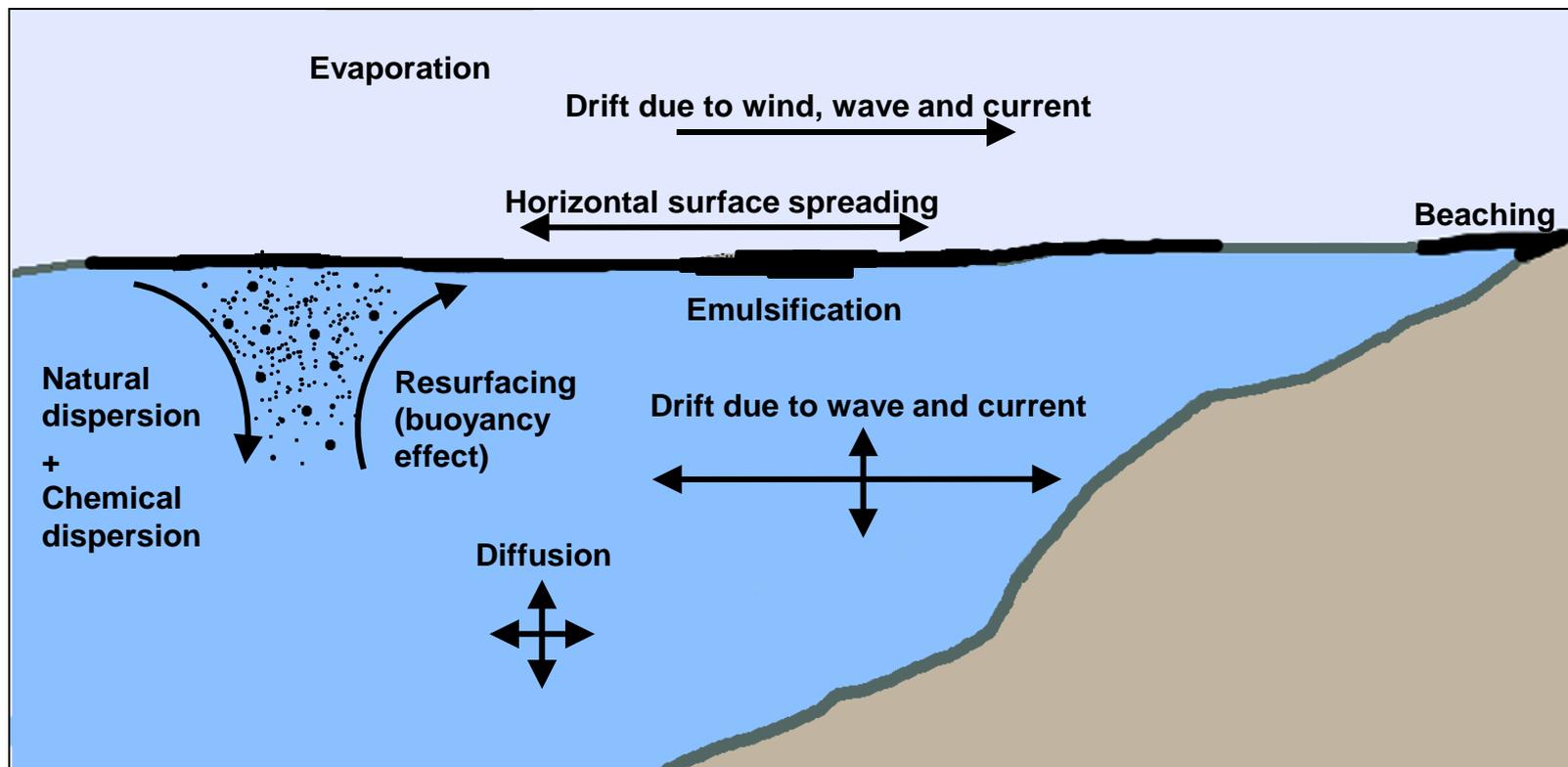
— Commercial solutions



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Each similar... thanks to a Lagrangian formulation



But also each different...

- Mathematical and numerical formulations
- Physico-chemical parameterizations
- Used oil databases
- Met-ocean forcing
- Operational constraints

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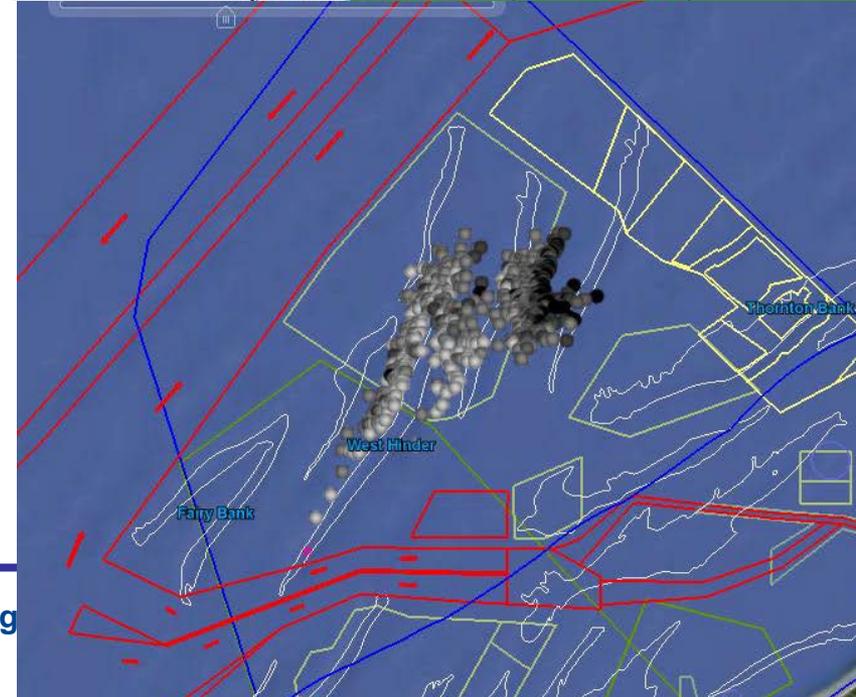
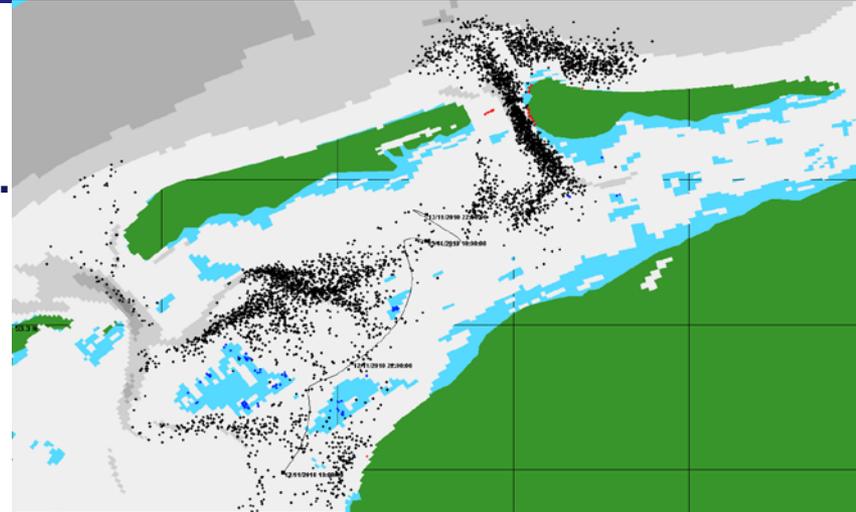
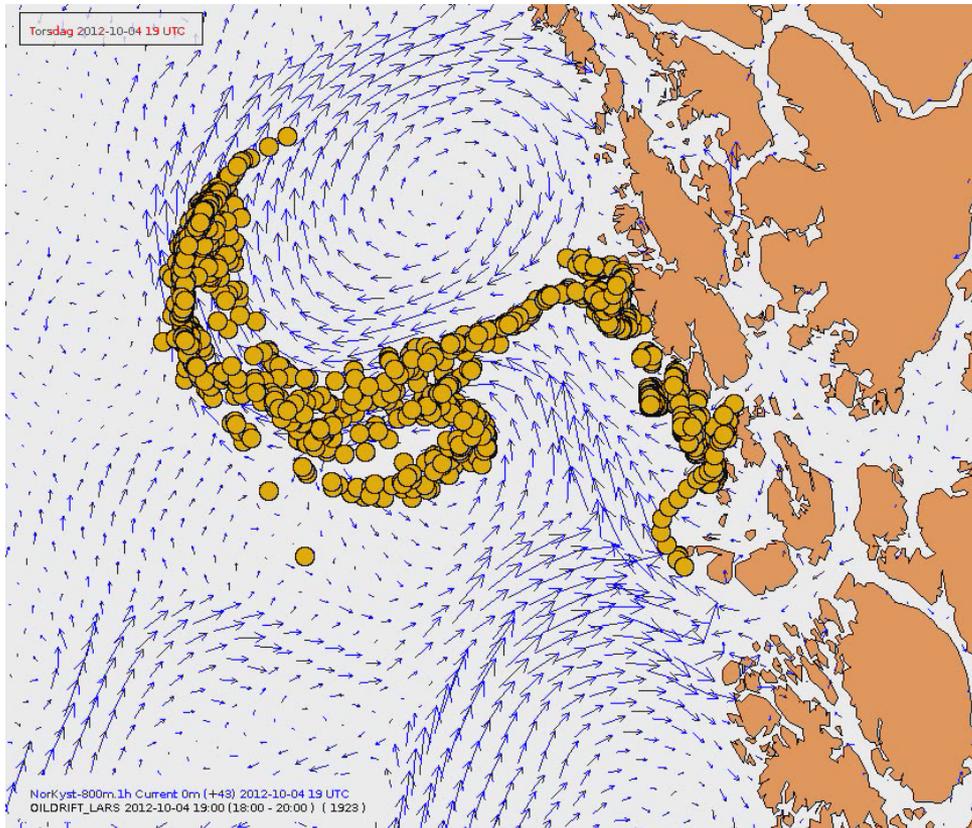
A « NOOS Working Group on Drift »

a focal point centralising every possible collaborations that could improve drift model forecast accuracy.



Contribution #1 : Place of exchange of latest developments and trends

Towards a higher space and time resolution of the met-ocean forcing...

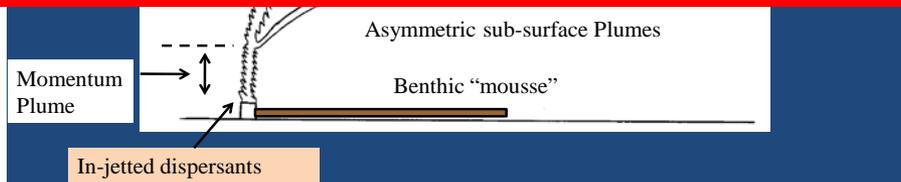


Contribution #2: A place to identify future challenges

Modelling blow-outs in deep water

Submerged spraying of chemical dispersants

CEDRE could help to improve the understanding
of physico-chemical processes



Contribution #3: Validation, intercomparison and post-crisis assessments.

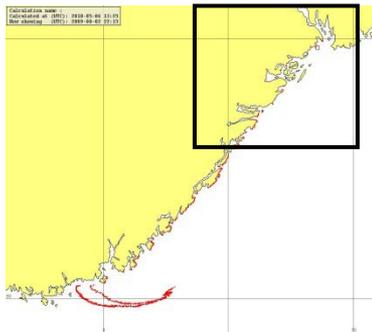
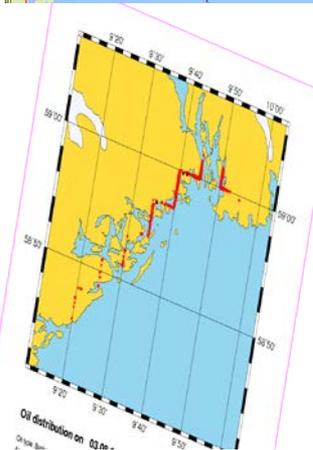
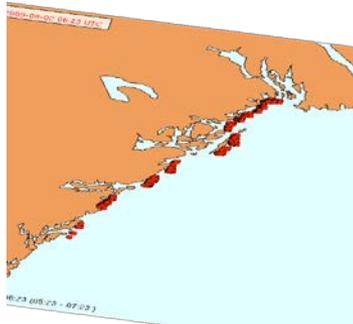
Ocean Sci., 7, 805–820, 2011
 www.ocean-sci.net/7/805/2011/
 doi:10.5194/os-7-805-2011
 © Author(s) 2011. CC Attribution 3.0 License.



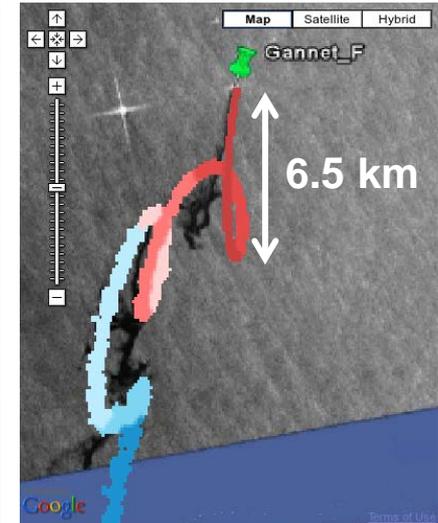
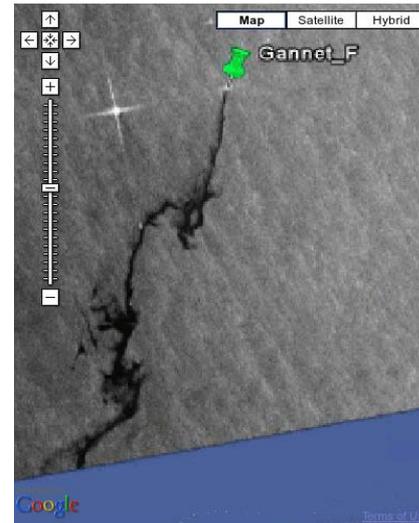
Usefulness of high resolution coastal models for operational oil spill forecast: the “Full City” accident

G. Broström¹, A. Carrasco¹, L. R. Hole¹, S. Dick², F. Janssen², J. Mattsson², and S. Berger⁴

- ¹Norwegian Meteorological Institute (met.no), Norway
- ²Federal Maritime and Hydrographic Agency (BSH), Germany
- ³Danish Maritime Safety Administration (DAMSA), Denmark
- ⁴The Norwegian Coastal Administration (NCA), Norway

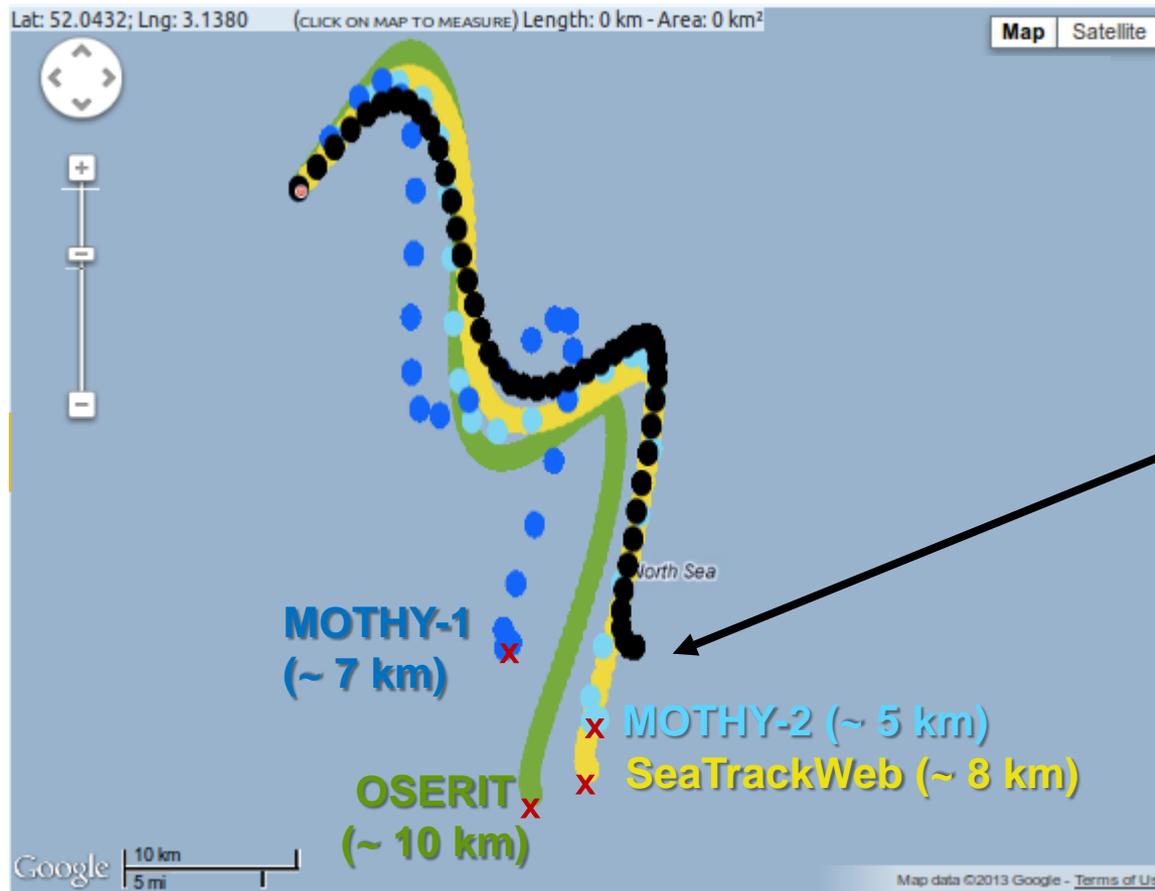


Gannet Oil Field, aug. 2011



Golden Trader, sept. 2011

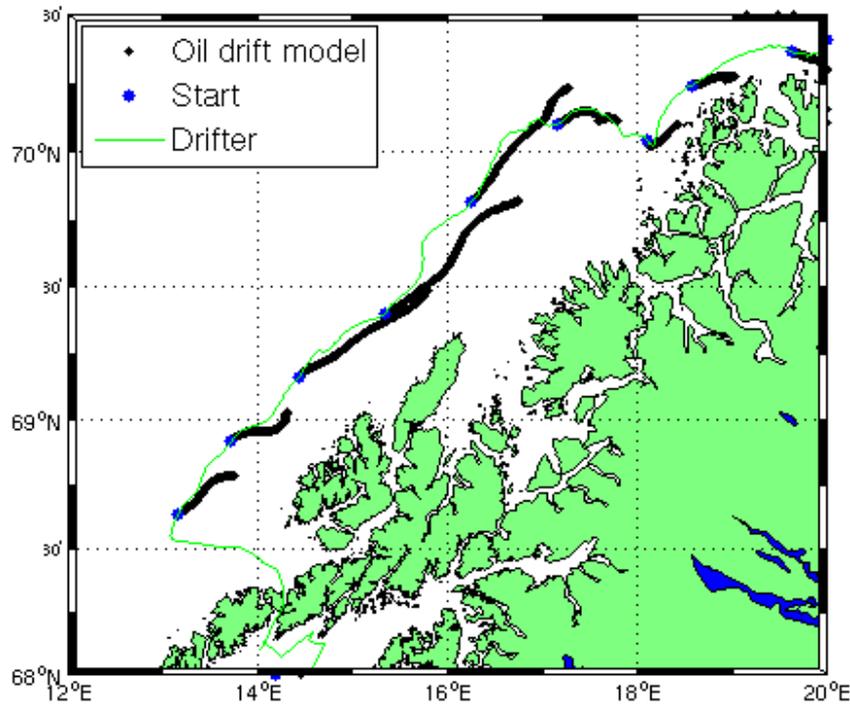
... but also validation against any cases of opportunity



Drifting buoy



Contribution #4: Organisation of common experiences in North Sea



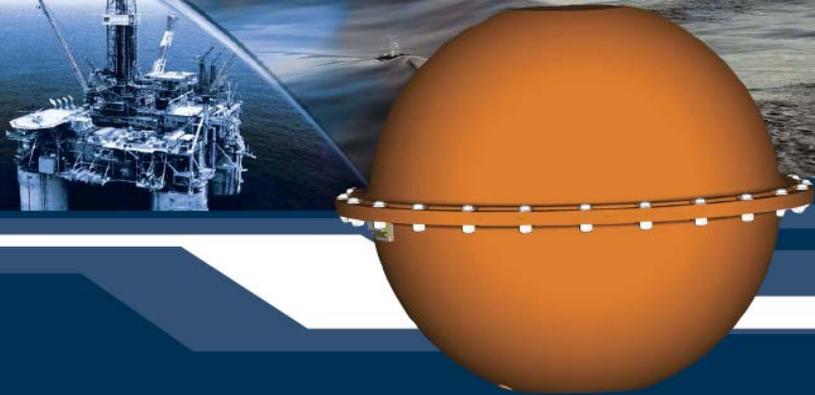
iSPHERE

OIL SPILL AND CURRENT TRACKING BUOY

Bi-directional Communication

Low Cost Telemetry Solution

Robust Design



The iSPHERE is an expendable, low cost, bi-directional spherical drifting buoy. The drifter was developed to meet the demanding needs of the offshore oil industry, ocean freight industry and the oceanographic scientific community. The buoy was designed specifically to track and monitor oil spill incidences. The iSPHERE drifter also provides the user with essential real-time sea surface temperature data and GPS positional data.

The robust design of the iSPHERE allows the buoy to be deployed effortlessly from a vessel or an oil platform. The standard operating life of the buoy is approximately 180-365* days.

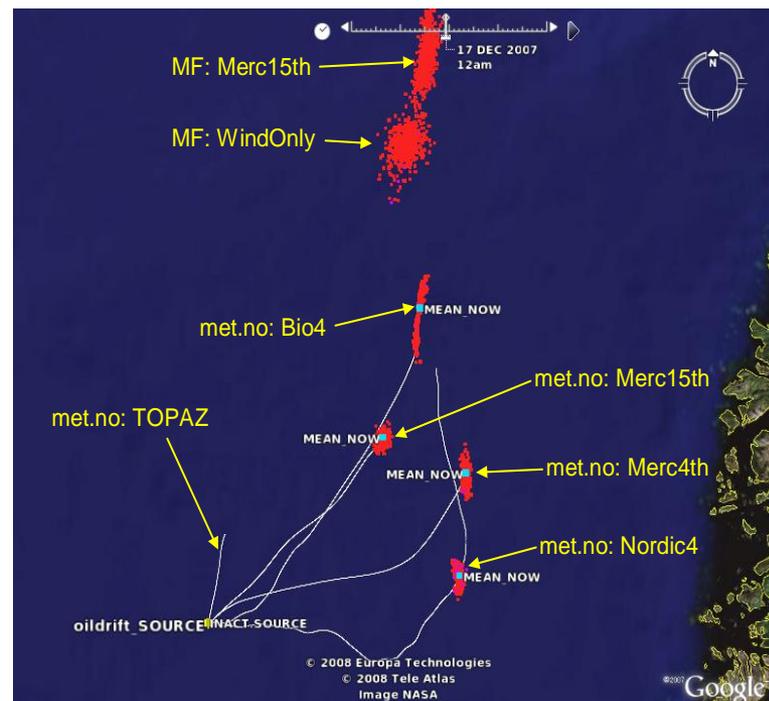
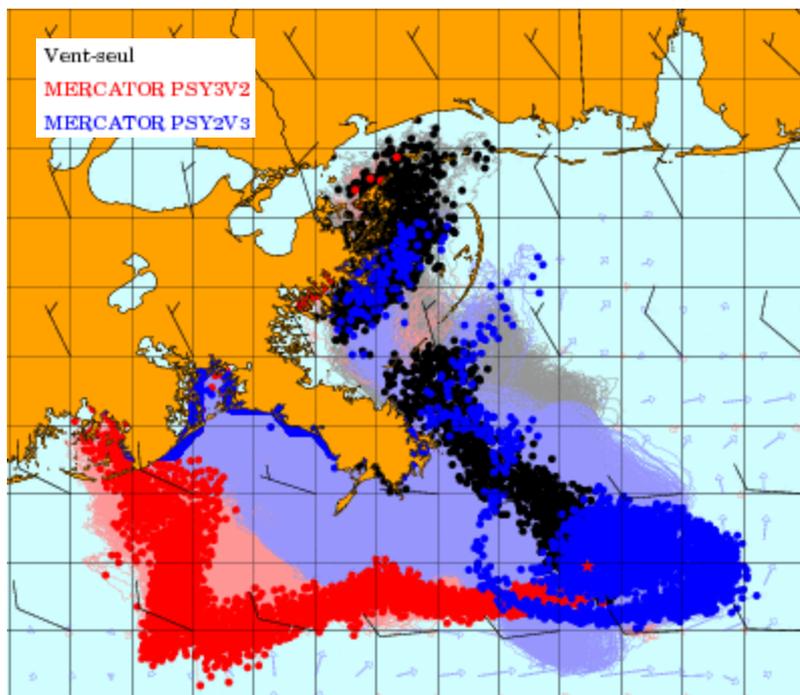
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Dartmouth, Nova Scotia B3B 1R9
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Fax: +1 902 468-4642
www.metocean.com
sales@metocean.com



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Contribution #5: Towards a system of ensemble drift forecast with accuracy estimations



Conclusion, “NOOS working group on Drift” is

a focal point centralising every possible collaborations that could improve oil drift model forecast accuracy.

- Information and data exchange
- Identifying new challenges
- Sharing best operational practices
- Organisation of common validation and intercomparison exercises
- Towards an improved interoperability of the different modelling systems

An aerial photograph of a large body of water, likely a lake or a wide river, during the golden hour of sunset or sunrise. The water's surface is covered in shimmering, golden reflections from the low sun. In the lower right quadrant, a small, dark boat is visible, moving across the water. Further to the right, a large, white, rectangular object, possibly a floating platform or a large boat, is partially visible. The overall atmosphere is serene and peaceful.

s.legrand@mumm.ac.be

<http://oserit.mumm.ac.be/>

Thank you for your attention!