

# ICES WGOOFE REPORT 2009

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## Report of the Working Group on Operational oceanographic products for fisheries and environment (WGOOFE)

24–26 November 2008

Hamburg, Germany



**ICES**

International Council for  
the Exploration of the Sea

**CIEM**

Conseil International pour  
l'Exploration de la Mer

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## Executive summary

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Working Group on Operational oceanographic products for fisheries and environment (WGOOFE) had its first meeting at BSH in Hamburg 24-26 November, 2008. The aim of WGOOFE is to address the problem that the large amount of freely available operational oceanographic data is under utilised by ICES research scientists, despite the regular complaint by researchers that they cannot develop the ecosystem approach due to lack of data and process understanding. WGOOFE's approach is operational and it aims to act as an interface between ICES and operational oceanography producers, whether institutions or project consortia (e.g. the Met Offices, MyOceans etc.) in the development of products designed for ICES needs for the ecosystem approach.

A core part of WGOOFE is to determine what oceanographic products (and what format) are needed by ICES scientists that work in fisheries and the environment. Its approach is iterative and incremental requiring all interesting parties to regularly interact and share objectives. Determining the sophistication of users needs, both in terms of oceanographic process understanding and the logistics of providing information proved to be a complex issue and was much discussed by WGOOFE with no clear resolution.

WGOOFE in 2008 revised the list of products to be developed and then determined which institutes, projects or individuals would produce them. A list of variables to be made into products, by region and producer is given in this report. It was planned to develop versions of products to test on users in 2009. This will require intercessional development of products before and after the workshops. It is planned to have the first workshop in Aberdeen at Fisheries Research Services in the first half of 2009. A similar workshop will be planned for an evening at the ICES ASC in Berlin. Less formal workshops will occur at other institutes across the ICES area. These workshops will all be used to interact with users and learn from their experiences of operating the first versions of products.

WGOOFE will then meet in late 2009 to review the progress made in 2009, plan further product development and consider the format and resolution issue for spatial data.

## 1 The rational for WGOOFE

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On the advice in 2007 of PGOOP (ICES Planning Group on Operational Oceanographic Products), a workshop WKOOP was initiated to suggest ways of developing and/or improving the dialog between producers of operational oceanographic products and the potential users of those products. It was also asked to define initial oceanographic products that can be regularly delivered to the identified users. In the light of products, WKOOP was then expected to formulate a strategy and a work plan for a new working group on the user/provider interface of operational oceanography products. This recommended the instigation of WGOOFE (see Annex 3 for the TORS) and WGOOFE thus met in November 2008 for the first time.

## 2 Publicise activities of the working group (ToR a)

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Three methods were used to publicise WGOOFE 2008:

- A targeted email to potential interested scientists in the ICES community. The list was prepared by members of the ICES Oceanography Committee.
- A general flyer circulated to all participants at the ICES ASC 2008 in Halifax, Canada. This was in a form of an invitation to WGOOFE and a brief explanation of the aims of the group.
- Personal approaches by members of WGOOFE to others they work with.

This extra activity failed to radically change the makeup of WGOOFE from that of WKOOP. In other words WGOOFE was still dominated by the providers of products and oceanographers. The publicity had resulted in an increase in the profile of WGOOFE, as this was reflected by the interest in WGOOFE at ICES ASC and the high level of support for its aims.

It is clear that users from fisheries and the environment are not attracted by the remit of WGOOFE as described by the current TORS (the failure of this approach has also been reflected in the poor attendance of “users” in WGDIM and similar groups). Thus WGOOFE decided that they must go to the users. Thus the work of WGOOFE in 2009 should be different from 2008 by both developing products and taking them directly to the users. This approach has been written into the suggested TORS for WGOOFE in 2009 (Annex 4).

## 3 Realistic products available (ToR b)

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There are a number of available products from the members of WGOOFE, both through their ordinary data collection and operational models, and through projects where the partners participate. These are described below by providing institute or project under the headings of hindcast and nowcast/forecast and modelling and observational data. At the end of this section useful web sites are listed.

### 3.1 Hindcast

#### 3.1.1 Modelling

- UIB-GFI/NIVA: Salinity (S), Temperature (T), Currents, nutrients, oxygen, primary production, zooplankton production, vertical mixing, transports, stratification turbulence, ice. In the following areas: North

Sea and Baltic and Barents Sea (only physics) – stored as daily means. Available via ftp. 25-50 years.

- MyOcean project: 20 years hindcast for “all” areas mainly for physics including ice. The project starts in April 2009.
- MEECE project: 20-50 years hindcast for ecosystems.
- ECOOP project: 20-50 years hindcast for ecosystems.
- IMR: North Sea 25 years biology, 50 years physics. Nordic+Barents+Arctic 25 years. North Sea available as monthly means via ftp and openDAP.
- UK Met Office: Hindcast from 2002 with physics and biogeochemistry.

### 3.1.2 Observations

- MyOcean project: *in situ* and satellite. 20 years of observations.
- IFREMER: Nausicaa server: SPM, chlorophyll, SST over 10years. Boby-clim: T&S climatology of the Bay of Biscay over 40 years. CORIOLIS: *in situ* T, S, currents repository. Quadriga: coastal monitoring data (sanitary quality, contaminants, phytoplankton biodiversity and toxic events).
- MUMM: network of fixed stations (20km) 80 chemicals monthly (to ICES database)
- FRS: available from ICES database
- IMR: available from ICES database

## 3.2 Forecast (incl. nowcast)

### 3.2.1 Modelling

- BSH: profiles for S, T, currents, oxygen, SST maps, transports on the NOOS and BOOS web pages, stratification index, ice
- MyOcean project: ref. service portfolio (40pp)
- MERSEA project:
- IFREMER: Previmer over Channel and Bay of Biscay, for physical and biological parameters.
- SMHI: physics (all) Baltic + parts of North Sea 10 days forecast
- UK Met Office: (includes MyOcean + Mersea products), NWS, Baltic, North Sea and global ocean...
- MUMM: physics eastern channel + southern North Sea.
- Met.no: MyOcean Arctic and Nordic Seas (physics). North Sea (mon-coze, interrisk) (physics and ecosystem parameters).
- IMR: operational drift of fish larvae (cod and herring).

### 3.2.2 Observations

- BSH: Marnet – profiles for S, T, currents, oxygen..., SST maps. North Sea + Baltic. Ice. SOOP, Argo,
- NIVA: Ferryboxes, onset and strength and length of blooms, water-mass distributions along transects, winter nutrients,
- MyOcean product: *in situ* and satellite. See ref. service portfolio (40pp)

- IFREMER: Nausicaa server (SPM, chlorophyll, ODYSSEA SST), Previmer (salinity profiler on fishing gears), Roslit (smartbuoys), CORIOLIS: in situ T, S, currents from profilers, vessels and moorings, IBI-ROOS mooring data (sea-level, waves,...).
- EuroGOOS: seprise (600 time series)-sealevel, currents, wind
- SMHI: deliver all to seprise
- MUMM: satellite images of SST, colour, chlorophyll, SPM
- Met.no: satellite OSISAF (SST, ice, SSI)
- UK Met Office:
  - OSTIA (operational SST and sea ice analysis)
  - [www.ghrsst-pp.org/GHRRST\\_PP\\_Data\\_Products.html](http://www.ghrsst-pp.org/GHRRST_PP_Data_Products.html)
- IMR: coastal monitoring stations

Most of these data can be found at the following web sites:

[www.bsh.de/en/Marine\\_data](http://www.bsh.de/en/Marine_data)

[www.ferrybox.no](http://www.ferrybox.no)

[www.mersea.eu.org/Indicators-with-B4G.html](http://www.mersea.eu.org/Indicators-with-B4G.html)

[www.previmer.org](http://www.previmer.org)

[www.coriolis.eu.org](http://www.coriolis.eu.org)

[www.seprise.eu](http://www.seprise.eu)

[www.ibi-roos.eu](http://www.ibi-roos.eu) (similar for noos, boos)

[www.nerc-essc.ac.uk/godiva](http://www.nerc-essc.ac.uk/godiva)

[www.npm.ac.uk/rsg/projects/algarisk](http://www.npm.ac.uk/rsg/projects/algarisk)

Mersea – opendap server

[wms.met.no/moncoze](http://wms.met.no/moncoze)

[wms.met.no/interrisk](http://wms.met.no/interrisk)

[saf.met.nou](http://saf.met.nou)

[www.ifremer.fr/envlit](http://www.ifremer.fr/envlit)

#### **4 List of products needed by users (ToR c)**

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The feedback provided to the group suggested the list of potential products provided by WKOOP was almost complete in terms of the current expectations of users, although the priority given to fronts was increased to high (Table 1). Thus this list was thought to form the basis for moving forward to product development.

However the required resolution of the data was still not clear. WGOOFE considered that there were 4 dimensions for the data (3 space and 1 time). When considering time, it is likely that monthly resolution is sufficient for generic hindcast products. Users of generic products would probably find this sufficient. Whereas nowcasts should be at the lowest resolution possible as users often require immediate data in the scale of hours (e.g. real time current or temperature data). High resolution forecasts products are thought to be unreliable beyond 5-10 days and thus the temporal scale over this period can be at a fairly high resolution. Long scale forecasts were not discussed and are at present viewed outside the remit of WGOOFE.



The spatial resolution requirements were more difficult to describe. WGOOFE found that the users often requested information at scales that were not appropriate to the oceanographic or climatic processes they were considering. For example: a request for the average temperature of the North Sea per year was difficult to reconcile with the processes that operate on the organisms within an ecosystem. However it was not the role of WGOOFE to dictate to the users what they required, but to make the data available as requested. The issue of scientific standards and appropriate methods should be dealt with by peer review and quality control of reporting. However many members of WGOOFE viewed education as important within the WGOOFE process and the sharing of data.

Users appeared to want products at variable resolutions of depth and distance. The modelled hindcast data was clearly only available at the spatial resolution of the models used, whereas observational data could be provided at the resolution at which they are collected. This was valid for nowcast information too. The users though, were unlikely to be aware of the problems associated with asking for too fine spatial or temporal scale of data. Whilst oceanographers and meteorologists regularly transfer and manipulate very large amounts of data, users from other research fields may not have this expertise.

Thus the products developed must account for the potential naivety of the users, especially when considering resolution of the products. The end goal should be a site where time series can be constructed for user specified areas, at user specified resolution. In the short term, the preliminary products should be at scales and for areas recognised by the users. The ECOOP project showed an approach that produced fisheries targeted data, e.g. at spawning grounds of commercially important fish. There is merit to this approach. Conceptually the areas considered by users are similar to the ICES areas and sub areas. These areas reflect the socio-economics of the fishing industries around northern and western Europe and thus may not be that useful in terms ecological processes but in terms of building the ecosystem approach to management, they may be useful starting points for the provision of products.

WGOOFE concluded that it was important to progress to developing products which could then be tested by users, where the latter will provide feedback. The developmental process should be iterative and inclusive. Thus a range of products with various approaches (based on Table 1) should be made available at the proposed workshops for 2009. It was hoped that once the users tested products, a greater understanding of their needs in terms of spatial resolution of data would become apparent.

WGOOFE also noted that there was still a North Sea bias to the products being considered, and although there were data and models available from WGOOFE for the Nordic Seas, Baltic Sea, Bay of Biscay and Mediterranean there was a lack of focus on areas such as the west of Scotland and Ireland and east of Greenland. Some larger projects (e.g. MyOcean and EuroGoos) do cover some of these areas, but local expertise was lacking from the WGOOFE group.

## **5 Identify who is to regularly produce and disseminate what products and when (ToR d)**

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WGOOFE aims to establish a web-based system based on a network of product providers that should update their products (time series) whenever there are updates available. The actual data should be accessible. The list below shows the potential

products. In the short term, the group will aim to provide a portfolio of products for those ranked as category 3 and 4 within the high priority category.

**Table 1. The list of user defined environmental variables of interest to fisheries and the environment researchers (developed by WGOOFE). The products were ranked by priority to users (High, Medium or Low) and then the high priority variables were ranked on the developmental time frame for the operational products by the data producers (4= achievable now, 1= not achievable now but a future objective)**

<i>Variable for product</i>	<i>Generic or derived</i>	<i>Priority</i>	<i>Achievable (now)</i>
Temperature	+	H	+ (4)
Ice	+	H	+ (4)
Transport/currents	-/+	H	+ (4)
Chlorophyll	(+)	H	+/- (3)
Primary production	+	H	+/- (3)
Nutrients	+	H	+ (3)
Zooplankton abund + prod.	+	H	+ (3)
Blooms time/duration/intensity	-	H	+ (3)
Fronts	-	H	+ (2)
Oxygen	+	H	+/- (2)
CO2/pH	-	H	+ (2)
River plumes and loads	-/+	H	+ (2)
Harmful algal Blooms	-	H	- (2)
Pollution dispersion	-	H	+ (2)
Fish larvae growth & distribution	-	H	(-) (1)
Salinity	+	M	+
Stratification	-	M	+
Turbulence	+	M	+
Light in the water column	+	M	+/-
Bed shear stress	+	M	+
Nekton plankton	-	M	-
Upwelling indices	-	M	+
Vertical mixing depth	-	L	+
Wave height/direction	+	L	+
SPM	+	L	+/-

\* Generic or derived refers to whether the model outputs or observations are direct (generic +) or require further analysis or construction (derived -).

WGOOFE looked for potential volunteers to host the WGOOFE website, which will act as an interface to existing web based products. IFREMER has agreed to host the WGOOFE website (GOOFE.org or com). Initial products should be available by the Aberdeen workshop in June 2009.

Various institutes and projects volunteered to develop the initial versions of the products to be considered in the workshops by the users. The approach was regionalised to fit into the regional nature of the advice within ICES and the ecosystem approach to management. The North Sea was split in terms of variables, but the other regions were not.

## 5.1 North Sea:

### *Temperature:*

BSH as for NORSEPP (monthly means of SST + anomalies – 2D maps). Mean North Sea temperature time series at relevant spatial scale and regionalisation as an index

UK Met office or MUMM or BSH, met.no: bottom temperatures with anomalies – 2D maps + mean bottom temp. Mean North Sea bottom temperature time series at relevant spatial scale and regionalisation as an index

### *Currents/transport:*

BSH, IMR/met.no, UK Met Office, MUMM at approximately 5 selected sections

### *Chlorophyll/blooms/prim.prod/nutrients (N, P, Si):*

UiB-GFI/NIVA, MUMM (chl+blooms), UkMet, imr/met.no, ifremer, NERSC (chl+blooms), UK Met Office.

### *Zooplankton:*

UiB-GFI/NIVA, UK Met Office.

## 5.2 Bay of Biscay:

UK Met Office: physics

Ifremer: most variables from models and observations

MUMM: chlorophyll/blooms

## 5.3 Celtic Seas (Celtic, Irish, Rockall, West of Scotland and Ireland)

Transport west of Ireland and Scottish shelf would be nice to have but input was required from other institutes, probably from Ireland.

UK Met Office: most variables for most of this region.

MUMM: chlorophyll/blooms

## 5.4 Baltic Sea

MUMM: chlorophyll/blooms

SMHI: most variables very soon (within months for biology)

UiB-GFI/NIVA: most variables

BSH: physics

UK Met Office: physics and biology.

## 5.5 Nordic Seas:

vTI\_SF: Temperature index in November for east and west Greenland waters

MUMM: chl/blooms

Met.no: physics

NIVA: ferryboxes

IMR: fixed hydrographic stations

MERCATOR: physics

ARGO floats (<http://www.coriolis.eu.org/cdc/Argo-NA-ARC.htm>)

## 5.6 Barents Sea

MUMM: chl/blooms

Met.no: physics

## 5.7 Mediterranean

MUMM: chl/blooms

Ifremer: physics in WMed, chlorophyll + Observations (In-situ e and ODYSSEA SST)

MERCATOR, UkMet, INGV (physics)

## 5.8 Iberian Peninsula:

MERCATOR: physics

UkMet: physics

MUMM: chl/blooms

PE: through MyOcean

Ifremer with PE: In-Situ Observations

Ifremer: ODYSSEA/SST

## 6 Promote and ensure exchange with operational organizations (ToR e)

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WGOOFE plans to hold workshops in 2009 to show its first versions of products (see section 2). It is planned to have the first of these in Aberdeen at Fisheries Research Services in the first half of 2009. A similar workshop will be planned for an evening at the ICES ASC in Berlin. This may be called "Wine and WGOOFE". Less formal workshops will occur at other institutes across the ICES area. These workshops will all be used to interact with users and learn from their experiences of operating the first versions of products.

It has been proposed to take the early versions of products to the NAFO science meeting in mid 2009 to gain further feedback.

Many of the members of WGOOFE are experienced at developing products (e.g. the meteorological institutes) and this experience will be shared with the less operational institutes through the WGOOFE workshops as well.

This plan to develop versions of products to test on users in 2009 will require inter-cessional development of products before and after the workshops.

WGOOFE will then meet in late 2009 to review the progress made in 2009 and plan for 2010.

## Annex 1: List of participants

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## **Annex 2: Agenda**

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### **24th November 2008**

- 13:00** Welcome and Introduction, meeting logistics
- 13:30** Plenary to discuss progress and developments and our approach
- 15:30** Coffee
- 16:00** Presentations and relationship of WGOOFE to other projects
- 18:00** End

### **25th November 2008**

- 09:30** Subgroups:
  - ToR b Realistic Products available
  - ToR c List of products needed by users
- 10:30** Coffee
- 10:50** Continue subgroups
- 12:00** Lunch
- 13:00** Plenary- report back from sub groups
- 15:30** Coffee
- 15:50** ToR d: Identify who is to regularly produce and disseminate what products and when. Where practical, tailor products to fill the identified gaps
- 18:00** End

### **26th November 2008**

- 09:30** Plenary - ToR e: Promote and ensure exchange with operational organizations and services (for example GMES MCS, GOOS regional alliances) to stimulate development of products appropriate for the ICES user base
- 10:30** Coffee
- 10:50** The Future
- 12:00** Lunch
- 13:00** The WGOOFE 2008 report
- 15:00** End of meeting

### **Annex 3: Terms of Reference for WGOOFE 2008**

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Terms of reference for WGOOFE 2008:

- a) prior to meeting, publicise the activities of the working group to attract potential members, with an emphasis on users Refine and evaluate the list of products to the evolving needs of the users, and identify gaps in the products available
- b) through the delivery of working documents present initial oceanographic products (based on the findings in WKOOP in 2008) that can be realistically regularly delivered from the group or individual members.
- c) refine and evaluate this list of products to the needs of the users, including format and timing, and identify gaps in the products available.
- d) initiate the process on identifying who is to regularly produce and disseminate what products and when. Where practical, tailor products to fill the identified gaps
- e) promote and ensure exchange with operational organizations and services (for example GMES MCS, GOOS regional alliances) to stimulate development of products appropriate for the ICES user base.

## Annex 4: WGOOFE Terms of Reference for the next meeting

The Working Group on Operational oceanographic products for fisheries and environment [WGOOFE] (Co-Chairs: Morten Skogen, Norway, Mark Dickey-Collas, the Netherlands), will meet for a demonstration workshop at FRS Aberdeen, 15-17 June 2009, and for a WG meeting at IMARES, IJmuiden from 16–18 November 2009 to:

- a) prior to the meeting and workshops publicise the activities of the working group to attract potential members, with an emphasis on users
- b) intercessionally develop the first versions of web based products (either from institutes, projects or individuals) for testing in the workshops
- c) arrange a demonstration workshop with users to get feedback on interim product list and operational services (Aberdeen 15-17 June 2009)
- d) hold other workshops, including an evening at the ICES ASC to demonstrate and operate the first versions of products.
- e) refine and evaluate the operational products to the needs of the users, including format and timing (IJmuiden November 2009)
- f) identify gaps in the products available, and define new products from this

WGOOFE will report by 10 December 2009 to the attention of the SCICOM.

### Supporting Information

Priority:	There is an urgent need to incorporate the field of operational oceanographic products into ICES to be able to support fisheries research, assessment and management advice and other ecosystem approach related activities.
Scientific justification and relation to action plan:	<p>WGOOFE justification:</p> <p>a) to make the products of WGOOFE relevant and encourage them to be used within ICES, it is essential to engage users in the work of the WG, and not make the group a fora only for operational oceanographers.</p> <p>b) available operational oceanographic products are to be used as initial products to initiate a dialogue with the users of their needs and possible use of the products.</p> <p>c) the dialogue will define improved products to better meet the user needs</p> <p>d) to ensure regularity of the products to be delivered WGOOFE will identify the producers</p> <p>e) several large projects are running operational oceanographic services. To ensure the relevance of their works, WGOOFE will establish a close dialogue with these initiatives to stimulate for delivery of relevant (to ICES) products.</p>
Resource requirements:	No specific resource requirements beyond the need for members to prepare for and participate in the meeting, and preferably participation from ICES data centre
Participants:	The Group should have participants from organizations dealing with operational services and/or development of operational techniques, and participants that are identified of users of such products.
Secretariat facilities:	None.
Financial:	No financial implications.
Linkages to advisory committees:	An obvious very close link with ACOM activities.



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Linkages to other committees or groups:	There would be a strong interaction with other experts groups within OCC such as WGZE, WGHABD, WGOH and WGRP, and modelling activities e.g. in WGPBI, PGNSP, NORSEPP, WGRES, REGNS. Later also with the ICES Advisory Programme.
Linkages to other organizations:	The WG must interact with IOC/JCOMM/GOOS/EuroGOOS/ArcticGOOS/GMES/GEOSS. The group should also have a close relationship with MyOcean

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