CGMS

CGMS-37 EUM-WP-12
v1, 30 September 2009
Prepared by EUMETSAT
Agenda Item: C.4
Discussed in Plenary

EUMETSAT ACTIVITIES IN OCEAN MONITORING

In response to CGMS action/recommendation: None

Working Paper Abstract (corresponding to ca ½ a page)

The purpose of this document is to describe the activities and programmes that the EUMETSAT Secretariat is conducting with the aim of positioning EUMETSAT as the leading European Operational Agency serving the space data needs of the Operational Oceanography User Community with both routine and off-line products.
The primary objective of EUMETSAT is to act as the main space data provider to serve the requirements of the GMES fast track service on Marine core Service (MCS).
These EUMETSAT activities in ocean monitoring have been approved by the 60th Council of EUMETSAT.
The document first recalls the user needs as they have been expressed within the report on "Space infrastructure for the GMES Marine Core Service".
Then, the way EUMETSAT is contributing to the fulfilment of these requirements is reviewed, both through the current and future mandatory and optional Programmes of the organization, but also through the participation of EUM to Third Party Programmes and the establishment of bilateral Agreements with other organisations with the objective to increase data and product exchanges with those.

EUMETSAT activities in ocean monitoring

1 INTRODUCTION

The long-term EUMETSAT strategy approved at the 59th EUMETSAT Council in July 2006 notes that "The vision of EUMETSAT is to be the leading operational satellite agency for European Earth Observation Programmes that are consistent with its Convention."

EUMETSAT will do so "through the establishment and operation of suitable satellite systems and dissemination schemes, and by adopting a gradual and progressive approach in maintaining and developing the existing services and enhancements to meet new requirements. Whilst maintaining the priority of operational meteorological and climate services, the development of new services in the environment should cover the oceans, atmosphere, land and biosphere, and natural disasters to the extent that they interact with, drive or are driven by meteorology and climate."

The purpose of this document is to describe the activities and programmes that the EUMETSAT Secretariat is conducting with the aim of positioning EUMETSAT as the leading European Operational Agency serving the space data needs of the Operational Oceanography User Community with both routine and off-line products.

The primary objective of EUMETSAT is to act as the main space data provider to serve the requirements of the GMES fast track service on Marine core Service (MCS).

These EUMETSAT activities in ocean monitoring have been approved by the 60th Council of EUMETSAT.

2 USER NEEDS

The GMES Marine Core Services Implementation Team published in 2008 some recommendations in its report on "Space infrastructure for the GMES Marine Core Service".
It can be considered that these recommendations give an adequate view of the ocean operational community user needs.

> The Jason series is an essential and critical component of the GMES satellite programme for MCS. Planning of Jason-3 must be a priority for GMES.
>
> The MCS requires a high resolution altimeter system with at least three altimeters in addition to the Jason series. Sentinel-3 should include a constellation of two satellites, flying simultaneously, providing adequate coverage and operational robustness. Instrumentation costs for S3 should be reduced as much as possible to allow for a two-satellite system.

The priority for Sea Surface Temperature is for high accuracy dual view measurements. The large swath requirement has a much lower priority, in particular (but not only), if S3 is a two satellite system.

As far as Ocean Colour is concerned, a sensor having a similar spectral resolution to MERIS is essential to meet the important shelf and coastal ocean water quality measurement requirements. The use of a SeaWiFS type of instrument (reduced number of channels) would serve only the minimum operational requirements for the open ocean.

SAR data (Sentinel 1) are required for oil spill detection and sea ice monitoring. This is clearly a European core service that should be considered as part of the MCS. The requirement is for at least one and preferably two SAR missions in addition to the other non-European missions (e.g. Radarsat).

Access to other European and non-European (e.g. NPOESS, RADARSAT) satellite data in real time is fundamental for the MCS.

Ground segment requirements will be addressed in a specific report/note. The main recommendation is likely to be that the GMES ground segment should develop strong interfaces with Eumetsat Ocean&Sea Ice SAF and with the MCS satellite Thematic Assembly Centres (TACs).

The following sections shortly present how EUMETSAT anticipate contributing to the fulfilment of these requirements, based on its current assets but also through new activities.

3 INVOLVEMENT OF EUMETSAT IN SUPPORT OF OPERATIONAL OCEANOGRAPHY

3.1 Current programmes

The EUMETSAT MSG and EPS programs are already contributing to the global ocean observing system. For example, the SEVIRI on MSG and AVHRR on METOP measurements are essential input for the NRT high-resolution mappings of SST and the derivation of radiative heat fluxes.

Scatterometers like Seawinds and ASCAT on METOP provide in NRT essential details on the momentum forcing (surface winds) and basic parameters (friction) for the determination of the turbulent air-sea fluxes. Currently, NWP models cannot provide the same resolution even with the assimilation of the scatterometer data. There are strong relationships between sea surface temperature (SST) and surface wind stress, especially in regions of strong SST gradients. In addition, radar altimeters are the key instruments to map and monitor the associated mesoscale motions and unique in providing Upper Ocean integrated heat content. Hence, there is a lot of synergy in the combined use of the instruments.

Future EUMETSAT mandatory programmes (MTG and post-EPS) would increasingly contribute to the delivery of useful data for operational oceanography.

EUMETSAT, through its current mandatory programmes (Meteosat, MSG and EPS), is already involved in a number of missions delivering key data for operational and science oceanography users.

In response to the requirements from the meteorological and climate community, EUMETSAT Member States have made a major effort by establishing the Ocean and Sea Ice Monitoring SAF (OSI SAF). This SAF develops and delivers Near Real Time products of Sea Surface Temperature, radiative heat fluxes, Ocean Vector Winds and Sea Ice based on data from MSG and EPS satellites, as well as third party missions. These products are disseminated in near real time via EUMETCast, or ftp, to the various Regional and Global Data Assembly Centres (RDAC's and GDAC's) of the Operational Oceanography community and also to the end users. Several products are already in an operational or preoperational state.

EUMETSAT is also already committed to the OSTM/Jason-2 mission, a partnership with CNES, NASA and NOAA. In this mission, EUMETSAT ensure operational and timely delivery of the Jason-2 wind speed and significant wave height observations which are key requisites for sea state services, bringing the essential Sea Surface Height (SSH) data for detecting the ocean mesoscale eddies, sea level variability and sea level rise. These products are delivered through EUMETCast and via the GTS network.

The exchange of geostationary data with NOAA is referred to under the "Agreement between EUMETSAT and NOAA on Access to Images and Meteorological Data Distribution Material from the EUMETSAT Geostationary Satellites". Access by EUMETSAT to the U.S polar data is covered by the Initial Joint Polar System (IJPS), the Joint Transition Activities (JTA) Agreements and related letters. The above Agreements secure the operational access by EUMETSAT to data generated by U.S. satellites from the GOES, POES and DMSP series. They also cover the access to future NPOESS satellite data, and discussions are underway to extend this to the NPOESS Preparatory Programme (NPP) mission.

Therefore, EUMETSAT is currently is a position to operationally deliver relevant data from the U.S. to the Operational Oceanography User Community.

3.2 Future programmes

EUMETSAT is currently engaged or exploring different areas which will increase its involvement in support to operational oceanography activities.

3.2.1 Jason follow-on program

As for Jason-2 OSTM, the optional EUMETSAT Jason-3 programme will rely on international partnership between EUMETSAT, NOAA and CNES. In addition, it is expected that ESA and the European Commission will contribute. The increased role of the NOAA and EUMETSAT operational agencies reflects the ongoing transition from research and development towards full operations. The optional Jason-3 Programme will constitute the first element of a long term European solution for precise altimetry missions to be complemented by a Jason-CS programme,

developed by ESA. This programme should be developed on the basis of the EUMETSAT cooperation model successfully used for operational meteorology. It is indeed essential to plan for a series of operational satellites developed along the principle used for operational meteorology in Europe.

The long-term objective (post 2013) is to have a single global altimetry system covering both the non-synchronous and the sun synchronous orbits, with common technology being used to the extent possible. This would be achieved with contributions from at least the US and Europe.

3.2.2 GMES Sentinel 3

In early 2006, the EUMETSAT Secretariat produced a position paper which provided a consolidated view of the proposed implementation approach for all the GMES Sentinels with a particular focus on the areas where EUMETSAT has the potential to contribute, oceanography and atmosphere monitoring. On this basis, ESA and EUMETSAT have jointly established a set of agreements which define EUMETSAT's role as operator of ESA GMES Sentinel-3 satellite. The role of EUMETSAT is:

To generate and disseminate all Sentinel-3 products routinely required by the EC GMES Marine Core Service and its related downstream services;

To serve the offline requests of the Operational Oceanography User Community for Sentinel-3 products (using a distributed network of centres of expertise);

To monitor and control the spacecraft and flight operations segment;

To acquire payload data, in a mode consistent with the overall GMES ground segment design which is under ESA's responsibility.

3.2.3 Third party data

Addition to its mandatory and optional programmes, EUMETSAT has also signed or is under discussion on a number of Agreements with other organisations with the objective to increase data and product exchanges with those.

One can note the Agreement with ISRO with the objective for EUMETSAT on one side to get access to relevant data and products from Oceansat2 (Scatterometer and ocean colour) and also, in synergy with Jason-2 to process the Near Real Time data of the CNES-ISRO SARAL altimetry mission.

Discussions have also been engaged with the Chinese State Ocean Administration (SOA)

4 CONCLUSIONS

In conclusion, it is noted that there is an expectation from both the meteorological and operational oceanography user communities that established services in terms of marine data and products are continued in the long-term. EUMETSAT's involvement

in this area must be considered as a role that needs to be pursued, as its data are necessary to guarantee the fulfilment of existing and emerging services of meteorological (and other) services within EUMETSAT Member States.

With this aim in mind, EUMETSAT has suggested a number of activities to be undertaken in the future. In terms of priorities, these activities would focus on:

The further development of the ESA – EUMETSAT cooperation on the ESA GMES Sentinel-3 satellites;

The definition of a Jason Follow-on Programme;

The initiation of discussions with third-parties to explore the implications of EUMETSAT operationally disseminating their data that is of relevance to the Operational Oceanography User Community.