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SHIP OBSERVATIONS TEAM

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ITEM III-2.2

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REPORT ON THE E-SURFMAR VOS TECHNICAL ADVISORY GROUP

(Submitted by Pierre Blouch, Programme Manager, E-SURFMAR)

Summary and purpose of the document

This document contains the report on E-SURFMAR Voluntary Observing Ship (VOS) activities.

ACTION PROPOSED

The Team will review the information contained in this report, and comment and make decisions or recommendations as appropriate. See part A for the details of recommended actions.

Appendices: A. Full report on the E-SURFMAR VOS component

- A - DRAFT TEXT FOR INCLUSION IN THE FINAL REPORT

III-2.2.1 Mr Pierre Blouch reported on the activities by the Surface Marine Observation Programme (E-SURFFMAR), an optional programme of the Network of European Meteorological Services (EUMETNET) Composite Observing System (EUCOS), and in particular on its VOS Technical Advisory Group (VOS-TAG). He noted that E-SURFMAR was co-ordinating the activities of about 50% of the world's VOS.

III-2.2.2 Although some of the topics were discussed in detail under other agenda items, Mr Blouch drew the meeting's attention to a number of developments carried out since SOT-IV. In particular:

(i.) The development and the first deployment of a simple AWS called 'Baros'. This station reports only air pressures and GPS positions through Iridium Short Burst Data (SBD). Twelve stations have been built. Priority was given to E-ASAP ships for the first installations, but ships plying in the Mediterranean Sea will be equipped soon;

(ii.) The data compression on Batos AWS reporting through Inmarsat-C (~55 units) has allowed hourly observations to be made instead of 3-hourly, without any increase in communication costs;

(iii.) The "half compression" data technique has also been successfully tested on a few ships. Unfortunately, it has not been deployed operationally. The TurboWin software is able to produce such reports, which may be sent through Inmarsat-C thanks to a dedicated SAC (different from Code 41). Communication costs are reduced by at least 50%. The decoding software can be freely distributed;

(iv.) The use of normalized GTS identifiers, which may be considered as "masked callsigns" on about 90 VOS ships, including 60 AWS. This practice facilitates the monitoring and the management of the E-SURFMAR fleets and avoids full identification of the ships on the Internet. A cross-reference list of mask/real callsigns is regularly provided to JCOMMOPS;

(v.) The development of a database that is able to manage online the Pub 47 metadata, as well as the "masked" callsigns. As a consequence, all metadata from European VOS are quickly updated and available for the WMO and IOC communities. CSV and XML files may be uploaded and downloaded. Mr Blouch proposed to the meeting that non-European VOS operators should also be invited to add metadata for their fleets into the database. In this respect, it was noted that the database already hosts Australian and New Zealand VOS metadata.

(vi.) The E-SURFMAR monitoring tools have been further enhanced. Improvements include the comparisons to model outputs for more observed parameters, the use of ECMWF analysis in addition to the French ones, the use of a sea/land mask to improve the reliability of interpolated model outputs, and the use of metadata when known to adjust the observations.

III-2.2.3 Mr Blouch also informed the meeting about the establishment of an E-SURFMAR Task Team on AWS. The main purpose of this team is to define and agree on specifications, which can be used in calls for tender for the procurement of basic and complex AWS for use on observing ships recruited by E-SURFMAR participants. The team recently met for the third time in Geneva on 14-15 May and will produce a report which will be made available to all VOS operators (i.e. not only European).

III-2.2.4 The full report on E-SURFMAR VOS activities is provided in Appendix A.

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APPENDIX A

Report on the E-SURFMAR VOS component

Submitted by Pierre BLOUCH – E-SURFMAR Programme Manager

I. Background

1. E-SURFMAR is an optional programme of the ground based EUMETNET Composite Observing System (EUCOS). It is responsible for surface marine observations, including VOS and data buoys. EUMETNET is the Conference of European Meteorological Services. Seventeen countries out of the 24 EUMETNET members are currently participating in E-SURFMAR.

2. E-SURFMAR objectives are to coordinate, optimize and progressively integrate the surface marine observations within the operational EUCOS framework. EUCOS' present aim is to optimize the ground observing system to improve short-range forecasts over Europe. However, E-SURFMAR is also supporting VOS activities outside the EUCOS area of interest, and contributes to other applications such as nowcasting and climatology.

3. The E-SURFMAR programme is funded through participant contributions, which are based on their respective Global National Incomes (GNI). The programme was a subject of a comprehensive study, carried out in 2004, which defines its broad design and objectives. The study will be revised in 2009-2010.

II. Data availability

1. E-SURFMAR is coordinating the activities of about 50% of the VOS in the world. In 2008, EUMETNET ships reported 59% of world VOS observations, approximately, compared with 50% in 2006. The increase is mainly due to the increased use of Batos Automatic Weather Stations which now report hourly observations instead of 3-hourly ones, previously. This has been possible without any increase of the communication costs thanks to the use of data compression.

2. In 2008, the number of manned observations reported by European VOS ships remained stable in the North Atlantic, but increased significantly elsewhere. This encouraging result is due in part to increased collaboration between European PMOs. The three European countries, which provide the most numerous manned VOS reports – Germany, United Kingdom and the Netherlands –, increased their numbers by 14%, 24% and 40% respectively when compared to 2007.

3. Globally, EUMETNET ships reported 320,000 manned and 424,000 automated observations in 2008. The number of automated observations has been higher than those of manned VOS since 2007.

III. Automation

1. E-SURFMAR participants are operating different ship borne Automated Weather Stations (AWS):

(a) France is operating about 50 Batos stations (complex AWS reporting through Inmarsat-C, 43 active at the beginning of 2009) and 7 Minos (simple AWS reporting through Argos);

(b) Germany is operating about 15 Milos stations (complex AWS reporting through Meteosat DCP) and 3-4 ships data loggers. Plans exist to renew these stations soon;

(c) UK evaluated a few different types of AWS: Automet, AVOS, Batos, Deck Drifter, MetPod and Minos. Six Minos, two deck drifters and one MetPod were operating at the beginning of March 2009. A Vaisala MAWS system is also being evaluated;

(d) Norway is using 3 AWS stations based on a QLC-50 system;

(e) Spain is operating a Milos station (not in operation at the beginning of 2009).

2. In addition, five Batos stations funded by E-SURFMAR were installed on board VOS contributed by member National Meteorological Services (NMS): UK, Ireland and Denmark. Further stations of that kind will be installed in 2009.

3. Twelve Baros stations reporting only hourly pressure measurements through Iridium SBD have been built since the SOT-IV meeting. A first prototype of a Baros station was installed by Meteo-France on a trawler from October 2007 to August 2008. It successfully reported 4690 observations before being removed when the trawler was sold. By the beginning of March, three Baros AWS were in operation on E-ASAP ships and eight others were ready to be installed. AWS are suitable on upper air E-ASAP ships to assist with data targeting exercises: operators may rapidly check where their ships are. When all E-ASAP ships have been equipped with Baros systems, consideration will be given to installing them on ships plying in southern European sea areas, in particular in the Mediterranean Sea.

4. The Met Office is also testing a simple AWS called MetPod. Presently, this AWS presently reports hourly measurements of air pressure, air temperature and air humidity through Iridium SBD, although it can also report wind speed and direction and has the flexibility to report additional parameters if required.

5. In 2008, E-SURFMAR established a task team on AWS. The main purpose of this team was to define and agree specifications, which could be used in calls for tender for the procurement of basic and complex AWS for use on observing ships recruited by E-SURFMAR participants. The team met twice in 2008 and had its final meeting prior to SOT-IV. A report on the Teams work will be made available.

IV. Data communication

1. Considerable work has been undertaken since SOT-IV by the E-SURFMAR programme. The SOT Task Team on Satellite Communications gives details into the report. This work includes:

- A “half compression” data technique, which had been developed to reduce the size of the manned observation reports, sent through Inmarsat-C and so, their transmission costs. The functionality to code such reports was made available in the TurboWin electronic logbook software produced by KNMI. The technique has been successfully tested on several ships. However, by the beginning of January 2009, only one French ship (TBWFR02), producing 180 observations per month in average, was still using this system;
- The operational use of Inmarsat-C Data Reporting service for Batos AWS systems (~55 stations) and of Iridium SBD on other AWS;
- The development of a data processing chain at Meteo-France will be able to convert Inmarsat-C compressed or “half compressed” data as well as Iridium data from ships and buoys into FM13-SHIP and FM18-BUOY messages. The production of FM96-BUFR reports should start in April 2009. The processing software is made freely available to any NMS that would wish use it (Free Software License CeCILL).

2. More than 90 European VOS are now using masked GTS identifiers, which are different from their ITU, assigned REAL callsigns. The identifiers take the form “tttccnn” where: “ttt” is the type of station, “cc” a country code and “nn” an increment. Although they are used as a mask, they also assist greatly the day-to-day monitoring of the fleets.

IV. VOS metadata

1. Because VOS metadata is essential for daily monitoring, performance evaluation and calculation of financial compensations to E-SURFMAR members, a metadata database has been developed. Available online, it allows an easy management of the Pub. 47 fields. CSV and XML files can be uploaded or downloaded, and the metadata can also be updated manually or through the

VOSP002 form. The database also manages MASK callsign records and permits digital images of the ships and instruments to be uploaded.

2. European VOS operators submit their updated metadata for addition to the database on a monthly basis. The database is then used to regularly provide WMO with Pub. 47 metadata for E-SURFMAR VOS (every quarter) and JCOMMOPS with the MASK/REAL cross-reference list. BoM and NZWS have also agreed to make their VOS metadata available in the E-SURFMAR metadata database.

3. The E-SURFMAR database will be adapted in the near future so that it can also complete FM96-BUFR reports built with the raw VOS data with suitable metadata such as the height of the anemometer and the method of obtaining the SST.

V. Compensations and fundings

1. Since E-SURFMAR started in 2003; financial compensation is paid every year to VOS operators for the observations carried out by their ships. In 2009, 0.24 € will be paid for each manned observation and 0.07 € for each automated measurement.

2. Compensation is also paid to those National Meteorological Services who bear the communication costs. In 2009, about 0.16 € should be paid for each report sent by a conventional VOS and 0.05 € for each report sent by an AWS. The share of compensations between the operators and NMSs are based on the observations carried out in the previous year.

3. In 2007, the E-SURFMAR programme also funded the adaptation of an AIS ship tracker tool – Royal Dirkswager Ship2Report system – to assist European PMOs to keep track of VOS movements within Northern European waters. In 2008, the programme also financially supported KNMI for their work on the development of the TurboWin program.

VI. Data monitoring and data quality

1. Since the E-SURFMAR design study was carried out, air pressure data reported by EUMETNET ships have been monitored as a matter of priority. The quality of measurements reported by conventional VOS still appears, on average, to be worse than those of AWS reports. Human readings often introduce non systematic errors on sea level pressure observations. Double correction of the pressure height of the barometer above the waterline is still a common error, although TurboWin includes warnings to the observers about this issue.

2. Since 2007, the E-SURFMAR monitoring tools have been improved. New features include:

(a) More parameters are now compared to model analysis. Humidity as well as wave height and period have been added;

(b) ECMWF analysis are now used in addition to those of Meteo-France (Arpege model);

(c) A sea/land mask is now used on all parameters except air pressure. Interpolations of model outputs at the locations of the ships are more representative of the conditions at sea;

(d) The height of the anemometer is now used (if present in the metadata) to bring the wind speed measured by the ship at the model level (10 metres) in a standard atmosphere, before comparison.

3. Monitoring tools for VOS (and data buoys) are available at ***http://www.meteo.shom.fr/qctools/***. They are not restricted to EUMETNET platforms.

VII. Meetings and Web sites

1. The 6th VOS-TAG meeting was be held on 14-15 May at WMO Headquarters in Geneva

2. E-SURFMAR public web pages may be seen at ***http://www.eumetnet.eu/***
and ***http://www.eucos.net/*** (choose “EUCOS networks” then “E-SURFMAR” in the left menu)
Working area (password protected) : ***http://esurfmar.meteo.fr/wikisurf-wa/***

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