TECHNICAL WORKSHOP

Enhancing ocean observations and research, and the free exchange of data, to foster services for the safety of life and property


(Geneva, 5-6 February 2019)

Concept note and provisional agenda

(version of 20190201)

(https://public.wmo.int/en/events/meetings/technical-workshop-enhancing-ocean-observations-and-research-and-free-exchange-of)

Organizing Committee: Chair: Tom Cuff (JCOMM/SCG); Members: Jon Turton (JCOMM/OCG), Erik Andersson (ECMWF), Glenn Nolan (EuroGOOS), Martin Visbeck (WCRP JSC), Johan Stander (JCOMM Co-President), Emma Heslop (IOC of UNESCO), Prof. Tullio Scovazzi (Italy).
CONCEPT NOTE

The safety and wellbeing of people throughout the world and the economic benefits to all nations are at the centre of the WMO mandate and action. To address meteorological hazards, strengthen resilience in the face of climate change and variability, and build the scientific knowledge base for sustainable development, sustained oceanographic and marine meteorological (ocean/met.), observations and their free and unrestricted exchange are critical.

While the oceans cover more than 70% of the Earth surface, the natural system is fully coupled between the atmosphere and ocean and the delivery of effective and improved marine and weather services depends on both atmospheric and oceanic information. The growth of seamless forecasting systems means that meteorological services need an increasing amount of quality information about the ocean and the atmosphere above the ocean surface in order to be able to deliver the weather, marine and climate services derived from the use of such prediction systems. Ocean and marine-focused services particularly need both ocean and atmospheric information. Examples of products and services and the required data are provided in table 1.

This workshop is organized by WMO with the support of its technical commissions and co-sponsored programmes.

The workshop will consider the evolving requirements for ocean observation and research in support of WMO Application Areas with focus on marine meteorological services, which particularly rely on global and high resolution numerical weather prediction. The following Applications, which also rely on ocean observations, will also be addressed: tropical cyclone, storm surge and high impact weather forecasting, sub-seasonal to longer range prediction, climate monitoring, climate modelling, climate impact analysis and climate services. As an example, Observing System Simulation Experiments (OSSEs) and sensitivity analyses could be used to investigate the importance of data collected within EEZs. The workshop may consider proposing a pilot activity in this regard.

To address such requirements, ocean/met observations are made in the framework of WMO initiatives such as the WMO Integrated Global Observing System (WIGOS), the World Weather Watch (WWW), and the Global Atmosphere Watch (GAW). Different collection means are used, such as ships of opportunity, data buoys and installations, profiling floats, remote sensing by satellites, and cabled observatories, to support critical services relying heavily on free and unrestricted exchange of the collected data.

The expected outcome of the workshop will be a set of recommendations with relevant standards and a workable list of marine meteorological and oceanographic variables (see note), including from exclusive economic zones, indispensable for the issue of timely and

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1 The Joint WMO-IOC Technical Commission on Oceanography and Marine Meteorology (JCOMM), the Commission for Basic Systems (CBS) and the Commission for Instruments and Methods of Observation (CIMO) and its co-sponsored WMO-IOC-ISC World Climate Research Programme (WCRP), IOC-WMO-UNEP-ISC Global Ocean Observing System (GOOS) and WMO-IOC-UNEP-ISC Global Climate Observing System (GCOS).

2 The GOOS strategic mapping tool has been developed to help provide an overview of the Global Ocean Observing System components. This visualization of the system shows the links to the Essential Ocean Variables identified by the GOOS Expert Panels, highlighting how they are efficiently measured through the observing networks to contribute to
accurate storm warnings for the safety of life at sea and the protection of life and property in coastal and offshore areas. Two sets of recommendations are foreseen:

(1) Short term approach with focus on facilitating the making of surface marine meteorological observations in support of safety of life and property at sea;
(2) Longer term approach, and future collaboration with the IOC of UNESCO with regard to ocean observations requirements, including in coastal regions, in particular in support of Earth System Prediction and hydro-climate services.

This outcome will be submitted to the World Meteorological Congress for consideration in the updating of Resolution 9 (Cg-IX) and they will be offered as a contribution to the United Nations Decade of Ocean Science for Sustainable Development and its objectives I (Knowledge of the ocean system), III (Ocean-related hazards) and IV (Cooperation in observation, data and other infrastructure).

The workshop will be organized in conjunction with the 2018 face-to-face meeting of UN-Oceans, the UN interagency coordination mechanism on ocean affairs, which will be hosted by WMO at the Headquarters. It will also entail the demonstration of the role of the WMO-IOC JCOMM in situ Observations Programme Support Centre (JCOMMOPS) for the distribution of ocean data.

Participation in the workshop will be by invitation to high-level experts in the fields of operational oceanography and marine meteorology, ocean research, instruments and methods of observation, and the law of the sea, as well as representatives of UN-Oceans members.

*Table 1: Examples of products and services and required data.*

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<thead>
<tr>
<th>Requirements</th>
<th>Products and services</th>
<th>Required data</th>
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<tbody>
<tr>
<td><strong>Maritime distress</strong></td>
<td>· Warnings, bulletins</td>
<td>· Satellite observations</td>
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<td></td>
<td>· Maritime Safety Information</td>
<td>(e.g. wind, sea-ice, sea surface temperature)</td>
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<td>· Forecasts of</td>
<td>· In situ observations</td>
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<td>· Weather (tropical cyclones, storms, wind, precipitation, temperature, snow &amp; frost),</td>
<td>(atmosphere, cryosphere, ocean)</td>
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<td>· Sea-state (waves, currents)</td>
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<td>· Sea-ice &amp; Icebergs</td>
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<td>· Climate outlook information (future)</td>
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<td>· Climatological information (history)</td>
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societal benefits in accordance with GOOS mandates:
http://www.goosocean.org/index.php?option=com_content&view=article&id=120&Itemid=277
### WMO Technical Workshop

*Enhancing ocean observations and research, and the free exchange of data, to foster services for the safety of life and property*

*(Geneva, 5-6 February 2019)*

#### PROVISIONAL PROGRAMME

##### Tuesday 5 February 2019

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tr>
<td>9:00 – 9:30</td>
<td><strong>Opening</strong> – WMO Secretary General (SG), Petteri Taalas, and/or Assistant Secretary General (ASG, Wenjian Zhang)</td>
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<td><strong>Working Arrangements</strong> – Secretariat</td>
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<td><strong>Introduction to session 1</strong> – Sarah Jones (DWD, Germany)</td>
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<tr>
<td>9:30 – 10:30</td>
<td><strong>Session 1 (socio-economic benefits): Socio-economic benefits of WMO Applications using marine meteorological and oceanographic observations</strong></td>
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<td><strong>Chair:</strong> Sarah Jones (DWD, Germany)</td>
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<td><strong>Lectures (10 min each):</strong></td>
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<tr>
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<td>● Sustainable Development Goals (SDGs) and the United Nations Decade of Ocean Science for Sustainable Development (2021-2030) – Martin Visbeck (WCRP, GEOMAR, Germany)</td>
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<td>● Medium to long range forecasting – Erik Andersson (ECMWF)</td>
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<td>● Copernicus Marine Service: Ocean monitoring and reporting - Karina von Schuckmann (Mercator Ocean)</td>
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<td>● Coastal application and other marine meteorological services – Nick Ashton (JCOMM, UK)</td>
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<td>● Severe weather – The Kerala flood example – P.J.Phillip (Institute For Sustainable Development and Research, ISDR, India)</td>
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<td>10:30 – 11:00</td>
<td><strong>Break</strong></td>
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<td>11:00 – 12:30</td>
<td><strong>Panel discussion (90 min) – Panelists:</strong></td>
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<td></td>
<td>● Sarah Jones (DWD, Germany), panel chair</td>
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<td>● Martin Visbeck (WCRP, Germany)</td>
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<td>● Erik Andersson (ECMWF)</td>
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<td>● Karina von Schuckmann (Copernicus Marine Service)</td>
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<td></td>
<td>● Johan Stander (GFCS &amp; JCOMM, South Africa)</td>
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<td>● John Wilkin (USA, OOPC)</td>
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<td><strong>Questions for Panel Discussion:</strong></td>
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<tr>
<td></td>
<td>1. How SDGs are relevant to protection of life and property at sea?</td>
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<td>2. How critical are WMO Applications to protection of life and property at sea?</td>
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<td>3. How do we make sure that ocean observations contribute through</td>
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the Global Data Processing and Forecasting System (GDPFS) for earth system monitoring, prediction and delivery of hydro-climate services relevant for sustainable resource management and adaptation to climate change

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<tr>
<th>Time</th>
<th>Session Details</th>
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<tr>
<td>12.30 – 13.30</td>
<td>Lunch</td>
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<td>13:30 – 14:00</td>
<td>Live demonstration of JCOMMOPS tools</td>
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| 14:00 – 15:30| **Session 2 (data needs and gaps):** The need for observations, assessed gaps and the evolving capabilities for the collection and distribution of oceanographic and marine meteorological data in support of WMO Activities related to safety of life and property at sea,  
  **Chair:** Erik Andersson (ECMWF)  
  **Introduction to session 2** – Erik Andersson (ECMWF) (5 min)  
  **Lectures (15 min each):**  
  - How protection of life and property at sea relies on WMO Application Areas (e.g. NWP) and observations - Nick Ashton (JCOMM, UK) (15 min)  
  - Tropical Cyclone forecasting requirements - Daniel Brown (NHC, USA) (15 min)  
  - WIGOS Framework and outcome of the International Workshop on the Impact of Various Observing Systems on NWP – Erik Andersson (ECMWF) (15 min) - Note: the presentation will bring focus on the need for marine meteorological and ocean observations, incl. in polar regions  
  - Use of ocean observations (requirements and gaps) - John Wilkin (OOPC, USA) and Giovanni Coppini (Italy) (15 min)  
  - Implementation of Ocean Observing Networks and trends with focus on coastal aspects (e.g. innovations, new technology) – Jon Turton (JCOMM, UK) (15 min)  
  - Ship Observations Team (SOT) implementation and issues – Henry Kleta (SOT, Germany), Voluntary Observing Ship Scheme (VOS) Panel (VOSP) Chair on behalf of SOT (15 min) |
| 15:30 – 16:00| Break                                                                            |
Session 2 (continued)

Lectures (15 min each):

- Monitoring of Ocean Observing Networks and support for addressing the gaps in particular in coastal regions – Mathieu Belbéoch (JCOMMOPS) – 15 min
- Global Atmosphere Watch requirements and the making of atmospheric measurements from ships – Chris Fairall (USA) – by teleconference – 15 min

Panel discussion (60 min) – Panelists:

- Erik Andersson (ECMWF), panel chair
- Karina von Schuckmann (Copernicus Marine Service)
- John Wilkin (OOPC, USA)
- Nick Ashton (JCOMM, UK)
- Jon Turton (JCOMM OCG vice-Chair, UK)
- Henry Kelta (VOSP Chair, on behalf of SOT, Germany)
- Stefan Klink (CBS IPET-OSDE, Germany)

Questions for Panel Discussion:

1. What are the most critical applications areas requiring marine meteorological and oceanographic observations to allow WMO to address its mandate to protect life and property, in particular in coastal regions?
2. What are the most critically needed atmospheric, marine meteorological and ocean observations variables to address the needs of these applications?
3. What are the emerging required atmospheric, marine meteorological and ocean observations variables to address the needs of these applications?
4. What are the most critical observational gaps in coastal areas to address the needs of these applications?
5. What are the main obstacles when it comes to filling these gaps?
### Recap of day 1 (30 min)

**Session 3 (Legal regime and practice): The international regime and the practice for the collection of Ship-based observations and other type of mobile marine meteorological platform data in coastal areas and the role of WMO**

**Chair:** Tullio Scovazzi (Italy)

**Introduction to session 3** – Tullio Scovazzi (Italy)

**Lectures:**
- Review of considerations on the legal status of routine meteorological observations and data collection from voluntary observing ships (VOS) in exclusive economic zones - Stefano Belfiore (WMO) (15 min)
- Operational activities and marine scientific research under UNCLOS - Ms. Alice Hicuburundi (Senior Legal Officer, UN/DOALOS) (25 min)
- Open legal questions on operational meteorological observations in marine waters within national jurisdiction - Tullio Scovazzi (Italy) (25 min)

### 10:30 – 11:00

**Break**

### 11:00 – 12:30

**Session 3 (continued)**

**Lectures:**
- Polar code requirements - David Jackson (Canada, IICWG) (25 min)
- IOC requirements and approach with regard to EEZ issue - Emma Heslop (IOC) (25 min)
- National experience regarding current regime – Henry Kleta (Germany) (25 min)

### 12.30 – 13.30

**Lunch**

### 13:30 – 15:30

**Panel discussion (120 min) – Panelists:**
- Prof. Tullio Scovazzi (Italy), panel chair
- Emma Heslop (IOC)
- Alice Hicuburundi (DOALOS)
- Prof. Fred Soons (Netherlands)
- Elie Jarmache (France)
- David Jackson (Canada, IICWG)

**Questions for Panel discussion:**

1. What is the regime for operational activities, such as meteorological observations, under the Law of the Sea Convention? How can “operational” activities be distinguished from
“marine scientific research”?  

2. A country such as the USA has clearly identified the collection of marine meteorological data and other routine ocean observations used for monitoring and forecasting of ocean state, natural hazard warnings and weather forecasts, and climate prediction - not to be marine scientific research. What is the position of other countries?  

3. What principles can be used to facilitate the conduct of operational meteorological observations at sea (not aimed to the exploitation of marine resources) with the necessary freedom and timeliness to serve the purpose of the protection of life and property?  

4. The Convention for the Safety of Life at Sea (Chapter 5, Safety of Navigation; Regulation 5, Meteorological services and warnings) requests Contracting Governments undertake to encourage the collection of meteorological data by ships at sea and to arrange for their examination, dissemination and exchange in the manner most suitable for the purpose of aiding navigation (this data includes atmospheric pressure, wind, air temperature, sea surface temperature, wave height and sea ice extent). What is the legal regime of such observations on surface compared to those in the water column?  

5. Based on the legal regime and the established practice of States, as well as the opinion formulated by the President of the Third Committee of UNCLOS III, what can be inferred about the legal status of routine meteorological observations at sea, including in exclusive economic zones?

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<tr>
<th>Time</th>
<th>Session 4 (Conclusion): Way forward and recommendations of the workshop</th>
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<tr>
<td>15:30 – 16:00</td>
<td><strong>Break</strong></td>
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| 16:00 – 17:30 | **Chair:** Johan Stander (JCOMM co-President, South Africa)  
                **Introduction to sessions 4** – Johan Stander (JCOMM co-President, South Africa)  
                **Lectures (15 min each)**  
                ● Engaging shipping and other ocean industries in ocean observations (Paul Holthus, WOC)  
                **Panel Discussion (30 min) – Panelists:**  
                ● Johan Stander (JCOMM co-President, South Africa), panel chair  
                ● Sarah Jones (DWD, Germany), chair session 1 panel  
                ● Erik Andersson (ECMWF), chair session 2 panel  
                ● Tullio Scovazzi (Italy), chair session 3 panel  
                ● Emma Heslop (IOC)  
                ● Karina von Schuckmann (Copernicus Marine Service)  
                ● Jon Turton (JCOMM OCG, UK) |
Guidance for Panel Discussion:

The workshop will address the short term and longer term approaches to facilitate the making of ocean observations in coastal regions.

In doing so, panel discussion will seek to consolidate the views of the workshop during previous Sessions discussions, in particular to identify a number of principles and technical elements to be brought to WMO Congress. This may include for examples:

- Relevance of WMO activities and applications to address socio-economic benefits, incl. in support of safeguarding life and property at sea;
- Critical variables and observations gaps;
- Roadmap forward to integrate data from partners for delivery of Earth system approaches/climate services;
- Future collaboration between WMO and IOC regarding facilitating the making of oceanographic observations in coastal regions in support of Earth System Prediction and climate services;
- How legal framework could be clarified, updated in such a way to facilitate the making of observations in coastal regions in support of WMO applications; etc.

Conclusion (30 min) – Johan Stander (South Africa) and Wenjian Zhang (WMO Assistant Secretary General):

Key principles and technical elements (e.g. list of critical variables to be observed and reported; list of emerging variables increasingly required) for a WMO 18-Cg resolution (or WMO-IOC), which may be transmitted to UN processes (UNGA and/or ICP).