



AGENDA ITEM 6: EARTH SYSTEM OBSERVATIONS AND PREDICTIONS

AGENDA ITEM 6.1: WMO Integrated Global Observing System

MARINE OBSERVATIONS

DRAFT RESOLUTIONS

Draft Resolution 6.1(3)/2 (Cg-18)

Ensuring Adequate Marine Meteorological and Oceanographic Observations and Data Coverage for the Safety of Navigation and the Protection of Life and Property in Coastal and Offshore Areas

THE WORLD METEOROLOGICAL CONGRESS,

Noting Recommendation 14 (EC-70), and subsequent work of JCOMM and its Observations Coordination Group (OCG) in liaison with the IOC-WMO-UN Environment-ICS Global Ocean Observing System (GOOS) Steering Committee,

Recalling:

- (1) Article 2 of the Convention of the World Meteorological Organization, committing Members: "(a) To facilitate worldwide cooperation in the establishment of networks of stations for the making of meteorological observations as well as hydrological and other geophysical observations related to meteorology ... ", and (b) "To promote the establishment and maintenance of systems for the rapid exchange of meteorological and related information",
- (2) The United Nations Convention on the Law of the Sea of 10 December 1982 (UNCLOS), in particular the provisions of Part XIII on marine scientific research, which require States and competent international organizations to promote and facilitate marine scientific research, including through cooperation, in order to increase scientific knowledge of the marine environment as a critical underpinning of effective measures to preserve the marine environment and ensure the sustainable use of ocean resources for the benefit of all mankind,
- (3) The report of the Third Committee of the Third United Nations Conference on the Law of the Sea (1973–1982), which included the letter sent on 25 August 1980 to the Secretary-General of WMO by the Chair of the Committee expressing that in his opinion the provisions of Part XIII of UNCLOS on marine scientific research would not create any difficulties and obstacles hindering adequate meteorological coverage from the ocean areas, including areas within the exclusive economic zones, carried out both in the

framework of existing international programmes and by all vessels, since such activities had already been recognized as routine observation and data collecting which was not covered by Part XIII and that they were in the common interest of all countries and had undoubted universal significance, as they are indispensable for the issue of timely and accurate storm warnings for the safety of navigation as well as for the protection of life and property in coastal and offshore areas,

- (4) The present Marine Meteorology and Oceanography Programme and Tropical Cyclone Programme, which use both vessels, under the Voluntary Observing Ship (VOS) Scheme, and operational surface marine meteorological observing platforms (e.g. moored and drifting buoys, and potentially unmanned surface vehicles), hereinafter called surface observing platforms, and strive to provide adequate meteorological coverage from the ocean areas, including areas within the exclusive economic zones, falling therefore under the content and the spirit of the letter mentioned in paragraph (3) above,
- (5) Resolution 9 (Cg-IX) – United Nations Conference on the Law of the Sea, which requested the Executive Council and the Secretary-General: (a) To arrange, in close consultation with the president of the Commission for Marine Meteorology (now Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology), for a continuing review of the implications of the legal provisions of the Convention on the ocean-related activities of WMO with a view to informing the United Nations and Members of WMO, as appropriate; and (b) To take action, as necessary, to ensure that the ocean-related activities of WMO, both operational and scientific, are undertaken under the most favourable conditions,
- (6) Resolution 40 (Cg-XII) – WMO policy and practice for the exchange of meteorological and related data and products including guidelines on relationships in commercial meteorological activities, which recognizes marine meteorological observations as essential data, and which are thereby freely exchanged in real time among all countries for the general benefit of all countries,
- (7) The International Convention for the Safety of Life at Sea (SOLAS, 1974) as amended,

Further noting:

- (1) The *Technical Regulations* (WMO-No. 49), Volume I, Part I,
- (2) The *Manual on the WMO Integrated Global Observing System* (WMO-No. 1160),
- (3) The *Manual on Marine Meteorological Services* (WMO-No. 558), Volume I, Part I, defining WMO Members' responsibility for issuing warnings for high seas and coastal waters according to internationally agreed procedures,

Welcoming the outcome and recommendations of the WMO Technical Workshop on enhancing ocean observations and research, and the free exchange of data, to foster services for the safety of life and property ([Ocean Safe](#), Geneva, 5-6 February 2019), which was organized as a contribution to the planning phase (2019–2020) of the United Nations Decade of Ocean Science for Sustainable Development (2021–2030),

Considering:

- (1) That adequate marine meteorological data coverage from ocean areas, including those from the exclusive economic zones (EEZs), is indispensable for the issue of timely and accurate storm warnings for the safety of life at sea and the protection of life and property in coastal and offshore areas,
- (2) That the SOLAS Convention, Chapter V, Safety of Navigation, Regulation 5, specifies that the contracting governments undertake, inter alia, to encourage the collection of

meteorological data by ships at sea and to issue warnings of gales, storms and tropical storms,

- (3) That the VOS Scheme, which has undergone technological developments, is even more important today, not only to ensure the safety of navigation and protection of life and property in coastal and offshore areas, but also to face other concerns, in particular the consequences of climate change,
- (4) That Members of WMO have taken on the responsibility of issuing warnings for the high seas and coastal waters according to internationally agreed procedures, including those based on advisories by Regional Specialized Meteorological Centres and Tropical Cyclone Warning Centres,
- (5) That WMO-coordinated research programmes require extensive marine meteorological and oceanographic data sets from the world ocean, including EEZs,
- (6) That meteorological observations from satellites over the oceans, including over EEZs, are routinely made available for operational purposes,
- (7) That *in situ* observations over the oceans, from the VOS and surface observing platforms, are indispensable for the generation of forecasts and services, as some of the marine meteorological and oceanographic observations, such as sea-level pressure, sub-surface temperature and salinity, cannot currently be adequately measured from space,
- (8) That *in situ* observations, for example sea surface temperature, wind and waves are also essential for calibration and validation of satellite data,
- (9) That marine meteorological and oceanographic observations included in numerical models contribute to improving prediction skills at all time scales,

Recognizing:

- (1) That since Resolution 9 (Cg-IX) was adopted, the observational user requirements of operational WMO applications, including global and high-resolution numerical weather prediction and sub-seasonal to longer-range prediction, and climate services have substantially evolved, and are now increasingly relying on marine meteorological and oceanographic observations,
 - (2) The future direction of WMO, as part of the Strategic Plan, in support of Earth system prediction which, coupled with ocean models, will be relying greatly on marine meteorological and oceanographic data made routinely available to WMO,
 - (3) That technological advances can now provide *in situ* observational data of the requisite enhanced quality and spatial and temporal resolution, from the world's oceans, including from EEZs,
 - (4) That there is no regulation in place for the collection of marine meteorological and oceanographic measurements within EEZs in support of operational applications of WMO, while the IOC Guidelines for the Implementation of Resolution XX-6 of the IOC Assembly Regarding the Deployment of Profiling Floats in the High Seas within the Framework of the Argo Programme (IOC Resolution EC-XLI.4) are operated effectively and fully consistently with UNCLOS,
 - (5) That open source TurboWin software currently used almost worldwide in the VOS Scheme for dissemination of (manual and semi-automated) VOS observations from ship to shore is currently only supported by the Dutch NMHS KNMI in the framework of the EUMETNET programme E-SURFMAR;
- Reaffirms:**

- (1) The indispensable and critical nature of routine marine meteorological and oceanographic observations used operationally by WMO Application Areas, through the variables listed in the Annex to this Resolution, including from EEZs, to the provision of services in support of safety of navigation and the protection of life and property in coastal and offshore areas;
- (2) The critical importance of the VOS Scheme and operational surface observing platforms, for ensuring the provision on a routine basis of adequate marine meteorological and oceanographic observations and data coverage, noting that:
 - (a) Voluntary observations from ships have been at the core of WMO and its predecessor's activities since the 1853 Maritime Conference held in Brussels for devising a uniform system of meteorological observations at sea and are specially recognized and requested in the 1974 SOLAS Convention and previous SOLAS Conventions;
 - (b) The VOS Scheme and surface observing platforms are not covered by UNCLOS Part XIII on marine scientific research and can consequently be freely operated in the EEZs;
 - (c) The VOS Scheme and surface observing platforms are supported by consistent practices of Members according to WMO Technical Regulations;
 - (d) While not covered by UNCLOS Part XIII, the operation of the VOS Scheme and surface observing platforms fully complies with UNCLOS general principles, such as the peaceful use of the sea, protection of human life at sea, dissemination of information;
- (3) The need to further strengthen existing cooperation and activities under surface observing platforms;
- (4) The fact that observations from the VOS Scheme and surface observing platforms are made in the context of agreed, long-standing operational systems and that they are freely exchanged among, and are of general benefit to, all countries;
- (5) The fact that VOS observations are made, on a voluntary basis under the VOS Scheme, by merchant vessels engaged in normal trading activities, whose officers should be reassured, where necessary, of the continuing legality and importance of their work in this regard;

Requests the Joint WMO-IOC Collaborative Board

- (1) in close consultation with the technical commissions and the Research Board to keep reviewing the implications of the legal provisions under ocean-related instruments (e.g. UNCLOS, SOLAS, Polar Code) on the ocean-related activities of WMO with a view to informing the Members of WMO and interested United Nations organizations, as appropriate;
- (2) to foster and contribute actively to projects for the United Nations Decade of Ocean Science for Sustainable Development (2021-2030) that will ensure the design and sustainability of adequate marine meteorological and oceanographic observations and data coverage;
- (3) to search for a more sustainable setup for the maintenance of the TurboWin software worldwide;

Requests the Executive Council to include a reference to UNCLOS and other relevant ocean-related legal instruments in Part 3 (Impacts of international agreements) of the WMO Statement on the Role and Functions of National Meteorological and Hydrological Services;

Urges Members:

- (1) To facilitate and promote marine meteorological and related oceanographic observational programmes to make their observations collected over the ocean, in particular from within EEZs, available for operational and research purposes;
- (2) To take, as necessary, action to ensure that the ocean-related activities of WMO, both operational and scientific, are undertaken under the most favourable conditions;
- (3) To adopt legislation encouraging the collection of marine meteorological and oceanographic data, as listed in the Annex to this Resolution, by surface observing platforms and to arrange for their dissemination and exchange in real time;
- (4) Where marine meteorological observations are generally made on a voluntary basis under the VOS Scheme by vessels engaged in their normal activities, to reassure their officers, where necessary, of the continuing legality and importance of their work in this regard;

Requests the Secretary General to relay the Resolution to the United Nations General Assembly for its consideration.

This Resolution replaces Resolution 9 (Cg-IX), which is no longer in force.

[Annex: 1](#)

Annex to draft Resolution 6.1(3)/2 (Cg-18)

Marine meteorological and oceanographic variables, the observation of which is critical for the safety of navigation and the protection of life and property in coastal and offshore areas

Observations of the following marine meteorological and oceanographic variables, including from within exclusive economic zones, are used operationally by WMO applications and are critical for those applications to allow WMO to deliver the services in support of the safety of navigation and the protection of life and property in coastal and offshore areas:

- Sea level pressure,
- Surface wind speed and direction,
- Surface air temperature,
- Surface relative humidity,
- Precipitation at the surface,
- Sea surface temperature,
- Sea surface salinity,
- Sea surface currents,
- Directional and non-directional wave observations,
- Visibility,
- Sea-ice,
- Ice accretion,
- Sub-surface temperature and salinity,
- Sea level,
- Atmospheric composition,
- Atmospheric temperature, humidity and wind profiles,
- All other ocean surface and atmospheric observations that are needed to derive fluxes between the ocean and the atmosphere.