



## **OCEANS AND THE LAW OF THE SEA: REPORT OF THE SECRETARY-GENERAL – PART II (2015)**

### **CONTRIBUTION OF WMO**

#### **SUMMARY**

WMO is the authoritative voice on the state and behaviour of the Earth's atmosphere, its interaction with the oceans, the climate it produces and the resulting distribution of water resources. The Oceans provide essential natural resources to human beings, and regulate the global climate. WMO contributes to oceans-related issues through the observation and monitoring of the ocean and climate; research on the climate and Earth systems; development and delivery of services for disaster risk reduction, including marine hazards; provision of science-based information and tools for policymakers and the general public at regional and global levels.

WMO continues strengthening the global observing systems through implementation of the WMO Integrated Global Observing System (WIGOS) and WMO Information System (WIS), and observing networks with partners. The WMO-ICSU-IOC-UNEP Global Climate Observing System (GCOS) serves the requirements of Members for comprehensive, continuous, reliable climate data and information, for climate monitoring, research, projections and assessments, to provide climate information and to promote sustainable development. The IOC-WMO-UNEP-ICSU Global Ocean Observing System (GOOS) improves its capabilities in climate- and ocean-related services, and recognizes the importance of coastal observations and links to products for societal benefits.

WMO coordinates the World Climate Research Programme (WCRP) to work on sea level rise and study changes in tracks of medium-latitude storms such as tropical cyclones, which reflect the complexity and interactions among the major components of the planet – ocean, atmosphere, land and ice. WCRP will work closely with IOC on oceanographic activities in WCRP Grand Challenge on Regional Sea Level. The Global Atmosphere Watch (GAW) continues its contribution on the latest trends and atmospheric burdens of the most influential, long-lived greenhouse gases, and has published its implementation plan 2016–2019.

WMO continues its collaboration with IMO and IHO for coordinated and standardized metocean information, forecasts and warning services for safety of life and property at sea, improved marine environment and sustainable management of natural resources, with due focus on Polar Regions. WMO through the work of the Marine Meteorology and Oceanography Programme coordinates and implements the Coastal Inundation Forecasting Demonstration Project (CIFDP) among others, to protect livelihoods and support the sustainable development of coastal communities.

WMO contributes to the global development agenda through its programmes and initiatives. The 17<sup>th</sup> World Meteorological Congress established new Small Island Developing States programme to consolidate WMO actions and activities for improved weather and climate services in SIDS and Member Island Territories. In the context of the Third World Conference on Disaster Risk Reduction to develop the Sendai Framework for DRR, WMO with multiple stakeholders in the UN system and beyond advocated to substantially increase the availability of and access to multi-

hazard early warning systems and disaster risk information and assessments, including for marine hazards, by 2030. WMO advocated also the established of an International Network for Multi-hazard Early Warning Systems (IN-MHEWS), and is now working extensively on engaging interested stakeholders, partners and organizations to develop and facilitate IN-MHEWS.

## **DEVELOPMENTS RELATING TO INTERNATIONAL SHIPPING ACTIVITIES**

1. WMO continued to work with the International Maritime Organization (IMO) and the International Hydrographic Organization (IHO) on the World-Wide Metocean Information and Warning Service (WWMIWS). The 17<sup>th</sup> World Meteorological Congress (Geneva, 25 May – 12 June, 2015) appreciated the establishment of the WWMIWS as an integral part of the Global Maritime Distress and Safety System (GMDSS) Marine Broadcast System, and requested WMO to ensure close collaboration with IMO and IHO for coordinated metocean information, forecasts and warning services<sup>1</sup>.

2. WMO continued reviewing and revising the *Manual on Marine Meteorological Services* (WMO-No. 558)<sup>2</sup> and the *Guide to Marine Meteorological Services* (WMO-No. 471) with a view of developing clear guidelines for Members for the preparation or issuing services for the GMDSS Marine Broadcasting System. Both documents are referenced in external publications and particularly in IMO resolution A.1051(27). The second meeting of the ad hoc team to review both documents took place in Tromsø, Norway on 22–24 June 2015.

3. To address ship owners and ship masters' security concerns with regard to the availability of ship identification on public websites, the WMO has put in place through Resolution 27 (EC-59) ship masking schemes concerning data from voluntary observing ship distributed in real-time between WMO Members. However, the masking schemes put in place are not entirely satisfactory and avoid undertaking important quality monitoring and data processing activities that are essential to assure proper use of the data. Further discussions with the IMO and other maritime and shipping organizations are planned in order to identify more satisfactory solutions.

4. Vandalism on data buoys is also another area of concern, and measures such as increasing awareness in local communities about the usefulness of data buoys are being taken, with limited success, to prevent such events to happen.

## **MARINE SCIENCE AND TECHNOLOGY**

### **Marine science, observations and services**

5. WMO Integrated Global Observing System (WIGOS) acts as an integrator of WMO and co-sponsored observing systems, including sensors and platforms in space, in the air, on the surface of the Earth, and in the deep ocean. Per decision of the 17<sup>th</sup> World Meteorological Congress (Geneva, Switzerland, 24 May – 12 June 2015) WIGOS is now undertaking its pre-operational phase (2016–2019). WIGOS is critical to the implementation of the Global Framework for Climate Services (GFCS), weather and disaster risk reduction services, capacity development, aviation services and other WMO priority areas. WIGOS is also looking at strengthening the partnership and collaboration with other UN agencies such as the Intergovernmental Oceanographic Commission of UNESCO (IOC/UNESCO) concerning ocean observations in order to realize the full potential of the WIGOS framework implementation and provide to WMO Application Areas the required observational data and metadata in the most cost-effective way.

<sup>1</sup> For all items concerning the seventeenth World Meteorological Congress, see the provisional report: <https://sites.google.com/a/wmo.int/cg-17/documents-english>.

<sup>2</sup> See [https://www.wmo.int/e-catalog/detail\\_en.php?PUB\\_ID=306](https://www.wmo.int/e-catalog/detail_en.php?PUB_ID=306).

6. The GCOS-GOOS-WCRP Ocean Observations Panel for Climate (OOPC) is charged with delivering requirements for the Ocean Component of GCOS (Global Climate Observing System), the physics variables for GOOS (Global Ocean Observing System), and observations for the World Climate Research Programme (WCRP) in addition to scientific advice to the Joint WMO-IOC Commission for Oceanography and Marine Meteorology (JCOMM). Following the adoption of the work plan for 2013–2018<sup>3</sup> as a framework to inform engagement with partners and focusing panel activities around priority system evaluations, OOPC-18 was held on 14–17 April 2015 in Sendai, Japan. Main focus, the GCOS Status Report, Preparations for the GCOS Implementation Plan, and the development of Variable/Network Specification Sheets. The meeting was held in parallel with the GOOS Biogeochemistry Panel, which is coordinated by the International Ocean Carbon Coordination Project (IOCCP).

7. WMO and IOC/UNESCO jointly coordinate through JCOMM global efforts to implement operational ocean forecasting services. Following its fourth session (Yeosu, Republic of Korea, 23–31 May 2012), JCOMM has been working towards the completion of its work plan for the intersessional period, focusing on the following priorities: (a) sustainable observations; (b) data management and interoperability, including for the management of historical marine meteorological and ocean climate data in support of the GFCS; (c) products and services including for coastal zones; (d) ocean forecasting; and (e) capacity development.

8. WMO established a joint Task Team on Weather, Climate and Fisheries (TT-WCF) through JCOMM and the Commission for Agricultural Meteorology (CAgM) to develop tools for use by the Pacific Island countries and Territories (PICTs) to assess the impacts of climate variability and change on ocean fisheries.

9. WMO through work of JCOMM has been developing an implementation strategy and plan for an international coordination framework to support response to marine environmental emergencies, with a focus on the maritime discharge of radioactive hazardous materials and to facilitate the global coordination of marine environmental emergency responses thereby ensuring that existing capabilities within the Marine Pollution Emergency Response Support System (MPERSS) for the high seas are effectively coordinated (including Synthetic Aperture Radar (SAR)). WMO collaborated with the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) and provides specialized operational modelling support to the Treaty's Verification regime.

10. WMO collaborated with IMO and IHO in the development of “Polar Code” for safety and marine environment protection in ice-infested waters of Polar Regions. WMO, through work of JCOMM Expert Team on Sea Ice and the International Ice Charting Working Group developed updated sea ice product standards.

11. WMO through research projects by the World Weather Research Programme (WWRP) and the Global Atmosphere Watch (GAW) Programme developed air quality predictions and forecasts, and other environmental related predictions to meet users' needs of Members. And WWRP, WCRP and GAW collaborated in environmental prediction research, such as High Impact Weather – HIWeather, Sand and Dust Storm Warning Advisory and Assessment System – SDS-WAS GAW Urban Research Meteorology and Environment Project – GURME.

## **SUSTAINABLE DEVELOPMENT OF OCEANS AND SEAS**

### **Scientific information and assessments to support decision-making**

12. A significant body of oceanographic research of direct benefit for decision-making in climate related risks is spearheaded and coordinated by the WMO-IOC/UNESCO-ICSU co-sponsored

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<sup>3</sup> See [http://www.ioc-goos.org/index.php?option=com\\_oe&task=viewEventRecord&eventID=1338&lang=en](http://www.ioc-goos.org/index.php?option=com_oe&task=viewEventRecord&eventID=1338&lang=en).

World Climate Research Programme (WCRP).<sup>4</sup> Through its scientific leadership to consolidate global and regional efforts to understand the dynamics, the interaction and the predictability of the coupled ocean-atmosphere system, significant improvement has been made in understanding climate variability and changes, as well as the benefit of society and the environment in which we live – such as predictive experiments for the future state of climate system and project how it will evolve under different emission scenarios.

13. Coordinated scientific activities by WCRP include the Coupled Model Intercomparison Experiment Project (CMIP) that serves as the key tool to better understand past, present and future climate changes arising from either natural, unforced variability or in response to changes in radiative forcing in a multi-model context. For its 5<sup>th</sup> phase of CMIP (CMIP5) during 2010–2013, more than 20 modelling centres produced a set of such complex predictions and made their results freely available to scientists worldwide. More than 350 articles were published using this unprecedented dataset. Many of them were reviewed in the most recent Report of IPCC entitled “Climate Change 2013: The Physical Science Basis”, which was unveiled in September 2013.<sup>5</sup> The design and organization of the 6<sup>th</sup> phase, CMIP6<sup>6</sup>, are aiming to address three broad scientific questions in support of the WCRP Grand Scientific Challenges<sup>7</sup>; 1) how the Earth System respond to forcing, 2) the origins and consequences of systematic model biases, and; 3) modality to assess future climate changes given climate variability, predictability and uncertainties in scenarios.

14. Oceanographic research in support of decision-making is developing especially fast in relation to the regional sea-level rise. While the global mean sea level is expected to rise in the 21<sup>st</sup> century up to approximately 80 cm, depending on the carbon emissions, the CMIP5 projects high regional variability of this increase. These results are corroborated by observations showing an increasing pace of sea-level rise with maximum around the Philippines. There is significant and unavoidable uncertainty in estimates and predictions of sea level and many other variables describing the future climate, and it is therefore extremely important that decision makers are able to take this uncertainty into account. Development of scientific methods for treatment of uncertainty in climate-related decision-making is one of key subjects of research conducted by WCRP; a WCRP Grand Science Challenge on “Regional Sea Level Change and Coastal Impacts”<sup>8</sup> addresses the imperative need for integrated interdisciplinary approach to establish quantitative understanding of regional to local sea level variability, to foster the development of sea level predictions and projections that are of increasing benefit for coastal zone management.

15. WCRP and the Prince Albert II of Monaco Foundation (FPA2) are jointly promoting a Polar Challenge competition, which would reward the first team able to send an autonomous underwater vehicle for a 2000km continuous mission under-ice in the Arctic or Antarctic, overcoming challenges in terms of under-ice navigation, endurance and environmental monitoring. A Prize money award would cover at least partially the recipients’ investment and operating cost related to the challenge. The amount of the Prize will be announced towards the end of 2015.

16. In the context of the Third World Conference on Disaster Risk Reduction to develop the Sendai Framework for DRR, WMO with multiple stakeholders in the UN system and beyond advocated to substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments, including for marine hazards, by 2030. WMO advocated also the established of an International Network for Multi-hazard Early Warning Systems (IN-MHEWS), and is now working extensively on engaging interested stakeholders, partners and organizations to develop and facilitate IN-MHEWS.

17. In the framework of the EU-funded projects PEARL (Preparing for Extreme And Rare events in coastal regions) and RISC-KIT (Resilience-Increasing Strategies for Coasts - toolKIT), of which

<sup>4</sup> See <http://www.wcrp-climate.org/>.

<sup>5</sup> See <http://www.ipcc.ch/>.

<sup>6</sup> See <http://www.wcrp-climate.org/wgcm-cmip/wgcm-cmip6>.

<sup>7</sup> See <http://www.wcrp-climate.org/grand-challenges>.

<sup>8</sup> See <http://www.wcrp-climate.org/grand-challenges/gc-sea-level>.

WMO is partner, a Policy Brief was jointly developed on “Disaster Risk Reduction strategies in EU coastal areas”. Based on several case studies conducted within the two projects, the document highlights the necessity of reviewing national and local DRR strategies to include more preventive ecosystem-based measures tailored on the indigenous historical and socio-cultural characteristics, as well as multi-level communication and stakeholder participation mechanisms.

18. Furthermore, good progress has been made in the development of the PEARL’s Risk and Root Cause Assessment (RRCA) approach, which expands the existing FORIN methodology to provide a framework for analysing the production of risk and vulnerability in coastal regions. A publication entitled “The FORIN Project – Understanding the Causes of Disasters” presents the implementation of RRCA in Taiwan, Haiti and USA, illustrating different models of root causes and risk drivers and related policy-relevant findings.

19. Moreover, different tools have been created within PEARL’s case studies. First, FloodAlert, a web Early Warning System (EWS), has been deployed for the Marbella (Spain) site: using radar observations and radar nowcasting, it is instrumental in the issuing of local warnings for pluvial floods. Secondly, a web application named Rainfall Forecast displays flood forecast information for the location of St Lucia, produced by assembling real-time flood model results, local rain gauge data and rainfall forecast data. Thirdly, to facilitate flood assessment and mapping activities for all case studies, an online platform was established to allow partners to share maps and geo-spatial data and eventually disclose them to the public according to their choice. Similarly, facts and figures collected for RISC-KIT’s Case Studies have been gathered in the Storm Impact Database, a webGIS interface to manage data necessary to test the potential DRR solutions previously formulated and conserve information after the project conclusion.

## **SMALL ISLAND DEVELOPING STATES**

20. The 17<sup>th</sup> World Meteorological Congress (Geneva, 25 May – 12 June 2015) approved Resolution 5.3(2)/1 (Cg-17) to create a Programme for WMO Small Island Developing States (SIDS) and Member Island Territories. The new Programme will consolidate existing WMO activities to support improved weather and climate services in SIDS and Member Island Territories, with a view to increase their resilience to extreme weather events and other adverse climate change impacts. Through the Partnership established at the 3<sup>rd</sup> International Conference on Small Island Developing States in Samoa (1–4 September 2014), WMO aims at implementing the “Samoa Pathway” for: 1) improved delivery of weather and climate information services; 2) enhanced human and technical capacities at national and regional climate centres; 3) increased range of products and services delivery to stakeholders; 4) South-South/ North-South Cooperation fostered; and 5) expansion of the infrastructure required for weather and climate research and services.

21. The WMO is recognizing the strong interest in increasing capacity in the Pacific Island countries to collect, analyse, and communicate oceanographic data across a number of sectors such as meteorology and climate services, fisheries, marine trade, and tourism. Increasing capacity in these sectors will increase the livelihoods of Pacific Islanders, and will allow them to more effectively engage in the global ocean community. The WMO has therefore organized a first Pacific Islands Training Workshop on Ocean Observations and Data Applications in the Republic of Palau on 4–7 May 2015. One goal of the workshop was to conceptualize the design, coordination of a Pacific Islands Ocean Observing System within the context of existing efforts.



## CLIMATE CHANGE AND OCEANS

### Mitigating the impacts of climate change

22. Carbon dioxide is the single most important anthropogenic greenhouse gas in the atmosphere.<sup>9</sup> It contributes ~65% to radiative forcing by long-lived greenhouse gases since pre-industrial time (1750). It is responsible for ~84% of the increase in radiative forcing over the past decade and ~83% over the past five years. The pre-industrial level of ~278 ppm represented a balance of fluxes between the atmosphere, the oceans and the biosphere. Observations at the marine and terrestrial ground based stations contributing to the Global Atmosphere Watch (GAW) Programme of WMO are used to assess globally averaged levels of CO<sub>2</sub> in the lower atmosphere. The sites (about 120) are operated by WMO Members.

23. Atmospheric CO<sub>2</sub> reached 142% of the pre-industrial level in 2013, primarily because of emissions from combustion of fossil fuels, deforestation and other land-use change. This conclusion is consistent with GAW measurements of the spatial distribution of CO<sub>2</sub> at the Earth's surface and its rate of increase, a decrease in the abundance of atmospheric oxygen (O<sub>2</sub>), and a decrease in carbon isotope ratio, 13C/12C, in atmospheric CO<sub>2</sub>. The globally averaged CO<sub>2</sub> mole fraction in 2013 was 396.0±0.1 ppm. The increase in global annual mean CO<sub>2</sub> from 2012 to 2013 of 2.9 ppm is greater than the increase from 2011 to 2012, the average growth rate for the 1990s (~1.5 ppm yr<sup>-1</sup>), and the average growth rate for the past decade (~2.1 ppm yr<sup>-1</sup>). Recent increases in emissions of CO<sub>2</sub> from fossil fuel combustion (~2% yr<sup>-1</sup> or ~0.2 PgC yr<sup>-1</sup>) cannot explain the interannual variability in CO<sub>2</sub> growth rate nor the greater-than-average increase in annual means from 2012 to 2013.

24. The average increase in atmospheric CO<sub>2</sub> from 2003 to 2013 corresponds to ~45% of the CO<sub>2</sub> emitted by human activity with the remaining ~55% removed by the oceans and the terrestrial biosphere. The main sinks for CO<sub>2</sub> emissions from fossil fuel combustion are the oceans and terrestrial biosphere. Uptake of CO<sub>2</sub> by the ocean leads to ocean acidification.. The *WMO Greenhouse Gas Bulletin* No. 10 published in 2014 includes a section on ocean acidification and trends in ocean pCO<sub>2</sub>. This section was jointly produced by the International Ocean Carbon Coordination Project of the Intergovernmental Oceanographic Commission of UNESCO, the Scientific Committee on Oceanic Research, and the Ocean Acidification International Coordination Centre of the International Atomic Energy Agency with support from WMO. According to the Bulletin during the last two decades ocean water acidity expressed as pH decreased by 0.0011–0.0024 units per year, and the amount of CO<sub>2</sub> dissolved in seawater (pCO<sub>2</sub>) increased by 1.2–2.8 µatm per year for time series from several featured ocean stations.

25. To ensure better coordination of CO<sub>2</sub> observations between atmospheric and ocean communities a special session on measurements of dissolved greenhouse gases and related ocean tracers will be organized at the 18th WMO/IAEA Meeting on Carbon Dioxide, Other Greenhouse Gases, and Related Measurement Techniques (GGMT-2015), which will be held on 13–17 September, 2015 in La Jolla, California.

26. Noting that there is a growing need for actionable information to understand and manage greenhouse gas budgets on enhanced temporal and spatial scales, the 17<sup>th</sup> World Meteorological Congress adopted a resolution on the implementation of the Integrated Global Greenhouse Gas Information System (IG<sup>3</sup>IS) which would address this need. The implementation of IG<sup>3</sup>IS would require the development of high resolution and complex observing systems and the development of modelling tools and data assimilation techniques. The Congress requested WMO Members to support to the development, improvement and modernization of networks for observations of

<sup>9</sup> See *WMO Greenhouse Gas Bulletin* no. 9, 6 November 2013 ([http://www.wmo.int/pages/prog/arep/gaw/ghg/documents/GHG\\_Bulletin\\_No.9\\_en.pdf](http://www.wmo.int/pages/prog/arep/gaw/ghg/documents/GHG_Bulletin_No.9_en.pdf)).

greenhouse gases and co-emitted species; to ensure respective data submission within the period of time required to support IG<sup>3</sup>IS; to cooperate on development of modelling tools for inverse modelling and anthropogenic greenhouse gas flux attribution; and to collaborate with organizations and institutions that address the carbon budget of biosphere and ocean. To ensure IG<sup>3</sup>IS implementation a writing team was organized with the task to develop an implementation plan by the end on 2015.

27. WMO acknowledges that climate engineering covers a wide spectrum of technologies, each with a different level of complexity, uncertainty and associated risk. The 17<sup>th</sup> World Meteorological Congress considered the issues related to climate engineering. It noted the interest of Members in developing a science-based assessment on climate engineering, specify the gaps in scientific understanding and promote specific research activities to fill such gaps. The Congress agreed with a conclusion of the Commission for Atmospheric Sciences (CAS) that further research is needed to adequately understand the potential feasibility, the effectiveness and risks associated with various climate engineering techniques and requested CAS to identify appropriate research to address gaps in the knowledge in a form of assessment. The Congress further requested CAS to coordinate its contribution to such an assessment in close cooperation with IMO, IOC/UNESCO, IPCC, WCRP and other relevant international, academic and science bodies. WMO is of the opinion that the future could require a UN-wide framework to govern these activities as consequences could be global and irreversible, involving the atmosphere, land and oceans.

### **Adapting to the impacts of climate change**

28. Information products and services based on climate predictions at the regional and sub-regional scales can play an important role in adapting to climate change and supporting climate-sensitive sectors. The need of adapting to climate change and supporting climate-sensitive sectors (e.g. fisheries, tourism) in coastal regions and SIDS will require the development of specific climate products and services.

29. Climate change affects coastal areas in a variety of ways; sea level rise, changes in the frequency and intensity of storms, increases in precipitation, and warmer ocean temperatures. The impacts of climate change are likely to worsen many problems in coastal zones, in particular, coastal inundation and associate disasters. They are increasing threats to the lives and livelihoods of people, living in low-lying, highly-populated coastal areas.<sup>10</sup> WMO implements the Coastal Inundation Forecasting Demonstration Project (CIFDP),<sup>11</sup> to meet challenges of coastal communities' safety and to support sustainable development through enhancing coastal inundation forecasting and warning systems that are embedded in the national disaster management. This project aims to support countries to establish an integrated forecasting system on coastal inundation based on interdisciplinary collaboration between scientists, operational forecasters, coastal disaster managers and institutional end-users. Upon completion of national sub-projects of CIFDP, countries aim to implement an operational system for integrated coastal inundation forecasting and warning, providing objective basis for coastal disaster (flooding) management; contributing to saving lives; reducing loss of livelihood and property; and enhancing resilience and sustainability in coastal communities.

30. The focus is to improve capabilities for operational monitoring and forecasts/warnings on coastal inundation from combined extreme events, such as extreme sea level rise (e.g. large waves, storm surges, high tide), fluvial flooding and tropical cyclones, and furthermore, for decision support system for emergency management Benefits of CIFDP implementation to countries are not only to enhance capacity of national meteorological and hydrological services for coastal risk warning, but also to improve interaction with users of their information services – primarily national disaster managers and decision makers. The CIFDP is implemented at national level by

<sup>10</sup> See *WMO statement on the status of the global climate in 2014* ([https://www.wmo.int/media/sites/default/files/1152\\_en.pdf](https://www.wmo.int/media/sites/default/files/1152_en.pdf)) and *2010–2010: a decade of climate extremes* ([http://library.wmo.int/pmb\\_ged/wmo\\_1103\\_en.pdf](http://library.wmo.int/pmb_ged/wmo_1103_en.pdf)).

<sup>11</sup> See <http://www.jcomm.info/CIFDP>.

operational forecasting agencies, under the WMO framework and with technical guidance provided by WMO Groups of Experts. By now, five (5) national sub-projects of CIFDP are under way – Bangladesh, Dominican Republic, Fiji, Indonesia and Shanghai/China, in view of further extension to other countries that express their need for such a project.

31. Launched at the Third World Climate Conference (WCC-3) (Geneva, 31 August – 4 September 2009),<sup>12</sup> the Global Framework for Climate Services (GFCS) is a global partnership of governments and organizations that produce and use climate information and services, led by WMO. The 17<sup>th</sup> World Meteorological Congress welcomed progress and growing number of partners in the initiative to improve the provision and use of climate services in priority areas of agriculture and food security, water management, health and disaster risk reduction. The energy sector was added as a new priority.

## **INTERNATIONAL COOPERATION AND COORDINATION**

32. Third Sessions of the African Ministerial Conference on Meteorology (AMCOMET) were successfully held in Cabo Verde in February 2015, jointly by WMO, the African Union Commission (AUC) and the Governments of host countries with the financial support from the several partners.

33. Ministerial conferences on meteorology were also held during by the Caribbean Meteorological Council (November 2014) and the League of Arab States (April 2015). The First Meeting of Ministers Responsible for Meteorology in the Pacific Region was planned as part of the Secretariat of the Pacific Regional Environment Programme (SPREP) Officials Meeting (July 2015).

34. WMO officials have been deeply involved in the Task Team and Open Working Group for Sustainable Development Goals related to the post-2015 development agenda and have also contributed to the discussions at the Environmental Management Group (EMG), the High Level Committee on Programmes (HLCP), the High Level Committee on Management (HLCM), and the United Nations Development Group (UNDG), High Level Political Forum (HLPF).

35. On the occasion of the 17<sup>th</sup> World Meteorological Congress, on 8<sup>th</sup> June 2015 WMO has organized a side event to celebrate World Oceans Day 2015, “Healthy oceans, healthy planet: opportunities for observations, research and services”. The side event addressed research into the Gulf Stream’s climatically important ocean-atmosphere interface, measurements and research concerning carbon dioxide concentrations in the atmosphere and oceans, the development of climate services for fishing communities, and deep-water monitoring tools for the Polar Regions.

## **ACRONYMS**

CAgM	WMO Commission for Agricultural Meteorology
CIFDP	Coastal Inundation Forecasting Demonstration Project
CMIP	Coupled Model Intercomparison Experiment Project
EU	European Union
GAW	Global Atmospheric Watch
GCOS	Global Climate Observing System
GFCS	Global Framework for Climate Services
GHG	Greenhouse gas
GMDSS	Global Maritime Distress and Safety System
GOOS	Global Ocean Observing System

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<sup>12</sup> See <http://gfcs.wmo.int/>.



IAEA	International Atomic Energy Agency
ICSU	International Council for Science
IFM	Integrated Flood Management
IHO	International Hydrographic Organization
IMO	International Maritime Organization
IOC/UNESCO	Intergovernmental Oceanographic Commission of UNESCO
IPCC	Intergovernmental Panel on Climate Change
JCOMM	Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology
OOPC	Ocean Observations Panel for Climate
PEARL	Preparing for Extreme And Rare events in coastal regions
RISK-KIT	Resilience-Increasing Strategies for Coasts - toolKIT
SIDS	Small Island Developing States
SPREP	Secretariat of the Pacific Regional Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WCRP	World Climate Research Programme
WMO	World Meteorological Organization
WMMIWS	World-Wide Metocean Information and Warning Service