

The Coastal Inundation Forecasting Demonstration Project (CIFDP) is a multi-hazard warning system that promotes an integrated and enhanced approach to deliver early warnings, no matter what the causes for coastal inundations. This is in line with the concept of impact-based forecasting and the UN Sendai Framework for Disaster Risk Reduction (DRR). The CIFDP is currently underway in four sub-projects (Bangladesh, Dominican Republic, Fiji and Indonesia), two of which are in urban coastal settings and two in SIDS. The project is expected to be completed in 2019. Before then, an independent external evaluation of the CIFDP is foreseen to assess the strengths, room for improvement and ongoing sustainability beyond the demonstration phase, and to encourage opportunities for other countries to engage in a MHEWS for coastal inundation.

[A/RES/71/257, para 203]

The 17th WMO Congress (2015) reiterated the importance to address ship security and piracy, and prevention of vandalism to data buoys, requesting the Secretary-General to organize a second WMO-IMO high level meeting in 2016/2017 to safeguard the buoys at sea, and further urged Members to follow recommendations of the Data Buoy Cooperation Panel (DBCP) Technical Document No. 41, *Ocean Data Buoy Vandalism – Incidence, Impact and Responses*. As further response, WMO and IOC have developed a draft Outreach Strategy to Reduce Damage to Ocean Data Buoys from Vandalism or Interference, which is intended to be finalized by October 2017.

[A/RES/71/257, para 282]

To support the implementation of SDG 14, WMO has launched three voluntary commitments for the Ocean Conference: (1) Year of Polar Prediction, (2) Responding to El Niño: Improving International Coordination for Improved Early Warning, and (3) Weather and climate services for Africa, Caribbean and Pacific (ACP) countries.

INTRODUCTION

Y T U Áã Ác@ Áæ c@ |ãã^ Áç[&^ Á[} Ác@ Á• cæ^ Áæ) áÁà^ cçã ~ !Á[-Ác@ ÁÒæc@ Áæç [•] @!^ Éã Á
 interaction with the oceans, the climate it produces and the resulting distribution of water
 resources. The Oceans provide essent

DEVELOPMENTS RELATING TO INTERNATIONAL SHIPPING ACTIVITIES

Maritime safety

1. WMO continued to work with the International Maritime Organization (IMO) and the International Hydrographic Organization (IHO) for the provision of marine safety information services in the context of the World Wide Met-Ocean Information and Warnings Service (WWMIWS) and the Global Maritime Distress and Safety System (GMDSS). Work is being undertaken to fully review the Manuals and Guides which provide the standards, recommended practices and guidance for services in the marine sector, principally WMO-No. 558 and WMO-No. 471, and in particular on the role of the Metarea Coordinators, as outlined in the IMO Resolution A.1051 (27). In this regard, WMO governing bodies have called further on Members to support the introduction of competency standards into marine forecasting and support the compliance to these standards within their National Meteorological and Hydrological Services and to introduce impact-based services into the marine sector, whilst ensuring that services continue to meet requirements outlined in the International Convention for the Safety of Life at Sea (SOLAS).

2. Metocean Forecasting services are also promoted in alignment with the WMO services delivery strategy and roadmap for marine services, including compliance with the future seamless Global Data-processing and Forecasting Systems (GDPFS), and its updated manual. These and other technical regulations are expected to be adopted by the fifth session of JCOMM (Bali, Indonesia, 25-29 October 2017). Efforts to improve the WWMIWS continued with the implementation of the Marine Forecaster Competency Framework undertaken by 11 of 16 NMHSs that have responsibilities for the WWMIWS. A user survey was also completed and positive results were maintained from the previous survey. An ad hoc Working Group on Marine Services has been established by the Secretary-General following the discussions at the 17th World Meteorological Congress (2015) to strengthen marine services. The sixty-eighth session of the Executive Council (2016) provided further direction to the Working Group. The results of their assessment will be considered by JCOMM-5 and reported to the seventieth session (2018). [\[A/RES/71/257, para 156\]](#)

SUSTAINABLE DEVELOPMENT OF OCEANS AND SEAS

recommendations of the Data Buoy Cooperation Panel (DBCP) Technical Document No. 41, *Ocean Data Buoy Vandalism – Incidence, Impact and Responses*. As further response, WMO and IOC have developed a draft Outreach Strategy to Reduce Damage to Ocean Data Buoys from Vandalism or Interference, which is intended to be finalized by October 2017 [A/RES/71/257, para 282]

5. Collaboration with the maritime industry is critical to maintain the ocean observing arrays as it provides opportunities for making observations from ships, or for deploying or servicing autonomous observing platforms at sea. While good progress was made since the beginning of the century to complete the global ocean observing systems (two third completed), much efforts

with all relevant partners/stakeholders (both within WMO and externally) for improved service delivery in marine meteorology, whilst taking into account the needs of users beyond mariners.

10. WMO is advocating 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. In this regard, WMO, in collaboration with UNISDR, UNESCO and its Intergovernmental Oceanographic Commission (IOP), Mexico, 22-23 May 2017). The Conference addressed progress in the implementation of Goal (g) of the Sendai Framework³, reviewed good practices in multi-hazard early warning systems and promoted investments in these systems. At the Conference, WMO launched the vision of a Global Multi-Hazard Alert System approved by the 69th WMO Executive Council.

Scientific information and assessments to support decision-making

11. 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 World Climate Research Programme (WCRP)⁴ particularly through its CLIVAR⁵ (Climate and Ocean: Variability, Predictability and Change) core project and in the polar regions through its CliC⁶ (Climate and Cryosphere) core project. CLIVAR supports a host of different ocean activities, for example with Research Foci on ENSO in a Changing Climate, Decadal Climate Variability and Predictability, Planetary Heat Balance and Ocean Heat Storage, and Eastern Boundary Upwelling Systems. As well as a variety of regional basin panels CLIVAR also includes global panels with foci on Ocean Model Development, Global Synthesis and Observations, Climate Dynamics, and on the [&^æ q Á[|^Áq ÁT [] •[ons. CliC covers a wide range of cryospheric activities, including those

the past 10 years, despite evidence that global anthropogenic emissions remained essentially static between 2014 and 2015.⁸ The El Niño event in 2015 contributed to the increased growth rate through complex two-way interactions between climate change and the carbon cycle. The year 2016 was the first year in which CO₂ at the Mauna Loa Baseline Atmospheric Observatory remained above 400 ppm all year.^{13,14}

19. WMO acknowledges that climate engineering covers a wide spectrum of technologies, each with a different level of complexity, uncertainty and associated risk. WMO/GAW is a supporting agency of a new GESAMP Working Group on Marine Geoengineering (WG 41) led by IMO. The WG was tasked with carrying out an assessment of a wide range of marine geoengineering approaches for their potential environmental and socio/economic impacts on the marine environment as well as their potential scientific practicality and efficacy for climate mitigation purposes. The final peer-reviewed report is intended to assist the Parties of the London Convention and London Protocol to determine which marine geoengineering activities might be listed in Annex 4 of the Protocol and consequently regulated. WMO hosted the 2nd meeting of WG41 in Geneva on 26-28 April, 2017. WMO will also host GESAMP's 44th session in Geneva from 4-8 September 2017.

20. There is an ongoing effort to improve coordination of CO₂ observations between atmospheric and ocean communities¹⁵. The 18th WMO/IAEA Meeting on Carbon Dioxide, Other Greenhouse Gases, and Related Measurement Techniques (GGMT), held on 13-17 September 2015 in La

SMALL ISLAND DEVELOPING STATES

26. The 17th World Meteorological Congress 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 3rd International Conference on Small Island Developing States in Samoa (1-4 September 2009), the Programme will:

- (1) enhance 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.

ACRONYMS

CIFDP	Coastal Inundation Forecasting Demonstration Project
CLiC	Climate and Cryosphere
CLIVAR	Climate and Ocean: Variability, Predictability and Change
CMIP	Coupled Model Intercomparison Experiment Project
DBCP	Data Buoy Cooperation Panel
DRR	Disaster risk reduction
ENSO	El Niño-Southern Oscillation
GAW	Global Atmospheric Watch
GCOS	Global Climate Observing System
GDPFS	Global Data-processing and Forecasting Systems
GESAMP	Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection
GFCS	Global Framework for Climate Services
GHG	Greenhouse gas
GMDSS	Global Maritime Distress and Safety System
GOOS	Global Ocean Observing System
IAEA	International Atomic Energy Agency
ICSU	International Council for Science
IG3IS	Integrated Global Greenhouse Gas Information System
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
LLGHG	Long-lived greenhouse gas
MHEWS	Multi-hazard early warning system
OOPC	Ocean Observations Panel for Climate
SIDS	Small Island Developing States
TPOS	Tropical Pacific Observing System
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
WCRP	World Climate Research Programme
WIGOS	WMO Integrated Global Observing System
WIS	WMO Information System