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Written Statement for Panel on "Future of International Cooperation in Observing Systems"

In the decades and century to come, mankind will experience – and therefore benefit and potentially suffer from – dramatic changes in the nature of the world's oceans, and their impact on society. The ages-old *reliance* on understanding the dynamics of the ocean's physical, biological, chemical, and geological characteristics will not change, but with an *increase* in that understanding, opportunities to prepare for, and even exploit that knowledge will improve dramatically. In general, that increased understanding will come in two categories: knowledge of ocean resources, and skill in forecasting change.

This future world of diverse resources and improved forecasts will be possible through improved ocean observations. Current efforts to build and sustain ocean observing systems that complement weather observations and environmental satellite systems will provide a revolutionary capability for quantifying the nature of ocean physics, chemistry, biology, and geology. Much as the advent of radar as a weather observing tool yielded dramatic improvements in the understanding and exploitation of weather, the same will hold true for the growing capabilities for observing the oceans.

A global observing system by definition crosses international boundaries with potential for both benefits and responsibilities shared by many nations. Recognizing the need for the global exchange of environmental data for national meteorological services to protect lives and property, the World Meteorological Organization (WMO) adopted Resolution 40 to broaden and enhance the free and unrestricted international exchange of meteorological data. While the Intergovernmental Oceanographic Commission (IOC) adopted a similar resolution in 2003, its effectiveness has been limited by international concerns for ocean resources and national security. The free and open exchange of international environmental data has been critical to weather forecasting and is critical to understanding and forecasting ocean processes.

The United States is a leading contributor of ocean observations, presently contributing nearly half of the Global Ocean Observing System (GOOS), part of the Global Earth Observation System of Systems (GEOSS), with the other half being provided by 72 other countries and the European Union. Key components of GOOS include the ARGO array of 3000 floats and the Tropical Atmosphere Ocean (TAO) array of buoys in the Pacific. The National Oceanic and Atmospheric Administration (NOAA) is a major contributor to the U.S. interagency Integrated Ocean Observing System (IOOS), the United States' ocean contribution to GOOS. IOOS will routinely and continuously provide quality-controlled data and information on past, current, and predicted future states of the oceans and Great Lakes from the global scale of ocean basins to local scales of coastal ecosystems. Many coastal processes (e.g. mass transport of nutrients and fresh water) contribute disproportionately to the kinetics and dynamics of the global ocean.

Additionally, the consequences of many global phenomena (e.g. tsunamis and sea level rise) are most evident in coastal environments. For this reason, the need for international consistency in coastal observations is paramount.

Consequently, international coordination and cooperation is essential to ensure the success of a global ocean observing system. NOAA's international contributions are coordinated through the Joint World Meteorological Organization-Intergovernmental Oceanographic Commission (WMO-IOC) Technical Commission for Oceanography and Marine Meteorology (JCOMM). JCOMM provides the essential intergovernmental framework for multi-national coordination of standards and best practices, as well as for coordinated deployment strategies.

Regional observing systems, an important component of both IOOS and GOOS, will contribute data and information to this network and, in turn, benefit from access to the entire network of integrated international data and information. For example, United States' regional associations in the northeast, Great Lakes, and northwest, work with Canadian counterparts; while the Southern California Coastal Ocean Observing System works with Mexican counterparts to meet its needs. GOOS also is forming larger regional associations of member countries.

The ability to see into the ocean and measure its properties has improved dramatically. Nevertheless, current efforts only begin to provide the knowledge needed to fully assess the impact of the oceans and coasts on commerce and transportation, weather and climate, and ecosystems. An integrated international ocean observing system will benefit society in countless ways - enhancing the design and location of ocean and coastal infrastructure, helping locate offshore energy facilities, improving operational planning for the U.S. Navy and Coast Guard, and mitigating the effects of natural hazards. Integrated ocean observation data also will contribute to a better understanding of the oceanic and atmospheric environments and improve fisheries management strategies, and forecast of and response to hazardous weather and climate change.