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New US-Japan Cooperation in Observing Earth's Last Frontiers

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For 50 years, the United States and Japan have cooperated in exploring our last frontiers —space and the ocean. Our challenge has been to gradually increase our knowledge of this planet on which we live. This knowledge is called science, but it is the most basic literature for our lives, for industry, and for predicting the future. In the last decade, space satellites and ocean floats (e.g., Argo Floats) deployed through our cooperation have enabled us to obtain real-time atmospheric and ocean conditions in high resolution. By this success and with progress in computer technology, more accurate simulations of future climate change are becoming possible, as seen in the IPCC 4th Assessment report. We must continue rigorous study of possible future crises however, and so the Japanese government is now examining a 25% reduction of CO2 by 2020. Concrete data can guide what we should do next.

The problem is not only CO2, however. We have to realize that many frontiers remain to be explored.

One is the deep ocean. The Argo Floats cannot sink to depths greater than 2000m, which is only half the depth of the average global water-depth. While we have little knowledge about the deep ocean currents at depths greater than 2000m, there are quite a number of petroleum wells at that depth! The deep ocean is associated with living things of unique DNA, seafloor natural resources, earthquakes, global deep currents, and, perhaps in the near future, CCS (carbon capture and storage). Thus, we need more and more data to understand the environment and proceed with industry. Japan and the US face each other over the North Pacific, which has many deep areas. Both are leading countries in ocean science and technology. Moreover, the US has sophisticated technology in unmanned underwater vehicles and autonomous gliders, and Japan has vessels and the necessary institutions. Combining our mutual strengths, Japan and the US should cooperate in deep ocean observing of the North Pacific, where a concentration on areas near Hawaii and Okinawa might be especially effective. The two islands are now cooperating on smart grid and renewable energy systems as well, and increased ocean data will continue to be necessary in these areas.

As well as the deep ocean, the Arctic Ocean is another frontier. Climate change is a problem not just among coastal countries but globally. To obtain current and seawater information under the sea ice, Japan and the US have been cooperating in setting buoys on the sea ice. This cooperation should be continued. In the open sea, research vessels and ice-breakers are the only way to measure underwater temperatures. Some researches indicate that warm water from the North Pacific through the Bering Strait causes the Arctic sea ice to melt. The US and Japan should take the initiative in developing new technology to observe the Arctic Ocean.

Lastly, I have to refer to a frontier in the sky — cooperation for weather/climate forecasting. With increasing data and the potential of computers, accuracy in weather forecasting has greatly improved, though problems remain in forecasting the near future of more than 10 days forward. To do this, we need satellites that are more accurate to measure the atmosphere. Japan and the US are already cooperating in developing new satellites and sensors. Moreover, the two countries should play larger roles in building an information sharing system for weather forecasting. Weather information is also important for industries such as agriculture and fishing. In these and other areas, accurate and timely data can make for vastly different outcomes.