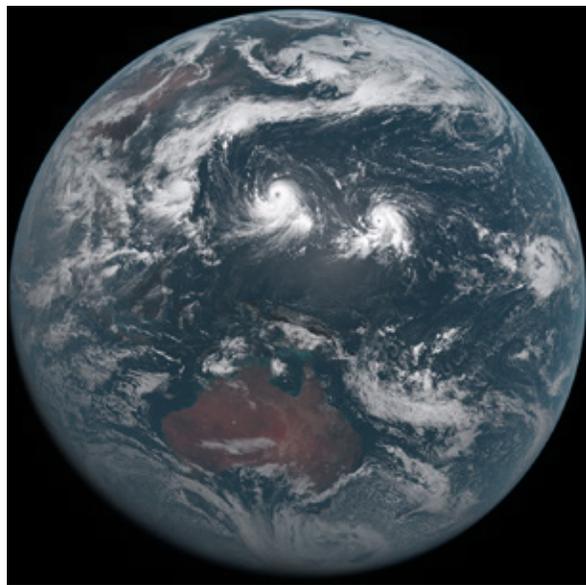


# The Sunflower Satellites

“Himawari” series Japanese weather observation satellites contribute to meteorological forecasts and disaster reduction not only in Japan, but also in East Asia and the West Pacific region.

**TOSHIO MATSUBARA**

Illustration of the Himawari-8 weather-observation satellite  
Courtesy of JMA



Planet Earth as captured by Himawari-8  
Courtesy of JMA

FROM early summer until autumn, Japan is afflicted with frequent natural disasters as a result of typhoons and heavy rain. In order to minimize the potential for damage due to such events, Japan has been working on a number of technological development projects. One of these is meteorological observation using satellites. In 1977, Japan’s first geostationary meteorological satellite Himawari (meaning “sunflower”) was launched, and it commenced operation in 1978. Satellite imag-

ery from the Himawari helped to clearly identify the movements of typhoons and clouds, contributing to a significant increase in the precision of meteorological forecasting and disaster reduction.

Subsequently, observation by successor satellites continued and Himawari-8, the eighth in the Himawari series, has been undertaking weather observations from space since July 2015. Furthermore, Himawari-9, which was launched in November 2016, will commence its backup operation to Himawari-8 in March 2017.

The performance of Himawari-8 and -9 is at the highest level in the world, greatly exceeding that of their predecessors. For example, resolution has doubled, providing sharper imagery. In addition, Himawari-8 and -9 have made it possible to send color imagery. This imagery is similar to the images of Earth seen by humans from space, and can be utilized to monitor volcanic fumes and yellow sand blowing from the Asian Continent to Japan. Furthermore, the duration of filming the observation range across East Asia and the West Pacific has been reduced significantly, from 60 minutes to 10 minutes, making it possible to observe rapidly developing thunderclouds.

The use of observation data from the Himawari series is not limited to Japan. Japan has been providing observation data to more than thirty countries and regions in Asia and the Pacific since the launch

of the original Himawari up until the present date.

“The launch and operation of satellites require substantial amounts of financial resources, and the number of countries that own satellites is limited. It is Japan’s international responsibility to provide observation data to those countries without satellites,” says Yoshiro Tanaka of the Office of International Affairs at the Japan Meteorological Agency (JMA). “Many typhoons and cyclones occur across East Asia and the West Pacific, and Himawari contributes to disaster reduction in the countries in these regions.”

In order to further disseminate highly accurate meteorological information among developing countries, the JMA has established a new system called HimawariCast concurrently with the commencement of the operation of Himawari-8. The data derived from Himawari-8 and -9 are transmitted mainly *via* an Internet cloud service. The use of the data is not easy in countries with a weak Internet environment because of the large volume of data involved. HimawariCast therefore transmits data with lower-resolution through a communication satellite, enabling the reception of the data with a parabola antenna. The system is being introduced with the assistance of the Japan International Cooperation Agency (JICA) and the World Meteorological Organization (WMO). The number of countries

receiving assistance with the introduction of HimawariCast is as many as twenty, including those in the planning stage.

“Training is necessary to properly use the image analysis software,” says Tanaka. “In the future,

A parabola antenna installed at a meteorological station in Tuvalu for reception of HimawariCast data

Courtesy of JMA



we plan to visit all the countries that use Himawari-Cast to transfer the know-how to interested parties.”

The JMA has been inviting weather forecasters from a range of countries every year since 1973 to provide them with training under the JICA framework. This initiative is aimed at transmitting a wide range of knowledge and technology relating to observation and forecasting during the training period, which lasts around three months.

“We are taught highly advanced contents, including the analysis of satellite imagery. In Samoa, disaster prevention in the rainy season is an issue,” says



A training session in the JICA program “Reinforcement of Meteorological Services” implemented by the Japan Meteorological Agency (JMA)  
Courtesy of JMA

Vaaua Wilson from the Meteorology Division of the Ministry of Natural Resources and Environment of Samoa and one of the participants in the training session that commenced in September 2016. “I strongly desire to become able to issue more accurate warnings sooner by making use of what I have learned in Japan.”

In 2016, these training sessions had a total of 333 participants from seventy-five countries. After returning from the training sessions, many of the participants have now assumed leading roles in meteorological services in their home countries.

“Technology innovation for data processing is advancing rapidly, and forecasting precision will continue to improve further in the future,” says Tanaka. “We continue to contribute to disaster reduction in a variety of countries to our full extent.” **J**