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insert name of database for which your country has responsibility						

A BRIEF SUMMARY OF SCIENTIFIC HIGHLIGHTS*:

Year-round observations have been carried out by overwintering JARE personnel at and around Syowa Station. Seasonal observations are also carried out by summer expedition personnel aboard the Shirase and Umitakamaru for oceanographic observations and in various research areas, including the Sør Rondane Mountains for meteorite search.

1. Continuous monitoring of Antarctic lower and middle atmosphere using the first Antarctic large aperture atmospheric radar PANSY started at Syowa Station

After the first light in March 2011, further installation work for the large aperture atmospheric radar PANSY (Program of the ANtarctic SYowa Mesosphere, Stratosphere, and Troposphere/Incoherent Scatter [MST/IS] Radar) was conducted during the 2011–12 austral summer, and continuous observations of the polar troposphere, stratosphere, and mesosphere began in April 2012. Although the operation still used only a quarter of the full system, it is already the largest atmospheric radar in the Antarctic, and interesting results concerning the polar atmosphere have been being obtained. Additional installation and adjustment work was conducted during the 2012–13 season, and half of the system is currently complete. The program has been moving steadily toward achieving a fully operational radar in the near future with the aim of understanding how the atmospheric system works from the surface up to 500 km, with precise measurement of three-dimensional winds including vertical velocity and plasma parameters, and contributing to improving the global atmospheric model for better forecasting of the future global climate.

2. Meteorite search on the Nansen Ice Field by JARE-54 in collaboration with BELARE

It has been well known that a lot of meteorites are scattered on the bare ice fields of the inland area in Antarctica. These findings began when nine different kinds of meteorites were collected on the bare ice field around the Yamato Mountains by the 10th Japanese Antarctic Research Expedition (JARE-10). Since then, about 17,000 meteorites have been discovered, mainly by JARE. The Asuka meteorites were newly collected by JARE-54 in collaboration with the Belgian Antarctic Research (BELARE) from the Nansen Ice Field (72°30' – 73° S and 23–25° E, elevation ~3000 m) on the ~100 km south of the Sør Rondane Mountains. The number of meteorites collected was about 420, and the total weight was about 75 kg. A huge ordinary chondrite (18 kg), carbonaceous chondrites, and achondrites are included among the meteorites. The average weight is about 180 g, which is much larger than the previous two joint expeditions (JARE-51 and BELARE 2010–11). The searched area on the Nansen Ice Field has been recorded in each handy GPS of the 10 members. As a result of this detailed recording, the searched area has been clarified. This suggests that meteorite search can be carried out more efficiently.

3. Balloon borne unmanned aerial vehicle system

A new observation platform, a balloon borne unmanned aerial vehicle system, has been developed, and aerosol observations were carried out at Syowa Station during the 2012–13 austral summer by the 54th Japanese Antarctic Research Expedition (JARE-54).

A small unmanned glider with a wingspan of 2.8 m and weight of 9.5 kg was launched from Syowa Station by a small meteorological rubber balloon on January 30, 2013. The airplane was separated from the balloon at 10 km a.s.l. and returned to Syowa Station by gliding flight with automatic navigation. The observation of aerosol concentration profiles and collection of aerosol samples were successfully carried out by UAV borne lightweight instruments during the ascending and gliding flights. A movie from the sky at an altitude of 10 km was also obtained by a lightweight hi-vision camera. It is difficult to reach 10 km in altitude only by the thrust of a small unmanned observation plane. This altitude also exceeded the record manned-plane height (approximately 8 km) achieved by JARE in the past. This new platform has the potential to acquire valuable high-altitude data safely in a short time and to recover important samples and expensive observation equipment. It also suggests the potential for stratospheric observation and wintering observation using the system.

This observation was carried out by a joint team from Kyushu University, which provided small unmanned plane technology, and Fukuoka University, which promoted aerosol observation, following a portent study by the National Institute of Polar Research.