

MEMBER COUNTRY: Japan
National Report to SCAR for year: 2009-10

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SCAR DATABASE						

A BRIEF SUMMARY OF SCIENTIFIC HIGHLIGHTS:

Selected Highlights of the Japanese Antarctic Research Expedition, 2009-10

JARE 50 Winter

1. Increasing GHG concentrations and similar levels of total O3 as in the previous year at Syowa Station

(Makoto Wada, wada@nipr.ac.jp and Shinji Morimoto, mon@nipr.ac.jp)

Long-term monitoring of atmospheric carbon dioxide (CO₂) and methane (CH₄) has been done at Syowa Station. Measurement of the concentration of the gases at Syowa Station in 2009 revealed a continuous yearly increase of the two greenhouse gases (GHG) in atmosphere. Total ozone has also been monitored from the 1960s at Syowa Station. The minimum amount recorded in 2009 was at about the same level as in the previous year at Syowa Station. These long-term monitoring programs offer evidence of climate change in Antarctica, where observation sites are scarce.

2. 2009's lowest level of aurora activity since 1966

(Hisao Yamagishi, yamagishi@nipr.ac.jp)

The disturbances in geomagnetism recorded at Syowa Station were at their lowest level, with many days of no sunspots on the surface of the sun, reflecting a low level of solar activity in 2009. This resulted in 2009 showing the lowest level of aurora breakups observed at Syowa Station since 1966.

JARE 51 Summer

1. New icebreaker Shirase

(Yoichi Motoyoshi, motoyoshi@nipr.ac.jp)

The new Japanese icebreaker Shirase, launched in May 2009, made its maiden voyage to Antarctic waters in the last austral summer season of 2009–2010. She is capable of continuously breaking sea ice 1.5 meters thick and has seawater nozzles on the bows to melt snow over the ice. She has 80 beds (20 beds more than the previous vessel) for expedition personnel and carried 56 twelve-foot containers to Syowa Station. Treatment systems for waste and wastewater are installed aboard the Shirase, and the double-hull structure was introduced to avoid oil spillage from the fuel tanks.

Two large CH-101 helicopters and a chartered smaller AS-350 helicopter were employed to transport cargos and to support field research activities. A newly installed multi-narrow-beam sounder on the Shirase was used for seafloor mapping in pack ice waters where ordinary research vessels cannot penetrate.

2. Geoscience programs in the Sør Rondane Mountains – an international collaboration among Japanese, Belgian and South African scientists

(Hideyasu Kojima, kojima@nipr.ac.jp)

A geoscientific field survey was conducted in the Sør Rondane Mountains from late November 2009 to early February 2010, which is the final season of a three-year project with an emphasis on meteorite search. This project included geology, geomorphology, and a meteorite search in this area, and the total number of personnel who joined in this project was 17, including Belgian and South African scientists. The geology and geomorphology teams flew into the Belgian Princess Elisabeth Station in the Sør Rondane Mountains using DROMLAN (the Dronning Maud Land Air Network) from Cape Town via Novolazarevskaya Station in late November 2009. The field teams established a main base camp at Brattnipane as well as additional advance camps in the mountain area.

The geology and geomorphology teams conducted their field survey and they collected rock specimens for petrological and geochronological studies.

The meteorite search team joined the geology and geomorphology teams at Crown Bay on board the icebreaker Shirase in late December 2009. After their rendezvous, the geomorphology team continued field survey mainly in the central Sør Rondane Mountains, whereas the geology and meteorite teams moved to the Balchen area, the eastern end of the mountains, for their activities. One Belgian scientist joined firstly as an exchange scientist on the meteorite team. The meteorite team successfully collected 635 pieces of meteorites, which include very unique types such as iron meteorites and ureilites. The meteorites collected will be shared among Japanese and Belgian scientists for further studies after initial processing at NIPR, Tokyo.

3. Biological programs near Syowa Station

(Sakae Kudoh, kudoh@nipr.ac.jp)

A JARE-51 biology team conducted field observations in the Lützow-Holm Bay region. One worthy of noting is a research program on a moss-pillar colony on the lake bottom, which employed SCUBA diving in Skarvsnes, some 50 km south of Syowa Station. Collection of lake sediment, measuring in situ photosynthetic activity of the colony, and installation of an U/W video camera to record the growth of the colony for a long period were carried out by SCUBA divers in late January 2010.

4. “Antarctic Classes” performed by two school teachers from Syowa Station

(Yoichi Motoyoshi, motoyoshi@nipr.ac.jp)

Two schoolteachers were involved in JARE-51 to offer classes, called “Antarctic Classes,” from Syowa Station to Japanese schools through an INTELSAT satellite link between Antarctica and Japan. The engagement of school teachers was the first such attempt during the past 50 years of Japanese Antarctic history, and it resulted in successful achievement as a JARE outreach activity.