

EARTH OBSERVATION SYMPOSIUM (B1)
Monitoring Change in the Arctic (6)

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TEN-YEAR ARCTIC AND ANTARCTIC OBSERVATIONS OF FORMOSAT-2

Abstract

The purpose of this paper is to summarize the enormous contributions of FORMOSAT-2 (Formosa Satellite 2) on Arctic and Antarctic observations in 10 years. As a small satellite operated for 10 years (20 May 2004 to 20 May 2014) in orbit, FORMOSAT-2 keeps constant observation on the Polar Regions. Its unique characteristics of 14 revolutions around the Earth per day with daily revisit capability provides changes of events on Earth in either short time (several days) or long term (several years). Global warming has attracted interests over the extensive Polar Regions. The first satellite optical image of the Amundsen-Scott South Pole Station (90 S) was taken by FORMOSAT-2 on 6 October 2006. To support the Third International Polar Years (IPY, March 2007 – March 2009) activities, FORMOSAT-2 images were acquired from the spring of 2006 to the spring of 2008. Among them were 307 targets in northern polar areas, including glaciers and ice shelves in Greenland, Canada, and Russia, as well as 37 targets in Antarctic areas, including Crane Glacier, Wilkins Ice Shelf, and Mertz Glacier. FORMOSAT-2 provides unprecedented imagery data with 2 m spatial resolution in terms of daily, weekly, monthly, seasonally, yearly and even decadal changes in both the Arctic and Antarctic regions. The unique feature of the high spatial resolution over these regions offers fine details of ice shelf breakups and was not available before. As an example, a relatively cloud-free image acquired on March 2008 displays details of an area just after an active disintegration ceased. Another striking feature image showing ice cracking was taken over Alert, Canada's North Pole Command Centre (-62.4165 E, 82.5747 N) on three consecutive days from 25 – 27 March 2006 taken at the same time every day. As is shown, the width of the ice crack varied from about 600–800 m wide to narrower and then to even wider than that observed on the first day. Images over the same area on a bimonthly basis were also acquired by FORMOSAT-2 on March 27, May 27, and July 27, 2007, to reveal the ice breaking and melting process. Then, images taken exactly one year later reveal the ice disintegration. More observation results shall be presented in the paper.