

# AVHRR・MODIS データを用いた長期北半球積雪分布の解析

堀 雅裕<sup>1</sup>、杉浦幸之助<sup>2</sup>、谷川朋範<sup>1</sup>、青木輝夫<sup>3</sup>、朽木勝幸<sup>3</sup>、庭野匡思<sup>3</sup>、榎本浩之<sup>4,5</sup>

<sup>1</sup>JAXA/EORC

<sup>2</sup>富山大学

<sup>3</sup>気象研究所

<sup>4</sup>極地研究所, <sup>5</sup>総合研究大学院大学

## Analysis of long-term northern hemisphere snow cover extent using AVHRR and MODIS data

Masahiro Hori<sup>1</sup>, Konosuke Sugiura<sup>2</sup>, Tomonori Tanikawa<sup>1</sup>, Teruo Aoki<sup>3</sup>, Katsuyuki Kuchiki<sup>3</sup>, Masashi Niwano<sup>3</sup>  
and Hiroyuki Enomoto<sup>4</sup>

<sup>1</sup>Japan Aerospace Exploration Agency

<sup>2</sup>University of Toyama

<sup>3</sup>Meteorological Research Institute

<sup>4</sup>National Institute of Polar Research, <sup>5</sup>The Graduate University for Advanced Studies

JAXA will launch an Earth observing satellite for climate study named “GCOM-C” in Japanese fiscal year JFY2016 which carries a multi-spectral optical imager SGLI. The GCOM-C will observe various cryosphere-related geophysical variables such as snow cover extent and snow physical parameters including snow grain size, surface temperature and so on in order to establish long-term satellite data record of those variables. As a preparatory data set, JAXA has started to generate climate-related geophysical variables using NASA’s optical sensor MODIS data and distribute them to the public through the web site named JAXA Satellite Monitoring for Environmental Studies (JASMES) since 2008. In this study, the data period of the snow cover extent (SCE) product were extended toward the past around 1980’s using NOAA/AVHRR radiance data. The long-term SCE product reveals that SCE in the northern hemisphere exhibit negative trends in all seasons during the past 35 years, particularly for summer and autumn (Fig.1). The sign of the summer SCE trend is basically consistent with that of the NOAA/NCDC Climate Data Record of Snow Cover Extent (SCE) products (ver.4). However, the rate of the SCE decrease is not so significant as shown in the NOAA SCE products. Comparison of those SCE products with in-situ measured snow depth data taken from Global Historical Climatology Network Daily (GHCND) data indicates that although JASMES SCE tends to underestimate SCE in melting season in forest region, commission error of JASMES SCE is always smaller than that of NOAA SCE products, whereas omission error of JASMES SCE is larger than that of NOAA SCE. This result suggests that NOAA SCE tends to overestimate the snow covered area compared with JASMES, which is considered partly due to the coarser spatial resolution (pixel size ~190km) of NOAA SCE products. As a result, careful considerations of uncertainties in satellite-derived products are found to be necessary when discussing long-term trend of climate variables. As for the SCE products, the 1st International Satellite Snow Products Inter-comparison Workshop was held in Maryland, USA in July 2014 to have an opportunity to compare various SCE (and snow water equivalent) products and enhance the accuracy of the SCE. JASMES SCE is also planned to join the inter-comparison project.

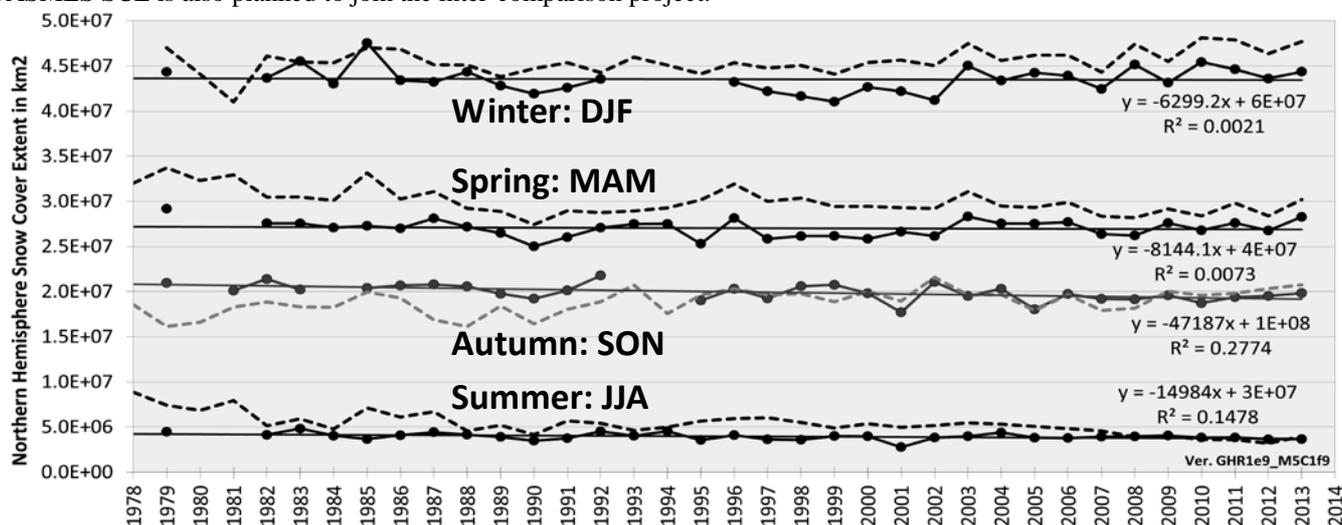


Figure 1. 35-year trend of snow cover extent in the northern hemisphere (solid line: JASMES SCE, broken line: NOAA SCE)