

## 衛星及び地上データを用いた長期北半球積雪域面積の抽出

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## Analysis of the long-term trend of Northern Hemisphere snow cover extent using satellite and in-situ snow data

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Snow cover extent (SCE) in the Northern Hemisphere (NH) is usually derived from visible reflectance imagery by optical sensor. However, none of algorithms succeeds in deriving long-term SCE without any biases. Past studies have pointed out that even the NOAA's climate data record of NH SCE has a bias in the trend of autumn SCE. In this study we derive snow cover map first from the radiance data of satellite-borne optical sensor (NOAA/AVHRR and NASA's optical sensor MODIS) and then estimate unbiased SCE together with uncertainty (confidence interval of SCE) by making use of both the satellite-derived snow cover map and in-situ snow data simultaneously. The unbiased SCE estimated for 1978-2015 has trends similar to those of SCE derived only from satellite imagery (signs of the trends are the same) but the slopes of the unbiased SCE are found to be slightly smaller than those of the ordinary SCE. Comparison of the unbiased SCE with NOAA SCE reveals that the NOAA SCE explicitly has biases in autumn and winter that cause apparent positive trends in both seasons and thus must have had serious impacts on the past analysis of long-term trends of NH SCE.

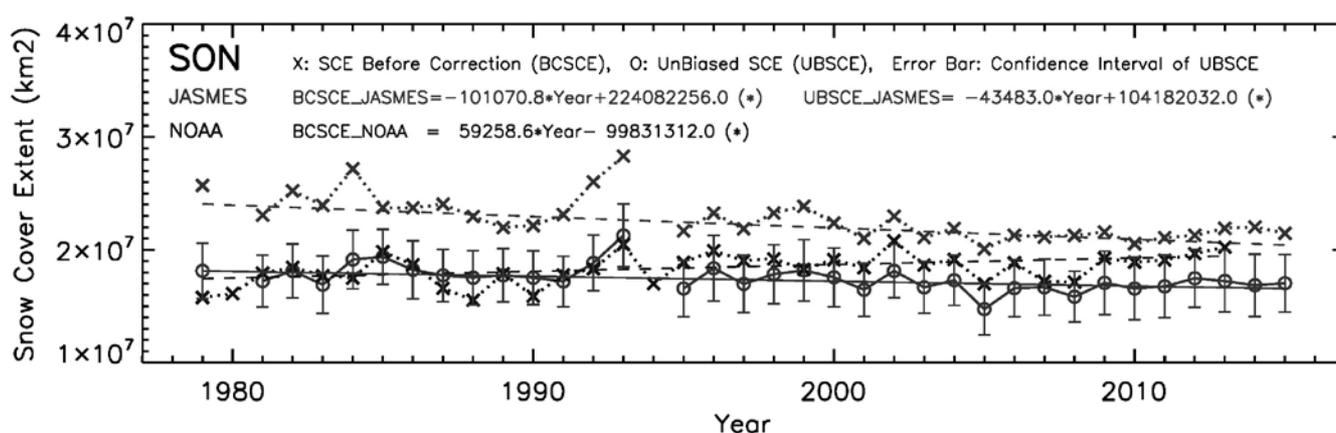


Figure 1. 37-year trends of autumn NH SCE (grey dotted line with cross symbols: this study's SCE without correction, grey solid line with circle symbols: this study's SCE (unbiased), black dotted line with cross symbols: NOAA's SCE)