# Testing of alternative data for generating the JASMES long-term snow cover extent product

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Snow cover is an important geophysical variable to be observed from space for monitoring the effect of the global warming on the Arctic region. We have been producing the JASMES long-term global snow cover extent (SCE) data derived from two satellite-borne optical imagers, Advanced Very High Resolution Radiometer (AVHRR) and Moderate Resolution Imaging Spectroradiometer (MODIS) and have revealed the occurrence of the significant negative trends of annual snow cover duration in the western Eurasian continents during the past four decades (Hori et al., 2017). The operation of MODIS sensors used for the SCE generation have continued for more than 20 years and thus the use of alternative sensors should be considered for preparing future sensor failure. A candidate of the alternative sensors is the Visible Infrared Imaging Radiometer Suite (VIIRS) onboard US's Suomi-NPP satellite and JPSS series satellites. In this study, we examined the applicability of Suomi-NPP/VIIRS data for the long-term SCE generation. VIIRS has the same spectral bands as AVHRR and MODIS used for the JASMES SCE analysis and thus the same algorithm can be employed with some adjustments of radiance taking into account the difference in spectral responses. The analysis results showed that the SCEs derived from VIIRS data are consistent well with those derived from the data of MODIS on Aqua satellite within the error of 3% as shown in Figure 1. Therefore, VIIRS can be a good alternative sensor of MODIS on Aqua for extending the long-term record of SCE toward the future.

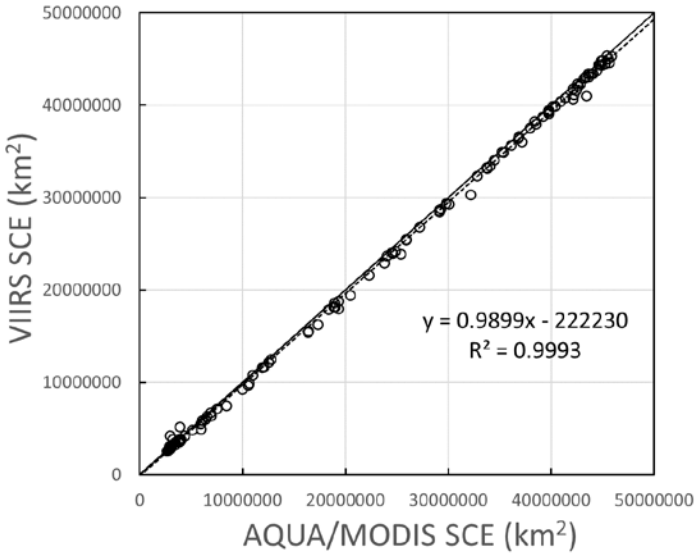


Figure 1. Comparison of the Northern Hemisphere snow cover extents derived from MODIS on Aqua satellite (AQUA/MODIS SCE) and those derived from VIIRS (VIIRS SCE) for the period of 2017-2022 (5 years).

**References**

Hori, M., K. Sugiura, K. Kobayashi, T. Aoki, T. Tanikawa, K. Kuchiki, M. Niwano and H. Enomoto, A 38-year (1978–2015) Northern Hemisphere daily snow cover extent product derived using consistent objective criteria from satellite-borne optical sensors, Remote Sensing of Environment, 191, 402-418, https://doi.org/10.1016/j.rse.2017.01.023, 2017.