



Inter-calibrating SMMR, SSM/I and SSMI/S to improve the consistency of snow depth data products in China

Liyun DAI (1) and Tao Che (2)

(1) Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences, Lanzhou 730000, China(dailiyun@lzb.ac.cn), (2) Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences, Lanzhou 730000, China (chetao@lzb.ac.cn)

The long time series of passive microwave snow depth/snow water equivalent (SWE) products were the fundamental data for climate and hydrological researches. However, the temporal continuity of the products was influenced by the update or supersede of passive microwave sensors or platforms. In this study, we inter-calibrated the brightness temperatures from Special Sensor Microwave Imager (SSM/I) and Special Sensor Microwave Imager/Sounder (SSMI/S), and evaluated the consistency of snow cover area (SCA) and snow depth derived from the Scanning Multichannel Microwave Radiometer (SMMR), SSM/I and SSMI/S. The results presented that the spatial pattern of SCA derived from SMMR and SSM/I showed more consistent after calibration than before calibration; the relative bias of SCA and snow depth in China between SSM/I and SSMI/S declined from 42.42% to 1.65% and from 66.18% to -1.5%, respectively; the SCA and snow depth derived from SSM/I carried on F08, F11 and F13 presented high consistency. In a word, to obtain consistent snow depth and SCA remote sensing products, the inter-sensor calibrations between SMMR and SSM/I, SSM/I and SSMI/S are important, while the SCA and snow depth derived from SSM/I sensors carried on F08, F11 and F13 presented no significant differences.