Geophysical Research Abstracts, Vol. 8, 04128, 2006
SRef-ID: 1607-7962/gra/EGU06-A-04128

Comparison of Sea Ice Concentration Datasets from Nimbus-7 SMMR and DMSP SSM/I

E. Rinne, J. Launiainen, J. Haapala, M. Johansson
Finnish Institute of Marine Research, Finland

Passive microwave satellite remote sensing provides the most comprehensive characterization of the global sea ice cover so far. The Scanning Multichannel Microwave Radiometer (SMMR) was launched onboard Nimbus-7 satellite in 1978. Since 1987 several Special Sensor Microwave Imager (SSM/I) instruments have provided passive microwave data. Combined dataset from SMMR and SSM/I thus covers timespan from late 1978 up to this date. Three widely used ice concentration datasets derived from SMMR and SSM/I data were used in the study. The US National Sea and Ice Data Center (NSIDC) provides datasets "Bootstrap Sea Ice Concentrations from Nimbus-7 SMMR and DMSP SSM/I", and, "Sea Ice Concentrations from Nimbus-7 SMMR and DMSP SSM/I Passive Microwave Data". Hadley Centre for Climate Prediction and Research in UK provides "Hadley Centre sea ice and sea surface temperature database" (HadISST1). The sea ice fraction of HadISST1 dataset derived from SMMR and SSM/I data was analyzed.

Monthly sea ice extent from all three datasets were calculated for both polar hemispheres using various ice concentration threshold values. Comparison between annual maximum, minimum and mean values of sea ice extent from different datasets was made. For small ice concentration threshold values results showed only minor differences between three datasets. However, sea ice extents for high ice concentration threshold values showed major differences between datasets. Different datasets resulted in different magnitudes and trends of high concentration sea ice extent. These differences have origin of different algorithms, tiepoints, coordinate systems and averaging techniques used in different datasets. Results imply that high concentration sea ice data derived from SMMR and SSM/I measurements should be used with caution. In addition, the ice concentration dataset to be used should be chosen with care.