

Title: Creation and Preservation of a Sea Ice Climate Data Record

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The passive microwave record of sea ice provides one of the longest satellite climate records, with a continuous record dating back to 1978. This record spans several sensors and efforts have been made to account for intersensor differences; the data have also included other quality controls to provide a consistent and accurate timeseries over the entire record. However, there remain many issues that could be improved to elevate the sea ice timeseries to the standard of a climate data record. These include using recalibrated brightness temperatures, better intersensor calibration using sensors overlaps from multiple seasons (e.g., winter and summer) if possible, and calibrating to a baseline of the most advanced sensor as opposed to the earliest sensor.

Due to the complexities of the passive microwave signal, sea ice fields such as extent and concentration are produced using a combination of sensor frequencies and polarization within an empirically based algorithm. Several algorithms have been implemented and while all provide reasonable estimates of the overall sea ice cover, all have limitations. Currently, there is not one universally accepted passive microwave sea ice algorithm from which to produce a climate data record. Nor are there error estimates or data quality flags associated with each measurement. Finally, sea ice concentration products have been developed and implemented in a research mode and accompanying metadata have been rudimentary.

This project will address many of these issues by (1) recalibrating the record based on the highest quality more recent instruments and the most advanced algorithms, (2) develop and implement automated error estimates and data quality information based on the internal properties of the dataset as well as ancillary fields, and (3) implement more comprehensive metadata information to provide longer-term secure data preservation with lower maintenance.