



Sea Ice Back to 1850: A Longer Observational Record for Assimilation By Models and Use In Reanalyses

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Gridded Monthly Sea Ice Extent and Concentration, 1850 Onward is the title of a new data set available from the U.S. National Snow and Ice Data Center. Observations from 13 historical sources such as whaling ship logs, compilations by naval oceanographers, and analyses by national ice services cover 1850 through 1978, while 1979-2013 ice concentration fields are derived from satellite passive microwave data. The sea ice concentration and source variables are provided in a NetCDF-4 file. The observation-based data product meets a need for longer records to use in reanalysis and climate diagnostic applications. It extends the record of an earlier version of this pan-Arctic data set that is heavily used by modelers, and improves upon it by incorporating newly available historical sources, using a more accurate data set for the satellite era, and by filling temporal gaps using an analog method. The resulting sea ice concentration fields have realistic values and variability throughout the record; in earlier versions, unvarying climatological values often fill gaps. The historical data vary greatly in their observational methods and came to us as both original data (e.g. a transcription of shipboard ice observations), or as observations to which some synthesis or analysis has already been applied (e.g. the Danish Meteorological Instituted yearbooks of charts). Each required different treatment before it could be used in our product, ranging from simple regridding to digitization and interpretation. The current version spans 1850-2013. With it, we can more confidently address questions like “Is the diminished ice cover of the past few years unique to the period since 1850?” And “Is the rapidity of the retreat of ice in the years since 2000 unique in the longer historical record?” We hope to continue improving the product with refinements to the gap filling method, additional historical sources, and assessment of the consistency of pre and post satellite period data, and yearly updates.