



## Abstract View

[Volume 9, Issue 3 \(May 1979\)](#)

### Journal of Physical Oceanography

Article: pp. 580–591 | [Abstract](#) | [PDF \(944K\)](#)

## An Analysis of Arctic Sea Ice Fluctuations, 1953–77

**John E. Walsh and Claudia M. Johnson**

*Laboratory for Atmospheric Research, University of Illinois, Urbana 61801*

(Manuscript received August 8, 1978, in final form October 26, 1978)

DOI: 10.1175/1520-0485(1979)009<0580:AAOASI>2.0.CO;2

### ABSTRACT

Arctic sea ice data from the 1953–77 period are digitized onto a set of 300 monthly grids covering the polar cap. Each grid contains 1648 ice concentration points at a spacing of 1° latitude (60 n mi). The synthesis of the regional ice data sets is described.

The digitized data are used to evaluate quantitatively the normal seasonal cycle of ice extent, the 25 year extremes for winter and summer, and the longitudinal dependence of the variance and trend of ice extent. Interannual variations of ice extent exceeding 5° latitude are found at most longitudes. The time series of total Arctic ice extent shows a statistically significant positive trend and correlates negatively with recent high-latitude temperature fluctuations.

Empirical orthogonal functions of longitude are used to identify the major spatial and temporal scales of ice fluctuations within the 25-year period. The dominant spatial mode is an asymmetric mode in which the North Atlantic anomaly is opposite in sign to the anomaly over the remainder of the polar cap. A tendency for ice anomalies to persist for several months is apparent in the lagged autocorrelations of the amplitudes of the dominant ice eigenvectors. The month-to-month persistence of the ice anomalies is considerably greater than the persistence of the high-latitude meteorological anomaly fields of sea level pressure, surface temperature and 700 mb height.

#### Options:

- [Create Reference](#)
- [Email this Article](#)
- [Add to MyArchive](#)
- [Search AMS Glossary](#)

#### Search CrossRef for:

- [Articles Citing This Article](#)

#### Search Google Scholar for:

- [John E. Walsh](#)
- [Claudia M. Johnson](#)



© 2008 American Meteorological Society [Privacy Policy and Disclaimer](#)

Headquarters: 45 Beacon Street Boston, MA 02108-3693

DC Office: 1120 G Street, NW, Suite 800 Washington DC, 20005-3826

[amsinfo@ametsoc.org](mailto:amsinfo@ametsoc.org) Phone: 617-227-2425 Fax: 617-742-8718

[Allen Press, Inc.](#) assists in the online publication of *AMS* journals.