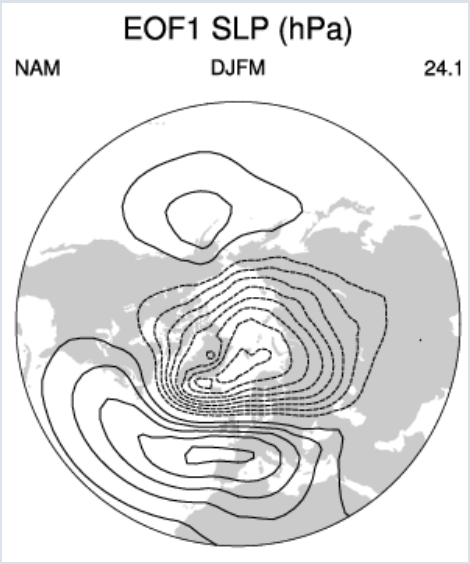
Hurrell wintertime SLP-based Northern Annular Mode (NAM) Index



The NAM (or Arctic Oscillation) is defined as the first EOF of NH (20°-90°N) winter SLP data. It explains 23% of the extended winter mean (December-March) variance, and it is clearly dominated by the NAO structure in the Atlantic sector. Although there are some subtle differences from the NAO regional pattern over the Atlantic and Arctic (see Figure 1 below), the main difference is larger amplitude anomalies over the North Pacific of the same sign as those over the Atlantic. This feature gives the NAM a more annular (or zonally-symmetric) structure. Positive values of the NAM are associated with lower-than-normal sea level pressures over the Arctic and westerly wind anomalies along ~55°-60°N.

Key Strengths

- Long NAM Index extending back to 1899
- Characterizes changes in the position and strength of the NH mid-latitude jet

Key Limitations

- Physical distinction from NAO and North Pacific indices is not completely agreed upon by researchers
- Dependent on any inherent weaknesses in the source data set and its gridding scheme

Data Access

Please cite data sources, following the data providers' instructions

Hurrell wintertime SLP-based Northern Annular Mode (NAM) Index

Years of record
1899-01 to 2024-03

Main variables
Atmosphere | Sea Level Pressure

Dataset collections
None

Type of data product
Climate Indices | Circulation | NAM

Institution and PIs
Jim Hurrell (NCAR)

About the experts

Pages with expert guidance by Adam Phillips at the National Center for Atmospheric Research (NCAR)

Hurrell North Atlantic Oscillation (NAO) Index (station-based)

Hurrell wintertime SLP-based Northern Annular Mode (NAM) Index

North Pacific (NP) Index by Trenberth and Hurrell; monthly and winter

Hurrell North Atlantic Oscillation (NAO) Index (PC-based)

Dataset DOIs
None

Hosted Climate Index Files

1. DJFM Northern Annular Mode Index (SLP-Based)

   Missing Value
   -999
   Units
   std.dev.
   Updated Through
   2024-03-31
   Next Update
   2024-05-01
   Start Date
   1899-01-01
   File Notes
   The DJFM PC index value for year N refers to an average of December year N-1 and January, February, and March year N SLP values prior to the EOF calculation. (Example: The 1999 PC value was based on the average of December 1998 and January, February, and March 1999 SLP values.)
   CAS Citation
   NAM Index Data provided by the Climate Analysis Section, NCAR, Boulder, USA. Updated regularly. Accessed DD Month YYYY [list date you accessed the data].

Data Access
None

Usage Restrictions
None

Cite this page

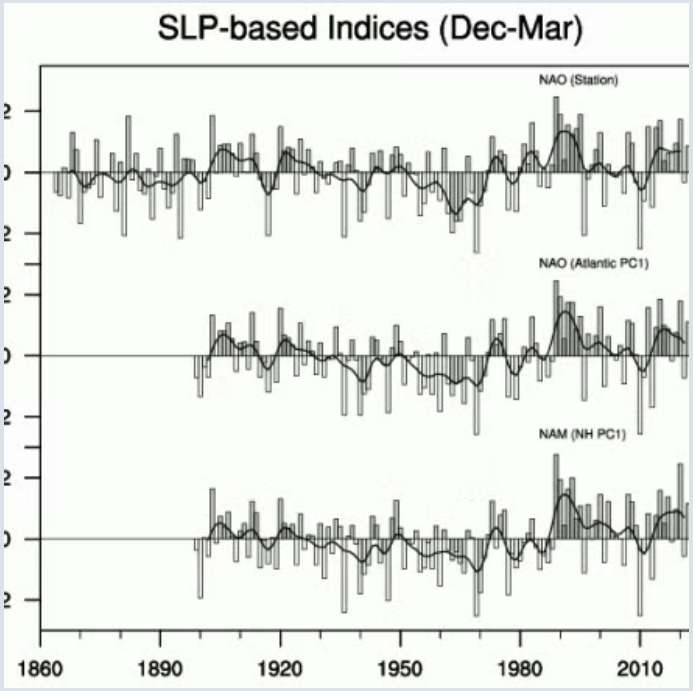
Acknowledgement of any material taken from or knowledge gained from this page is appreciated:

Phillips, Adam & National Center for Atmospheric Research Staff (Eds). Last modified 2024-04-18 "The Climate Data Guide: Hurrell wintertime SLP-based Northern Annular Mode (NAM) Index." Retrieved from https://climatedataguide.ucar.edu/climate-data/hurrell-wintertime-slp-based-northern-annular-mode-nam-index on 2025-03-07.

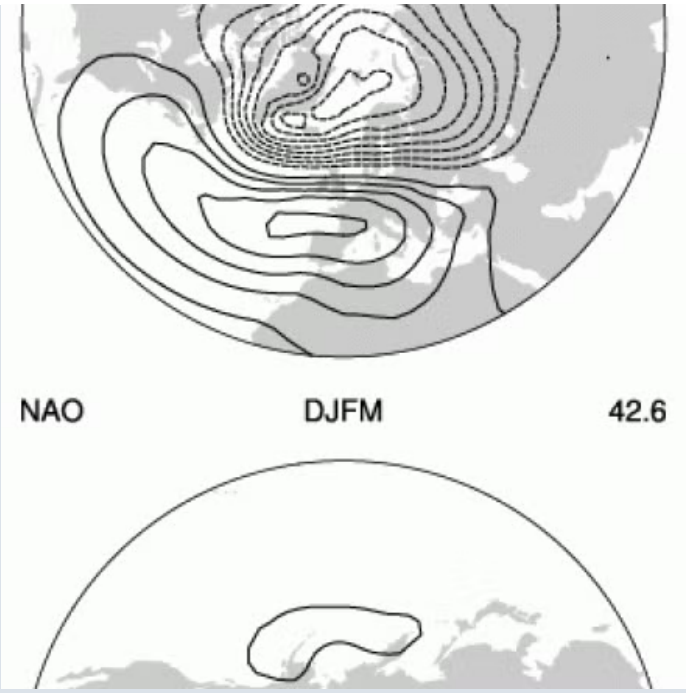
Citation of datasets is separate and should be done according to the data providers' instructions. If known to us, data citation instructions are given in the Data Access section, above.

Acknowledgement of the Climate Data Guide project is also appreciated: Schneider, D. P., C. Deser, J. Fasullo, and K. E. Trenberth, 2013: Climate Data Guide Spurs Discovery and Understanding. Eos Trans. AGU, 94, 121–122, https://doi.org/10.1002/2013eo130001

Key Figures



Time series of the various NAO and NAM indices. They are highly correlated. (Climate Data Guide; A. Phillips)



The NAM pattern (top) explains ~24% of the extended winter-mean (DJFM) variance, and is clearly dominated by the NAO structure in the Atlantic sector. Although there are some subtle differences from the regional pattern of the NAO (EOF1 of DJFM North Atlantic SLP; bottom) over the Atlantic and Arctic, the main difference is larger amplitude anomalies over the North Pacific of the same sign as those over the Atlantic. This feature gives the NAM a more annular (or zonally-symmetric) structure. (Climate Data Guide; A. Phillips)

Other Information

Main Variables & Data Classification

Earth system components and main variables
Atmosphere, Sea Level Pressure

Type of data product
Climate Indices, Circulation, NAM

Dataset collections
None

Metadata

Years of record
1899-01 to 2024-03

Metadata ID
CDG-hosted-4839

Data time period extended
Yes, data set is extended

Timestep

Seasonal

Domain
Atlantic Ocean, NH - Northern Hemisphere, Pacific Ocean

Formats:
ascii

Input Data
SLP from NCAR (Trenberth/Palino) SLP

Vertical Levels:
None

Missing Data Flag
Spatially complete

Ocean or Land
Ocean & Land

Spatial Resolution
None

Model Resolution (reanalysis)
None

Data Assimilation Method
None

Model Vintage (reanalysis)
None

References

Key Publications

1. Hurrell, J. W., and C. Deser, 2009: North Atlantic climate variability: The role of the North Atlantic Oscillation. J. Mar. Syst., 78, No. 1, 28-41
2. Trenberth and Hurrell (1994): Decadal atmosphere-ocean variations in the Pacific, Climate Dynamics 9:303-319
3. Thompson, D. W. J., J. M. Wallace and G. C. Hegerl, 2000: Annular modes in the extratropical circulation. Part I: Month-to-month variability. J. Climate, 13, 1000-1016.
4. Hurrell, J.W., 1995: Decadal Trends in the North Atlantic Oscillation: Regional Temperatures and Precipitation. Science: Vol. 269, pp.676-679

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