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Time variability of regional atmospheric excitation functions of polar motion during 1948-2004

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A set of atmospheric excitation functions of polar motion, namely the monthly regional equatorial components of atmospheric angular momentum (AAM), was computed for the 57- year period 1948-2004 from the surface pressure fields of the NCEP-NCAR reanalyses. Their values are on a high spatial resolution network of 3312 equal-area sectors over the globe. The Inverted Barometer (IB) model is applied here to the pressure fields, leading to the large reduction of variability over the ocean areas.

Larger intra-monthly variability, according to a series of monthly standard deviations plots, takes place during the Northern Hemisphere winter months in general, with the greatest maxima of these standard deviations occurring in the record of February months. The highest maxima appear usually over Europe and Asia.

The seasonal signal may be attributed to weather patterns that are generally more variable during the cold-weather months. However, the interannual variability of these signals may have some connection to global climate modes like the El Niño/Southern Oscillation. Interestingly, certain recent El Niño years appear to have smaller intra-monthly variability, possibly reflecting stable conditions during these periods.