

The long-term variations of North-Atlantic Oscillations index NAO and solar activity

I.V. Artamonova, M.I Pudovkin (*V. A. Fok Research Institute of Physics, Saint-Petersburg State University, Saint-Petersburg, Russia, e-mail: artamonova@hotmail.ru, pudovkin@geo.phys.spbu.ru)*

The long-term variations of the North Atlantic Oscillations (NAO) and their relations with Wolf numbers, Galactic Cosmic Rays flux intensity and Kleczek index are investigated. It's demonstrated, that index NAO has a distinct 11-year recurrence.

It's shown, that index NAO is determined by total effect of the solar energy variations Q_{50} and Q_{65} input in the Earth atmosphere at latitudes $\varphi=50^\circ$ and $\varphi=65^\circ$ correspondingly. In turn, Q_{50} and Q_{65} correlates with Galactic Cosmic Rays flux intensity and flare index.

Thus, variations of the North Atlantic Oscillations are substantially determined not only by different atmospheric processes, but also by cosmic phenomena and solar activity.

At the same time, relations between index NAO and Wolf numbers turned out very complicated. Coefficient of correlation $R(\text{NAO}, W)$ changes the sign twice at the period under consideration, in 1966 and 1976.

We drawn the conclusion that sign of the coefficient of correlation $R(\text{NAO}, W)$ was changed due to violation of dependence between index NAO and solar energy input variations. This modification of dependence may be explained by volcanic eruptions, which may cause an appearance of dust clouds and thus decrease the total amount of solar energy reaches the Earth surface.