The dependence of southern oscillation index dynamics on the phase of the 11-year solar activity cycle

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In this presentation we consider Southern Oscillation Index (SOI) dynamics on the annual time scale in dependence on external forcing of the atmosphere-ocean system with solar activity and with solar plasma parameters. The SOI measures the pressure difference between Tahiti and Darwin which is responsible for the equatorial wind. This wind governs such famous phenomena as El Ninho and La Ninho, influencing on global temperature. The Fourier analysis of long SOI series from 1900 up to now reveals the11(3)-year periodicity in the SOI dynamics, however with small amplitude in comparison with another ~ 2 and ~ 7 years periods, (see also Landsheidt, 1999 and references therein) that could mean at least partial influence of the solar activity on the SOI variations. Recognising this influence and trying to understand the mechanism transmitting it to the atmosphere-ocean system we study correlation of the SOI with the solar activity phase and with the solar plasma parameters, i.e. solar wind velocity, density, and temperature. Preliminary results of the search show that during last hundred years a strong decrease of the SOI value, averaged over solar cycle phases, happens on the initial phase of solar cycle, characterising with $x < 0.2$ and on the phase with $0.5 < x < 0.7$ (x is a solar activity phase with x=0 at the beginning and x=1 at the end of a given cycle); both decreases follow with the strong increases. We found that during strong SOI decreases, responsible for developing El Ninho events (as the SOI increases are responsible for La Ninho events), the correlation coefficient between the SOI and the solar wind velocity reached about 95%%. These and another findings will be presented in the report.