

Influence of solar magnetic activity on El Nino

Hiroshi Serizawa^{1*}, Takuya Kasai¹, Takashi Amemiya¹, Kiminori Itoh¹

¹Yokohama National University

Solar magnetic activity affects surface temperatures via the Arctic oscillation (AO) [1, 2]. According to our results so far, the aa index in winter has large correlation with spring surface temperatures, while the AO index in winter highly correlates with winter surface temperatures. This suggests that the mechanism of the effect of the solar magnetic activity change on the climate is complicated.

The figure shows that the correlation between the aa index and the AO index has large values for combinations of certain months of the two indices: that is, January vs. January and February vs. March. The reason behind is not clear now, but this fact is useful as shown below.

El Nino, a large scale oscillation at the tropical oceans, has large influence on Indian monsoon etc. There has been an interesting suggestion that El Nino is affected by the Arctic oscillation; that is, the onset of El Nino has a weak correlation with the AO [3]. As seen above, the AO index of March significantly correlates with the aa index of January. Thus, we can conclude that the onset of El Nino is indirectly affected by the solar magnetic activity through the correlation between the AO.

The solar magnetic activity thus appears to have influence on the climate of a large part of the globe.

- 1) K. Itoh, Influence of solar magnetic activity on the global climate (1): relations with local surface temperature and Arctic oscillation, Jpn. Geophys. Union Meeting 2008.
- 2) K. Itoh, Influence of Solar Magnetic Activity on the Global Climate (2): Correlation with Surface Temperature and Arctic Oscillation, Jpn. Geophys. Union Meeting 2009.
- 3) T. Nakamura, Y. Tachibana, M. Honda, and S. Yamane, Influence of AO on ENSO through westerly bursts, Abstract of Meteorological Society of Japan Annual Meeting, 89 (2006) 316.

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