Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

AAS23-02 会場:301A 時間:5 月 22 日 14:03-14:18

A new perspective on the weak relationship between ENSO and Atlantic Ninos
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While it has long been documented that ENSO has a strong influence on the northern tropical Atlantic, there appears to be no clear link with equatorial Atlantic variability. Thus the correlation between Pacific Ninos and equatorial Atlantic warm events (also called Atlantic Ninos) is rather weak, about -0.1 when ENSO leads by two seasons. Several attempts have been made to explain this weak relationship but a comprehensive understanding remains elusive. This is partly due to the small number of well-documented events, and partly to the poor representation of tropical Atlantic climate in general circulation models (GCMs). The present study re-examines the problem using satellite-era reanalyses and observations as well as GCMs with comparatively realistic representations of tropical Atlantic climate. We find that in both observations and GCMs the influence of tropical Pacific SST on equatorial Atlantic surface winds is strongly seasonal, with pronounced impacts limited to boreal spring. During this season negative Pacific SST anomalies induce equatorial surface westerlies in the tropical Atlantic. In GCMs these equatorial westerlies lead to a deepening of the thermocline, which is typically followed by an Atlantic Nino one season later. Thus the correlation between tropical Pacific SSTs and Atlantic Ninos is about -0.5 when the Pacific leads by two seasons. In observations and reanalyses, on the other hand, the relation between equatorial Atlantic winds and Atlantic Ninos is much weaker. Thus, in both models and observations ENSO induces similar wind patterns over the western equatorial Atlantic in MAM. In observations, however, this wind stress forcing is only one of the factors controlling the evolution of equatorial SSTs. Other factors controlling equatorial Atlantic SSTs will be discussed.

キーワード: ENSO, Atlantic Nino, correlation, surface wind
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