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Atmospheric circulation response to the two flavors of El Nino

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This study focuses on features of the atmospheric circulation response on the two types of El Nino. There are different viewpoints on question of the influence of localization of SST anomalies on the character of the remote response. Some authors believe that the initial position of the SST anomalies do not significantly affect the character of teleconnections [Trenbert el.al., 1998]. According to studies by other authors [Ashok et.al., 2007; Weng et.al., 2009], changes in the localization of SST during two different types of El Nino in some areas causes the opposite response.
Intensity of remote atmospheric response depends not only on the SST anomalies. Atmospheric sensitivity to the influence of the ocean also plays a role. Maximum sensitivity of the atmosphere observed in the Indo-Pacific warm pool, where the most intensive processes of deep convection. On this ground we can assume that El Nino Modoki should give a greater response in the atmospheric circulation anomalies, since the maximum SST anomalies shifted to the west compared to the canonical El Nino.
Investigated as a response to the global wind speed circulation of the circle of latitude, and circulation in the main centers of atmospheric activity [Gushchina D.Yu. and Petrossinats M.A, 1998]. Results are based on a composite analysis and correlation analysis of the indices of atmospheric circulation.
Atmospheric response to the two flavours of El Nino originates near the equator and extends to higher latitudes. The main differences observes in the southern hemisphere. In the case of El Nino Modoki observes increasing trade winds near 20S and weakening of the equator and low latitudes of the northern hemisphere . Canonical El Nino is characterized by a weakening of the trade wind transport in both hemispheres almost equally in both in the lower and upper troposphere. However, the general nature of the response is similar for the two types of El Nino. Our results support the hypothesis that the change in longitude localization anomalies had no significant impact on the nature of the response of the extratropical circulation.
Analysis of circulation anomalies in the centers of atmospheric action showed that a stronger signal is observed during El Nino Modoki, with the exception of a circulation anomalies in the Indian Ocean and its surroundings (Mascarene anticyclone, cyclones in the South Indian Ocean, the Indian monsoon), where more evident connection with the canonical El Nino.
Significant response to the canonical El Nino is practically absent in most regions of the Northern Hemisphere (Icelandic and Aleutian depression, Siberian anticyclone). Opposite response to the two types of El Nino observed only for a few selected regions.
Thus, our study supports the hypothesis that the response to El Nino Modoki is stronger than the response to canonical El Nino, and the nature of the response in most cases retained regardless of the type of El Nino.

References:
1. Ashok K., Behera S. K., Rao S. A., Weng H., Yamagata, T. El Nino Modoki and its possible teleconnection. J. Geophys. Res. 2007, 112, C11007, doi:10.1029/2006JC003798.
2. Gushchina D.Yu.and Petrossinats M.A. Connection surface temperature of the equatorial Pacific Ocean and wind speed circulation in the centers of atmospheric action. Meteorology and Hydrology, 1998. No. 12, pp. 5-15.
3. Trenberth K.E., Branstator W.B., Karoly D., Kumar A., Lau N.-C. and Ropelewski C., 1998: Progress during TOGA in understanding and modeling global teleconnections associated with tropical sea surface temperatures. J.Geophys.Res, vol.5 103,C7, 14291-14324
4. Weng H., Behera S. K. and Yamagata T. Anomalous winter climate conditions in the Pacific Rim during recent El Nino Modoki and El Nino events. - Clim. Dyn., 2009, vol. 32, pp. 663-674.