Possible Causes for the Persistence Barrier of SSTA in the South China Sea and the Vicinity of Indonesia

Jianping Li and Xia Zhao

LASG, Institute of Atmospheric Physics, Chinese Academy of Sciences, Beijing 100029, China

The persistence barrier refers to the lag correlation of sea surface temperature anomalies (SSTA) showing a rapid and significant decline in a specific season, regardless of the starting month. This implies that there is a decrease in forecast skill for SSTA in this specific season. This paper investigates the possible causes for the persistence barrier of SSTA in the South China Sea (SCS) and its adjacent regions from the perspective of interannual-interdecadal time scales. The results show that the persistence barrier of SSTA exists not only in the SCS, but also in the vicinity of Indonesia south of the equator. The SCS barrier occurs around October-November, while the occurrence of the barrier in the Indonesia region is around November-December. For these two regions, the occurrence of the persistence barrier is closely associated with the interdecadal variability of SSTA, as well as the interannual variability. The persistence barriers in the SCS and the Indonesia region do not exist alone if the interdecadal variability is not considered, because SSTA have a short memory of less than 4 months, regardless of the starting month. Moreover, the influence of the interdecadal variability of SSTA on the persistence barrier of SSTA in the SCS and the Indonesia region may be associated with SSTA in the Indian Ocean and the western Pacific, but is not closely associated with the Pacific Decadal Oscillation. However, compared with the spring persistence barrier (SPB) of ENSO, the close relationship between the persistence barriers in the SCS and the Indonesia region and the interdecadal variability is unique, since the ENSO SPB is not significantly affected by such variability. In addition, although the persistence barriers in both the SCS and the Indonesia region are quite obvious in strong ENSO cases, the interdecadal variability of SSTA also plays a non-negligible role in this relationship.