

北太平洋副热带高压年际变异与ENSO循环之间的选择性相互作用

李 熠¹, 杨修群¹, 谢 倩^{2*}

1. 南京大学大气科学学院, 南京 210093;
2. 解放军理工大学气象学院, 南京 211101

Selective interaction between interannual variability of North Pacific Subtropical High and ENSO cycle

LI Yi¹, YANG Xiu-Qun¹, XIE Qian^{2*}

1. School of Atmospheric Sciences, Nanjing University, Nanjing 210093, China;
2. Institute of Meteorology, PLA University of Science and Technology, Nanjing 211101, China

摘要

参考文献

相关文章

Download: PDF (1288KB) [HTML](#) 1KB Export: [BibTeX](#) or [EndNote \(RIS\)](#) [Supporting Info](#)

摘要 利用NCEP/NCAR大气再分析资料以及Hadley中心海表温度资料,针对北太平洋副热带高压(简称副高)的完整系统,通过ENSO事件的海平面副高年际异常特征及其对ENSO事件的触发作用以及ENSO事件对500 hPa副高和海平面副高的滞后作用,表明了北太平洋副热带高压年际变异和ENSO循环之间存在选择性相互作用.即在大多数情况下,一方面,前期海平面副高减弱导致西太平洋表面西风异常,通过海洋平流过程触发El Nino事件在夏季发生发展,在秋冬季成熟;而另一方面,El Nino事件在秋成熟后,增强了赤道中太平洋的对流性热源,通过对异常热源的动力响应,同期和次年夏季500 hPa副高增强,又通过增强的Hadley作用,副热带地区下沉运动增强,从而使得次年夏季海平面副高增强,增强的海平面副高又有利于触发下一个La Nina事件.副高和ENSO循环之间相互作用的选择性主要取决于副高异常是否接近于赤道以及ENSO事件本身的持续性.这种相互作用有利于太平洋海气系统产生准两年振荡.

关键词: 北太平洋 副热带高压 ENSO 相互作用

Abstract: With NCEP/NCAR atmospheric reanalysis data and Hadley Center sea surface temperature data, this study investigates possible interaction between the North Pacific Subtropical High (NPSH) and the ENSO cycle with emphasis on the role of the surface subtropical high anomaly in triggering an ENSO event and the influence of the ENSO event on both the 500 hPa and the surface subtropical highs on the interannual timescale. Results exhibit that the interaction between the NPSH and ENSO is selective. In most cases, the preceding weak surface subtropical high causes anomalous surface westerly in the tropical western Pacific which tends to trigger an El Nino event to develop in summer and mature in autumn and winter mainly through oceanic advective process. On the other hand, the convective heating strengthens over the central tropical Pacific when the El Nino event matures in autumn and winter. The simultaneous and subsequent summertime 500 hPa subtropical high intensifies as a dynamical response to the anomalous heating associated with the El Nino event. The subsequent summertime surface subtropical high also intensifies due to the enhancement of Hadley cell. Resultantly, the enhanced surface subtropical high tends to trigger next La Nina event. Therefore, the interaction between the NPSH and ENSO is in favor of generating a quasi-biennial oscillation. However, such an interaction is selective which depends on if the NPSH anomaly is close to the equator and on the life cycle of ENSO itself.

Keywords: North Pacific Subtropical High ENSO Interaction

Received 2009-09-12; published 2010-05-04

Fund:

国家自然科学基金项目(40730953,40425009)、江苏省自然科学基金创新学者攀登项目(BK2008027)和高等学校科技创业项目培育资金项目资助.

Corresponding Authors: 杨修群,男,1963年生,教授,主要从事海气相互作用和气候动力学研究. E-mail: xqyang@nju.edu.cn Email: xqyang@nju.edu.cn

About author: 李 熠,女,1980年生,工程师,主要从事海气相互作用和气候变化的研究. E-mail: judyliyi@sohu.com