

地球物理学报 » 2013, Vol. 56 » Issue (2) : 383-391 doi: 10.6038/cjg20130203

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引用本文(Citation):

林爱兰, 谷德军, 郑彬, 李春晖, 纪忠萍.南海夏季风爆发与南大洋海温变化之间的联系. 地球物理学报, 2013,56(2): 383-391,doi: 10.6038/cjg20130203

LIN Ai-Lan, GU De-Jun, ZHENG Bin, LI Chun-Hui, JI Zhong-Ping. Relationship between South China Sea summer monsoon onset and Southern Ocean sea surface temperature variation. Chinese Journal Geophysics, 2013, 56(2): 383-391, doi: 10.6038/cjg20130203

## 南海夏季风爆发与南大洋海温变化之间的联系

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Relationship between South China Sea summer monsoon onset and Southern Ocean sea surface temperature variation

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摘要

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摘要

利用1979-2009年NCEP第二套大气再分析资料和ERSST海温资料,分析南海夏季风爆发时间的年际和年代际变化特征,考察南海夏季风爆发早晚与南大洋海温之间的联系.主要结果为:(1)南海夏季风爆发时间年际和年代际变化明显,1979-1993年与1994-2009年前后两个阶段爆发时间存在阶段性突变;(2)南海夏季风爆发时间与前期冬季(12-1月)印度洋-南大洋(0-80° E,75° S-50° S)海温、春季(2-3月)太平洋-南大洋(170° E -80° W,75° S-50° S)海温都存在正相关关系,当前期冬、春季南大洋海温偏低(高)时,南海夏季风爆发偏早(晚).南大洋海温信号,无论是年际还是年代际变化,都对南海夏季风爆发具有一定的预测指示作用;(3)南大洋海温异常通过海气相互作用和大气遥相关影响南海夏季风爆发的迟早.当南大洋海温异常偏低(偏高)时,冬季南极涛动偏强(偏弱),同时通过遥相关作用使热带印度洋-西太平洋地区位势高度偏低(偏高)、纬向风加强(减弱),热带大气这种环流异常一直维持到春季4、5月份,位势高度和纬向风异常范围逐步向北扩展并伴随索马里越赤道气流的加强(减弱),从而为南海夏季风爆发偏早(偏晚)提供有利的环流条件.初步分析认为,热带大气环流对南大洋海气相互作用的遥响应与半球际大气质量重新分布引起的南北涛动有关.

关键词 南海夏季风, 爆发, 南大洋, 海温

Abstract:

The interannual and interdecadal variability of South China Sea summer monsoon onset date is analyzed, and the relationship between the date and the Southern Ocean sea surface temperature is studied using the 31a (1979-2009) daily mean NCEP-DOE Reanalysis 2 and monthly extended reconstructed sea surface temperatures (ERSST.v2). It is shown that there is significant interannual and interdecadal variability in the monsoon onset date. The mean onset date shows a significant shift from 1979-1993 to 1994-2009. The onset date is positively correlated to Indian Ocean- Southern Ocean (0-80° E,75° S-50° S) SST in preceding winter (Dec.-Jan.) and Pacific- Southern Ocean (170° E -80° W,75° S-50° S) SST in preceding spring (Feb.-Mar.). The monsoon onset is earlier (later) when SST over Southern Ocean in preceding winter and spring is anomalously low (high). Thus the SST signal over Southern Ocean may be regarded as a predictor for the South China Sea summer monsoon onset. The SST anomaly over Southern Ocean may impact the South China Sea summer monsoon onset through air-sea interaction and atmospheric teleconnection. A strong (weak) ant-arctic oscillation (AAO) during a negative (positive) SST anomaly over Southern Ocean in boreal winter may remotely cause a negative (positive) geopotential height anomaly and a positive (negative) zonal wind anomaly in tropical Indian Ocean-western Pacific. The tropical circulation anomaly is maintained from the winter to April and May, and as a result the cross-equatorial low-level Somali jet from southern hemisphere to northern hemisphere is enhanced (weakened). These provide a favorable circulation condition for the early (late) onset of the South China Sea summer monsoon. The inter-hemispheric oscillation (IHO) resulted from the air mass redistribution contributes to the teleconnection between air-sea interaction over Southern Ocean and tropical monsoon circulation.

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Keywords [South China Sea summer monsoon](#), [Onset](#), [Southern Ocean](#), [Sea surface temperature](#)

Received 2011-12-13;

Fund:

全球变化研究国家重大科学研究计划(2010CB950304); 国家自然科学基金(41075073)项目资助.

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