

亚洲夏季风水汽输送的年际年代际变化与中国旱涝的关系

陈际龙, 黄荣辉

中国科学院大气物理研究所季风系统研究中心, 北京 100080

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摘要 利用1958~2002年的NCEP-R1和ERA-40逐日再分析资料以及中国160站点月平均降水资料探讨了亚洲夏季风水汽输送的年际年代际变化及其与中国降水异常的关系. 分析结果表明, 亚洲夏季风水汽输送和中国夏季降水的异常主模态呈现显著的准两年变化周期. 当南亚夏季风纬向水汽输送偏强(弱)时, 东亚—西北太平洋地区水汽输送的偶极型异常有利于长江中下游地区和江淮流域的水汽辐合负(正)异常与华南和华北地区的水汽辐合正(负)异常, 从而引起中国东部的经向三极子雨型, 即长江中下游地区和江淮流域的偏旱(涝)与华南和华北地区的偏涝(旱). 1970s年代末之后, 亚洲夏季风水汽输送的年代际减弱与西北太平洋地区水汽输送的偶极型异常相配合, 导致长江中下游地区的持续偏涝与华南和华北地区的持续偏旱. 从中国夏季降水异常与水汽通量辐合异常的同相对应关系来看, ERA-40资料对亚洲夏季风水汽输送年际年代际变化的描述能力强于NCEP-R1资料.

关键词 [亚洲夏季风](#), [年际变化](#), [年代际改变](#), [偶极型水汽输送异常](#), [三极子雨型](#)

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Interannual and interdecadal variations of moisture transport by Asian summer monsoon and their association with droughts or floods in China

CHEN Ji-Long, HUANG Rong-Hui

Center for Monsoon System Research, Institute of Atmospheric Physics, Chinese Academy of Sciences, Beijing 100080, China

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Abstract The NCEP/NCAR reanalysis data (NCEP-R1) and the ECMWF reanalysis data (ERA-40) for the period of 1958~2002 are used to estimate interannual and interdecadal variations of vertically integrated moisture transport (VIMT) by Asian summer monsoon (ASM) and investigate their association with summer rainfall anomalies based on monthly precipitation at 160 stations in China. The results show that both VIMT by ASM and summer rainfall in China exhibit obvious biennial rhythms as revealed by time coefficient of the leading EOF mode. When summer VIMT is strong (weak) in the south Asia monsoon region, a dipole VIMT anomaly in the East Asia—western North Pacific is propitious to negative (positive) VIMT convergence anomalies in the middle and lower reaches of the Yangtze River and the Yangtze-Huaihe valley but positive (negative) VIMT convergence anomalies in South China and North China, which result in a meridional tripole structure of rainfall anomalies in eastern China, i.e., droughts (floods) in the middle and lower reaches of the Yangtze River and the Yangtze-Huaihe valley but floods (droughts) in South China and North China. On interdecadal scale, persistent floods in the middle and lower reaches of the Yangtze River but persistent droughts in South China and North China are mainly linked with weakening of VIMT by ASM and a dipole VIMT anomaly in the western North Pacific after the end of 1970s. In view of the in-phase relationship between summer rainfall anomalies and VIMT convergence anomalies in China, the analysed results also show interannual and interdecadal variations of VIMT by ASM can be better described by the ERA-40 reanalysis than the NCEP-R1 reanalysis.

Key words [Asian summer monsoon](#) [Interannual variation](#) [Interdecadal change](#) [A dipole VIMT anomaly](#) [A tripole rainfall anomaly](#)

通讯作者:

陈际龙 cjl@mail.iap.ac.cn

作者个人主页: 陈际龙; 黄荣辉

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