

TRMM多卫星降水分析资料揭示的青藏高原及其周边地区夏季降水日变化

白爱娟^{1,4}, 刘长海³, 刘晓东^{1,2}

1 中国科学院地球环境研究所黄土与第四纪地质国家重点实验室, 西安 710075; 2 西安交通大学人居环境与建筑工程学院, 西安 710049; 3 National Center for Atmospheric Research, Colorado 80301, USA; 4 陕西省气象台, 西安 710015

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摘要 本文在对比了TRMM多卫星降水分析TMPA(TRMM Multi-satellite Precipitation Analysis)资料和中国643个气象站观测降水量时空分布的基础上, 采用2002~2006年夏季TMPA每小时降水量资料, 用合成分析和谐波分析的方法研究了青藏高原及其周边地区夏季降水量和降水频率的日变化特征. 分析结果表明, 平均降水量和降水频率日变化谐波分析的标准振幅显示出青藏高原地区夏季降水具有显著的日变化特征, 高原中部地区对流活动日变化最强, 其次是高原西南方向的印度半岛地区. 谐波分析的位相表明降水量和降水频率最大值出现的时间具有选择性, 高原中部降水量最大值多集中在傍晚前后, 高原以东的四川盆地通常在夜晚, 尤其是在后半夜达到最大值, 而长江上游和中下游地区对流活动则分别在上午和下午最为活跃. 青藏高原以东地区降水量日变化的位相明显不同于其他陆地地区, 也不同于高原中部, 具有自西向东传播的信号, 四川盆地的夜雨现象可能是高原地区对流活动日变化自西向东传播的结果.

关键词 [TMPA](#) [日变化](#) [谐波分析](#) [青藏高原](#)

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Diurnal variation of summer rainfall over the Tibetan Plateau and its neighboring regions revealed by TRMM Multi-satellite Precipitation Analysis

BAI Ai-Juan^{1,4}, LIU Chang-Hai³, LIU Xiao-Dong^{1,2}

1 State Key Laboratory for Loss and Quaternary Geology, Institute of Earth Environment, Chinese Academy of Sciences, Xi'an 710075, China; 2 School of Human Settlement and Civil Engineering, Xi'an Jiaotong University, Xi'an 710049, China; 3 National Center for Atmospheric Research, Colorado 80301, USA; 4 Shaanxi Meteorological Observatory, Xi'an 710015, China

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Abstract This paper investigates the diurnal variations of summertime precipitation over the Tibetan Plateau and its neighboring regions using the TRMM Multi-satellite Precipitation Analysis (TMPA) product during 2002~2006. We first compare the TMPA data with rain-gauge observations to demonstrate their applicability and fidelity. Both diurnal composite and harmonic analyses are employed to examine the diurnal cycles of precipitation intensity and frequency. Results show remarkable daily variability in summer precipitation over the Tibetan Plateau and nearby areas. The strongest diurnal oscillation occurs in the central Plateau, and other significant diurnal signal is present in the Indian Peninsula, to southwest of the Plateau. The occurrence of the maximum/minimum rainfall intensity and frequency has salient geographical dependence. On the whole, a late-afternoon-evening maximum is dominant in the central Plateau, whereas a late-night maximum is prevalent around the Plateau periphery and in Sichuan Basin, and a morning and afternoon maximum appear in the upper and mid-lower reaches of the Yangtze River, respectively. There is a coherent diurnal variation pattern east of the Plateau, characterized by systematically delayed precipitation away from the Plateau. The significant nocturnal rainfall in Sichuan Basin is likely associated with eastward-propagating convective systems originated over the Tibetan Plateau.

Key words [TMPA](#) [Diurnal variation](#) [Analysis of harmonic wave](#) [The Tibetan Plateau](#)

通讯作者:

白爱娟 baiaj@ieecas.cn

作者个人主页: 白爱娟^{1,4}; 刘长海³; 刘晓东^{1,2}

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