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### 全球对流层顶气压场和温度场的时空演变结构特征

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### The structure characteristic of spatial-temporal variation of the global tropopause pressure and temperature

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- 摘要
- 参考文献
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全文: PDF (1220 KB) HTML (KB) 输出: BibTeX | EndNote (RIS) 背景资料

**摘要** 利用1948~2004年共57年的对流层顶气压场和温度场资料,对全球对流层顶平均温压场的空间分布结构、年际和年代际变化以及季节变化进行了分析.结果表明:①热带对流层顶和极地对流层顶的平均气压场的空间位置和热状况大致吻合,并存在空间波动性,两半球对流层顶的温压场具有显著的非对称性;②对流层顶的纬向气压与温度距平场都具有不同尺度的年际和年代际变化,两极地区对流层顶的温压场最不稳定,两半球中纬度地区的时间演变尺度存在明显差异.对流层顶断裂带及其对应温度的时空波动存在反位关系,20世纪70年代末温度出现突变现象,此时对流层顶断裂带迅速向南部空间移动;③不同季节对流层顶的温压场都将进行空间结构的调整,两者之间存在着季节变化的协调性,但北半球较南半球的演变过程复杂;④对流层顶温压场纬向距平的季节变率可划分为5个位相不同的时空波动区域,构成了气压场和温度场的经向型相关结构.北极地区气压场变化有超前于温度场变化的趋势,对流层顶断裂带的温度季节变化存在着双峰波动结构.冬半年断裂区的地理位置较夏半年稳定,气压场和温度场的最大季节变程均发生在南极.

**关键词:** 对流层顶 气压场 温度场 年际和年代际变化 季节变化 时空结构

**Abstract:** The space structure, interannual and seasonal variation of the global mean pressure and temperature were analyzed using the 57 years (1948-2004) data sets of pressure and temperature at tropopause. The results are as follows: ① The mean spatial position of the tropical tropopause and the polar tropopause approximately consistent with heating fields of the tropopause, and isopiestic, isotherm present zonality and appear wave motion at the middle and high latitude. The tropopause temperature and pressure are not symmetrical between two hemispheres. ② The interannual (interdecadal) variations of the tropopause zonal-mean pressure and temperature anomalies are remarkable. The tropopause temperature are the most instable both in two polar regions, the time-scale of evolution have obvious differences between middle latitudes in the two hemispheres. The spatial-temporal wave motions phases of the tropopause breakpoints and corresponding temperature are contrary, and the temperature presents catastrophe in the end of 1970s, tropopause breakpoints rapidly translated to south. ③ The spatial structures of the tropopause temperature and pressure will change in different seasons. The seasonal variations of tropopause pressure and temperature are almost consistent, but the variation in the Northern Hemisphere is more complicated. ④ The variability of the tropopause pressure and temperature anomalies has obvious seasonality, they can be divided into five zonal regions with different space-time wave motions, and five regions form meridional correlation structure of pressure and temperature. The variation of temperature and pressure in North Pole are different with others regions, the variation of pressure is prior to that of temperature, and the seasonal variation of temperature at the tropopause breakpoints present notable double-peaks structure, the largest seasonal variation happens in the South Pole.

**Key words:** tropopause pressure temperature interannual (interdecadal) variation seasonal variation space-time structure characteristic

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