

近60年全球大气环流经向模态的气候变化

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摘要 本文根据1948~2004年NCEP/NCAR 1000 hPa、500 hPa、100 hPa高度场逐月再分析资料, 分析了近60年全球大气环流经向模态的气候变化. 结果表明: 近60年来第一模态从低层到高层都表现出高纬与低纬地区之间明显的反向变化关系, 且随时间有明显的增强趋势. 第一模态位相发生了相反的改变, 低纬地区由负距平演变为正距平, 高纬地区由正距平演变为负距平. 1000 hPa和500 hPa高度场上的南半球比北半球变化激烈, 而100 hPa高度场上的北半球比南半球变化激烈. 第二模态在1000 hPa高度场上, 主要表现为南极涛动(AAO)和北极涛动(AO), 且两涛动在年际、年代际尺度上表现出明显的负相关关系; 在100 hPa高度场上, 主要表现为南北半球高纬度地区之间的反向变化; 500 hPa高度场是1000 hPa和100 hPa的一个过渡层次, 主要表现出明显的南极涛动(AAO). 第二模态可能是南北半球中高纬环流相互作用的桥梁.

关键词 [全球大气环流](#), [高度场](#), [经向模态](#), [气候变化](#)

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Climatic variability in the meridional mode of global atmospheric circulation during recent 60 years

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Abstract The climatic variability in the meridional mode of global atmospheric circulation is investigated by using the monthly geopotential height fields at 1000, 500, and 100 hPa during 1948 and 2004. The data are taken from the NCEP/NCAR Reanalysis. The leading meridional mode shows opposite characteristics in its spatial and temporal distributions at the high and low latitudes at the three levels. The latitude differences are significantly enlarged in recent 60 years. An abrupt change occurred in the mid-1970s, leading the phases of the first mode reversed at the low and high latitudes in both hemispheres. The variability is generally larger in Southern Hemisphere (SH) at 1000 and 500 hPa, but in Northern Hemisphere (NH) at 100 hPa. In contrast, the second meridional mode shows different features in its spatial and temporal distributions. It mainly manifests as the AAO and AO at 1000 and 100 hPa. The two oscillations have a negative correlation at interannual and interdecadal scales, and show strong anti-phase variations at the SH and NH high latitudes at 100 hPa level, suggesting that the mode could connect the SH and NH circulation at mid- and high latitudes and affect global climate change.

Key words [The global atmospheric-circulation](#) [Height field](#) [Meridional mode](#) [Climate variability](#)

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