

World Conference on

Climate Change

October 24-26, 2016 Valencia, Spain

Close correlations of the air temperature with the earth length of day in the interdecadal time scale

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The close relationship in interdecadal time scale is found between LOD and the tropospheric air temperature over the north of 30°N. The northern subtropical skin temperature will increase/decrease 0.28°C when LOD decrease/increase 1 ms. Also, the significant correlation between LOD and the air temperature only occurs in the middle summer and autumn (from July to November). According to the principle of the angular momentum conservation, the high relation of LOD with the air temperature may be associated with the atmospheric angular momentum (AAM) change. Therefore, correlations of LOD with AAM, the zonal wind and geopotential height are also analyzed. The result shows that the LOD change is only significantly related to the averaged AAM in northern hemisphere. When LOD increase, the westerly wind belt will expand toward the equator, and there are significant increases in the air mass over the northern tropical area (from the equator to 30°N) below the layer of 700 hPa, while decreases in the northern subtropical region (around 60°N) from 700 hPa to 30 hPa, and vice versa. The further analyses reveal that the significant correlations of LOD with the zonal wind and the geopotential height both start from April. That means the change of the air temperature lags 3 months compared with the change of atmospheric circulation. Therefore, the change of LOD results in the change of atmospheric circulation to satisfy the principle of the angular momentum conservation, then causes the change of air temperature.

Biography

Wenjing Shi has completed her PhD at the age of 29 years from Nanjing University of Information Science & Technology and Postdoctoral studies from Institute of Atmospheric Physics/Chinese Academy of Sciences. She has published more than 14 papers in reputed journals. She mainly studies monsoon, climate change, and air-ocean interaction.

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