



The background of cold/warm advection for two interdecadal warming processes during the last century in China

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During the last century, China experienced two notable decadal warming processes, before the 1940s and after the 1970s, respectively. It's beneficial to analyze the temperature advection associated with the atmospheric circulation in order to help understanding the regional warming processes. This paper firstly analyzed homogenized long-term temperature observations at 32 stations in China using the ensemble empirical mode decomposition (EEMD) method and revealed the geographical pattern of temperature anomalies around the 1940s, the interdecadal timescales, with cold anomalies in northern North China, Northeast China and part of southern coast and warm anomalies in most of rest China. Similar results were obtained based on the CRU global grid temperature data. Secondly, temperature advection around the same time based on the grid temperature and sea level pressure data was calculated. The spatial corresponding coefficient between the temperature anomalies at the stations and the large scale temperature advection is 85%. In contrast, the coefficient between for the recent warming period is 49%. The results indicate from a novel point of view that the internal climate variability associated with the atmospheric circulation, might play a more important role in the early warming process, but the recent warming progress could be more due to external thermal forcing.