Study on atmospheric circulation characteristics of precipitation anomalies in arid region of Central Asia

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As climate transition zone between Mediterranean climate region and East Asian monsoon region, arid region of Central Asia (including five Central Asian countries and Xinjiang province of China) which is influenced by high, middle and low latitude circulations has different synoptic-climatic characteristics from that of Europe and East Asia while its climate characteristics also varies greatly within the region. Central Asia has unique and complicated topography and ecosystem patterns like deserts, oasis, glaciers and basins, forming a highly representative meteorological disaster-breeding environment under the influence of multiple-background, multiple-factor and multiple-scale. This area has abundant solar-heat energy, large evaporation and dramatic temperature changes. Besides, its precipitation is scarce and has extremely uneven distribution with high value in the western and middle parts of Tianshan Mountains. Over the last one hundred years, Central Asia has experienced a warm and wet trend. Central Asia low value system together with the high, middle and low latitude circulation systems linked by West Asia westerly jet stream have contributed to the interdecadal and interannual variations of precipitation in Xinjiang. However, due to the insufficient construction of integrated meteorological observation network, the studies concerning regional featured circulation system, regularity and mechanism of disastrous weathers, high resolution regional numerical model, impacts of land-atmosphere interaction on regional weather and climate change prediction are still inadequate. Correspondingly, to carry out those studies has essential scientific significance and strategic value for the sustainable social and economic development in Silk Road Economic Belt.

Keywords: Arid region of Central Asia, synoptic-climatic characteristics, precipitation anomaly, atmospheric circulation, water vapor

