



Drought Risks under Climate Change in the Region of Belt and Road

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Drought is the most complex and damaging natural disaster in the world, and it severely affected the sustainable development of social economy. Frequent droughts have been observed in the Belt and Road area. Monthly mean air temperature and total precipitation for 1971-2015 from the Climatic Research Unit (CRU) were used to analyze climate change using the Mann-Kendall trend test and the Spatial Analysis in GIS; the Standardised Precipitation-Evapotranspiration Index (SPEI) was introduced to explore drought variations by extracting drought frequency and drought intensity; based on the above two indicators, the composite index model was employed to estimate drought risk in the region of Belt and Road. During 1971-2015, air temperature generally increased, but there were significant spatial differences in the whole region of Belt and Road. The average (maximum) increase rate of annual mean air temperature was 0.35 (0.82) °C/decade in Asia, 0.40 (1.02) °C/decade in Europe, 0.28 (0.50) °C/decade in Africa, and 0.16 (0.64) °C/decade in Oceania. At the same time period, precipitation generally increased in the Belt and Road area, except Oceania. On average, the annual total precipitation increased by 4.1 mm/decade in Asia, 9.1 mm/decade in Europe, and 0.4 mm/decade in Africa; however, it decreased by 9.7 mm/decade in Oceania. Under the climate warming, drought events were more in Asia and Africa than those in Europe and Oceania. The average (maximum) number of drought events was 14 (44) in Asia, 10 (29) in Europe, 14 (40) in Africa, and 10 (21) in Oceania. Drought risk was higher in Asia and Africa than those in Europe and Oceania. The average (maximum) drought risk index was 42.52 (94) in Asia, 33.74 (84) in Europe, 50.22 (91) in Africa, and 32.69 (75) in Oceania. This study can provide data support and key scientific basis for drought disaster risk assessment, drought risk prevention and reduction.