



Global semi-arid climate change over last 60 years

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This study analyzes areal changes and regional climate variations in global semi-arid regions over 61 years (1948–2008) and investigates the dynamics of global semi-arid climate change. The results reveal that the largest expansion of drylands has occurred in semi-arid regions since the early 1960s. This expansion of semi-arid regions accounts for more than half of the total dryland expansion. The area of semi-arid regions in the most recent 15 years studied (1990–2004) is 7 % larger than that during the first 15 years (1948–1962) of the study period; this expansion totaled 0.4×10^6 and 1.2×10^6 km² within the American continents and in the Eastern Hemisphere, respectively. Although semi-arid expansion occurred in both regions, the shifting patterns of the expansion are different. Across the American continents, the newly formed semi-arid regions developed from arid regions, in which the climate became wetter. Conversely, in the continental Eastern Hemisphere, semi-arid regions replaced sub-humid/humid regions, in which the climate became drier. The climate change in drying semi-arid regions over East Asia is primarily dominated by a weakened East Asian summer monsoon, while the wetting of semi-arid regions over North America is primarily controlled by enhanced westerlies.