

Bronze age megadrought and Trans-Eurasian culture exchange

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Arid Central Asia (ACA), with its diverse landscapes of high mountains, oases, and deserts, hosted the central routes of the Silk Roads that linked trade centers from East Asia to the eastern Mediterranean. Ecological pockets and ecoclines in ACA are largely determined by local precipitation. However, little research has gone into the effects of hydroclimatic changes on trans-Eurasian cultural exchange. Here, we reconstruct precipitation changes in ACA, covering the mid-late Holocene with a U-Th dated, ~3 a resolution, multi-proxy time series of replicated stalagmites from the southeastern Fergana Valley, Kyrgyzstan. Our data reveal a 640-a megadrought between 5820 and 5180 a BP, which likely impacted cultural development in ACA and impeded the expansion of cultural traits along oasis routes. Instead, it may have diverted the earliest transcontinental exchange along the Eurasian steppe during the 5th millennium BP. With gradually increasing precipitation after the megadrought, settlement of peoples in the oases and river valleys may have facilitated the opening of the oasis routes, ‘prehistoric Silk Roads’, of trans-Eurasian exchange. By the 4th millennium BP, this process may have reshaped cultures across the two continents, laying the foundation for the organized Silk Roads.

Keywords: Megadrought, Trans-Eurasian exchange, Silk Roads, Arid Central Asia, Mid-Holocene