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A hydromorphic re-evaluation of Central Asia's Medieval floodwater farming civilizations

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The Aral Sea basin in Central Asia and its major rivers the Amu Darya and Syr Darya were the center of advanced river civilizations, and a principal hub of the Silk Roads trade network. The region's decline has been traditionally attributed to the Mongol invasion of the early-13th century CE. In this study, we demonstrate the role of changing hydroclimatic conditions on the development of these culturally influential potamic societies that were depending on floodwater farming. Radiometric dating of irrigation canal abandonment and an investigation of regional river channel dynamics at Otrār oasis, a UNESCO World Heritage site located at the confluence of the Syr Darya and Arys rivers in southern Kazakhstan, revealed that major phases of fluvial aggradation occurred between the 7th to early-9th century CE and the mid-14th to mid-16th century CE. These periods coincide with economic flourishing of the oasis, facilitated by NAO-induced wet climatic conditions and higher river flows that favored floodwater farming. Periods of abandonment of the irrigation network and cultural decline primarily correlate with fluvial entrenchment during periods of drought. As the decline of the region seems to have initiated before the arrival of Ghenghis Khan and his armies, climate change has to be considered as a pivotal factor in the region's final demise.