Abrupt shift to hotter and drier climate over inner East Asia beyond the tipping point

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Unprecedented heatwave-drought concurrences in the recent two decades have been reported over inner East Asia. Tree-ring based 260-year heatwave and soil-moisture reconstructions reveal an abrupt shift to hotter and drier climate over inner East Asia. Enhanced land-atmosphere coupling induced by the soil moisture deficit appears to intensify the surface warming and associated anticyclonic circulation anomalies, fueling heatwaves that exacerbate soil drying. The analysis demonstrates that the magnitude of the warm and dry anomalies compounding in the recent two decades is unprecedented over the quarter of a millennium, and this trend obviously exceeds the natural variability range. The “hockey stick” like change warns that the warming and drying concurrence is potentially irreversible beyond a tipping point in the East Asian climate system.