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A record of late quaternary Asian southwest monsoon rainfall from upper montane peat archive in Sri Lanka

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The upper montane (2,200 m above sea level) peat archive of environmental response to climate change provides a unique opportunity to understand low latitude monsoon rainfall changes. In this regard, an accelerator mass spectrometry (AMS-14C) dated palaeo multi-proxy (i.e., pollen, spores, diatoms, phytoliths, charcoal, Sphagnum spp. macrofossil carbon isotopes, C/N ratios, grain size and environmental magnetics) rainforest record from peat archive in the Horton Plains, central Sri Lanka reveals a ca.24 kyr (24,000 year) history of millennial- to multi century-scale monsoon climate change since the Last Glacial Maximum (LGM). Arid-LGM punctuates fairly climatic ameliorations in very short episodes. Proxies indicate that post-LGM earliest tropical warming and monsoon initiation preceded Northern Hemisphere ice-sheet melting by >3 kyr before the Bolling interval, with a significant increase in rainfall at Termination 1A. This suggests an early strengthening of the monsoon at low latitudes. Starting ca. 18 kyr before AD 2000 (kyr BP), rainforest diversity increases in-step with several progressively increasing rainfalls. The first Intertropical Convergence Zone (ITCZ) induced rains occur between 16.2-15.9 kyr BP and a period between 13.7-13 kyr BP is marked with a short-lived monsoon strengthening as landmark event in regional hydrological history. The progressive trend is interrupted by two major relatively semi-arid phases (decreasing rainfall), of which the second (Termination 1B) ending ca. 10.4 kyr BP may reflect a delayed Younger Dryas event. Large climatic amelioration, with significant increase in monsoon rains occurs during the early Holocene (10.4-8.8 kyr BP), but rainfall in the first part of this period seems to have a fluctuating trend. Optimum rainforest diversification coincides with the Holocene monsoon rainfall maximum between 9.2-8.8 kyr BP. A disruption to these millennial cycles coincides with a gradual monsoon downturn, rainfall and rainforest decline and increasing aridity occurs between 8.1-3.4 kyr BP, which marks a global change in hydrological cycle during the middle Holocene. Rainfall changes towards the progressive trend, with significant fluctuations during the late Holocene. Finally, the overall record suggest that period of monsoon rainfall weakening lasted longer than the period of monsoon rainfall intensification during the past 24 kyr. Broadly synchronous palaeo climatic records of the Horton Plains, Arabian Sea, Oman and India, west and east Africa, and the North Atlantic regions indicate two-way teleconnections between tropical Asian monsoon rainfall fluctuations and high latitude temperature changes. The above changes reflect vast spatial rearrangements in atmospheric circulation patterns, probably caused by forcing associated with coupled ocean-atmosphere-vegetation feedbacks.

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Study of drinking water quality of Chas block of Bokaro district Jharkhand India

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The underground water in Bokaro districts has already been reported to contain high percentage of iron. Increasing number of deep bore wells especially in urban areas of Chas due to increasing number of apartments has already started aggravating the problems with underground water including high concentration of mineral content of underground water which has gone much deeper than the desired water level. Due to lack of proper drainage system most of the house hold liquid waste are sent in the disposal wells underground. The problem is most critical where disposal wells are near pumping wells. Leakage from these wells can introduce high concentration of BOD, COD, nitrate, organic chemicals, and possibly bacteria into ground water.

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