[JJ] Evening Poster | M (Multidisciplinary and Interdisciplinary) | M-IS Intersection

[M-IS10]Paleoclimatology and paleoceanography

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Wed. May 23, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

Past environmental changes and events at multi-decadal to tectonic timescale toward an understanding of Earth climate system by an integration of terrestrial and marine proxy studies and numerical modeling will be discussed. We welcome a variety of paleo-environmental studies from a wide range of background. In particular, a series of presentations relating to the Anthropocene will be planned. This is a merged session of A-OS31 "Linkage between oceanography and paleoceanography in marginal, shelf and coastal oceans" and M-IS23 "Paleoclimatology and paleoceanography" sessions at JPGU 2017. We hope that this session will provide an opportunity to promote communication between participants from multidisciplinary field.

[MIS10-P01]Multi-proxy evidence of role of tectonics on C_3- C_4 plants abundance from the Mio-Pliocene Siwalik deposits of Central Himalaya

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Upliftment and denudation of the Himalayas continuously supplied sediments into its foreland basin. Over a period of time, the sediment accumulation resulted in the development of large alluvial megafans deposits known as Siwalik group of rocks. This Neogene foreland deposits recorded the effect of Himalayan orogeny in controlling the past climate, CO_2 concentration in the atmosphere and flora and fauna of the Indian subcontinents. One of the important floral changes documented from the Siwalik sediments is the appearance C_4 plants. Although timing, as well as the causes of the appearance and expansion of C_4 vegetation, is well debated. The reconstruction of C_4 plants abundance was believed to be done from paleosols developed on the floodplain of low lying river. However, the southward propagation of fault system into the Himalayan foreland basin resulted in exhumation while sedimentation was still going on. The topographic difference as a response of foreland exhumation would impart a change in climatic and environmental condition for the vegetation to thrive. Throughout the foreland basin, the exhumation rate was also not uniform which would have resulted in lateral variation in elevation and climate which in turn would have controlled vegetation. In order to track the vegetation distribution as a result of surface exhumation, reconstruction of paleovegetation and climate was done from the Siwaliks of Central Himalayas. The carbon isotopic composition of bulk OM along with long chain n-alkane and n-alkanoic acid showed enrichment in δ^{13}C values around ca. 7.5 Ma implying C_4 plants expansion. However, from ca. 4 to <1 Ma, the δ^{13}C values showed depletion indicating an increase in the abundance of C_3 plants. Previously, it was interpreted that variation in C_3-C_4 plant abundance was controlled by seasonality in Indian summer monsoon. In contrast, the rainfall intensity measured from hydrogen isotopic composition of molecular proxies (δD) does not show any direct control in the distribution of vegetation type. The higher rate of exhumation during post 4 Ma as evident from the Sr and Nd isotopic records probably controlled the abundance of C_3-C_4 plants. The topographic elevation gave rise to a cool and arid climatic condition which favoured C_3 vegetation growth. The distal

part of the Bengal fan sediments also showed the signature of the increased C_3 vegetation during this time.