

Paleo (Cretaceous - Modern) East Asian monsoon controlled by topography and mid- tropospheric flow, not $p\text{CO}_2$

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The East Asian Monsoon system plays an integral role in human society yet the geological history and controls of the monsoon are very uncertain. Using a general circulation model (HadCM3L) with state of the art paleogeographies [1] and a synthesis of geological data we explore the controls on the onset and evolution of the monsoon system.

Our work indicates monsoonal conditions during the Early Cretaceous had ceased by the middle Cretaceous, re-establishing in the Eocene, strengthening to 'super-monsoon' conditions by Middle Miocene then weakening into the modern configuration.

This evolution is primarily controlled by changing paleogeography modifying atmospheric and oceanic circulation. In particular the uplift of the Himalayan-Tibetan Plateau acts as a mechanical barrier to cold, dry continental north-westerly air advecting into the region, replaced by moist air from the Indian ocean/South-China Sea. In contrast to recent previous work, carbon dioxide variations are shown to have little or no control on the onset or evolution of the monsoon system.

[1] Lunt, D. J., Farnsworth, A., Loftson, C., Foster, G. L., Markwick, P., O'Brien, C. L., Pancost, R. D., Robinson, S. A., and Wrobel, N.: Palaeogeographic controls on climate and proxy interpretation, *Clim. Past Discuss.*, 11, 5683-5725, doi:10.5194/cpd-11-5683-2015, 2015.