Paper Number: 2026

Stable isotopes from Miocene to Pliocene planktonic and benthic foraminifera: preliminary results from IODP Expedition 354 (Bengal Fan)

Bogus, K.A.[1,2], Fox, L.R.[3], Kender, S.[1,4], Leng, M.J.[1,4] and the Exp. 354 science party

[1] Centre for Environmental Geochemistry, School of Geography, University of Nottingham, NG7 2RD, UK
[2] International Ocean Discovery Program, Texas A&M University, College Station, TX, 77845, USA
[3] Department of Earth Sciences, The Natural History Museum, London, SW7 5BD, UK
[4] British Geological Survey, Keyworth, Nottingham, NG12 5GG, UK

The northern Indian Ocean constitutes the Earth's strongest hydrological region involving large inter-hemispheric exchanges of mass and energy between the ocean, atmosphere and continents. These exchanges produce seasonal monsoon winds and precipitation in India and surrounding areas. The monsoon ultimately delivers surface runoff into the Bay of Bengal, resulting in changing seasonal surface salinity and ocean currents due to wind forcing [1]. The climates of Asia are affected significantly by the extent and height of the Himalayan Mountains and the Tibetan Plateau. Uplift of this region began about 50 Myr ago, and further significant increases in altitude of the Tibetan Plateau are thought to have occurred through the Miocene and more recently. However, the climatic consequences of this uplift remain unclear. There are contradictory summer monsoon reconstructions that highlight the importance of long continuous sediment records and robust proxies to achieve consensus about the timing of monsoon intensification, which can then potentially be correlated to changing topography in central Asia and the tectonic history of the Himalaya. Given that the present day monsoon brings large changes in precipitation to the Bay of Bengal, one way to characterize this is by reconstructing the $\delta^{18}O$ of the sea surface, which is linked to salinity and temperature.

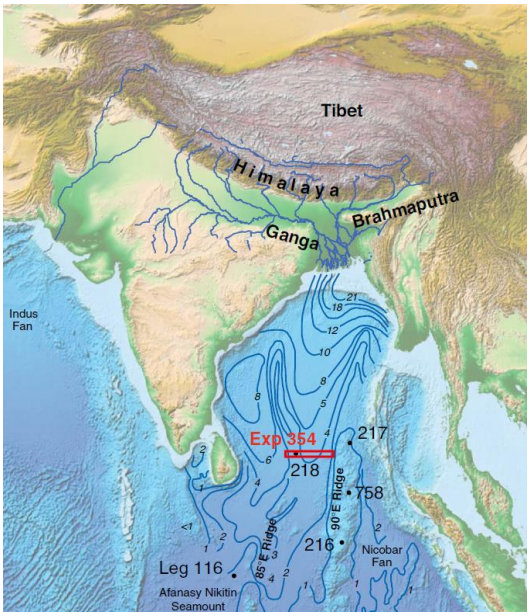

Figure 1: Map of the Bengal Fan, showing the position of IODP Exp. 354 and other ocean drilling sites [1].

International Ocean Discovery Program (IODP) Expedition 354 to the Bay of Bengal (February-March 2015) cored a series of seven sites along a longitudinal (8°N) transect (Fig. 1), and recovered 1727 m of sediment spanning the Cenozoic. IODP Sites U1450 (1350 m below sea level) and U1451 (1307 mbsl) recovered material from a succession of late Miocene to Recent distal turbidites. The sediments predominantly consist of sand, silt and clay with occasional bioturbated calcareous clays containing varying proportions of foraminifera. These calcareous clays were interpreted as representing hemipelagic sedimentation during channel-levee inactivity, and were sampled for this study. We generated paired records of surface and deep $\delta^{18}O$ and $\delta^{13}C$ from planktonic and benthic foraminifera. We use benthic $\delta^{18}O$ to constrain the biostratigraphic age model produced on the ship, and surface water changes to put constraints on the possible long-term evolution of surface water salinity from the late Miocene to the

Pliocene. These results are compared with other core records from the region (e.g., DSDP Sites 217, 218 and ODP Site 758; Fig. 1).

References:

[1] France-Lanord C et al. (2015) *IODP Preliminary Report*, 354. doi:10.14379/iodp.pr.354.2015