

Biotic interchange between the Indian subcontinent and mainland Asia through time

With the support by the National Natural Science Foundation of China and the Chinese Academy of Sciences, the research team led by Prof. Li Jiatang (李家堂) at Chengdu Institute of Biology, Chinese Academy of Sciences, explored the biotic interchange between the Indian subcontinent and mainland Asia through time, which was published in *Nature Communications* (2016, doi:10.1038/ncomms12132).

The tectonic collision between India and Asia induced a major biotic exchange from the former Gondwana continent to tropical Asia during the Early Cenozoic. Li Jiatang's research group has confirmed that diversification of rhacophorid frogs provided evidence for accelerated faunal exchange between India and Eurasia during the Oligocene. This finding was published in *PNAS*, 2013.

The opening of dispersal corridors not only allows for range expansions and tree frog dispersal, but also other biotic influx increases species diversification. Biotic interchange after the connection of previously independently evolving floras and faunas is thought to be one of the key factors that shaped global biodiversity as we see it today. However, it was not known how biotic interchange develops over longer time periods of several million years following the secondary contact of different biotas. The authors reconstructed the magnitude of dispersal between both areas, authors compiled age estimates of 127 range shifts based on 37 dated phylogenies to investigate those scientific problems, such that whether dispersal between the Indian subcontinent and mainland Asia was a uniform process over time.

Most excitedly, they presented a novel method to investigate the temporal dynamics of biotic interchange based on a phylogeographical meta-analysis. They showed that biotic influx from mainland Asia onto the Indian subcontinent after Eocene continental collision was not a uniform process, but was subject to periods of acceleration, stagnancy and decrease, and discussed potential palaeo environmental causes for this fluctuation. Accelerated biotic interchange happened since the Eocene. A Middle Miocene peak of biotic interchange existed. They found a sharp increase of MDE (maximal number of dispersal events) from mainland Asia to the Indian subcontinent between 21 and 11 Ma, peaking at 15 Ma, and decrease of biotic interchange since 14 Ma.

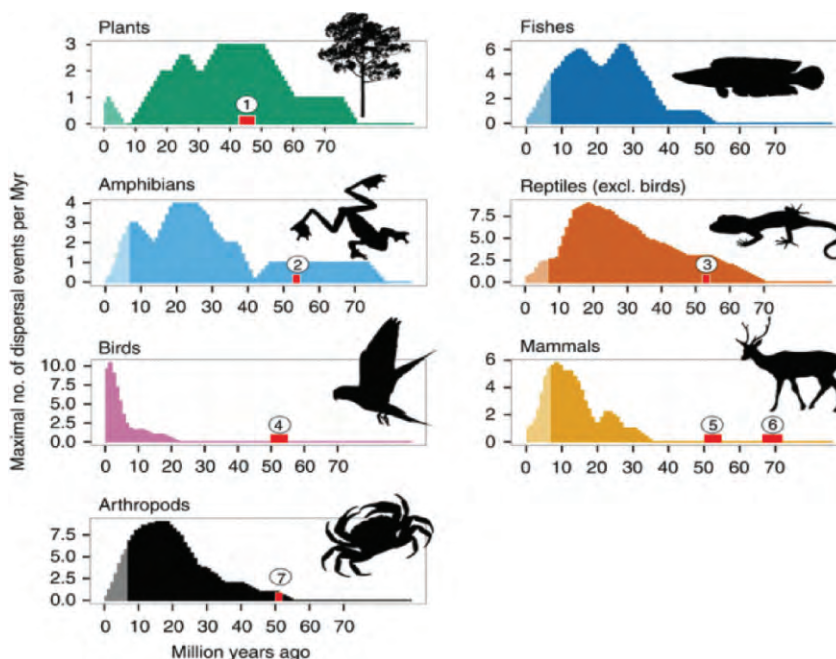


Figure MDEs for different groups of organisms and early fossil evidence for biotic interchange.