Many groups of organisms have a discontinuous African-Asian distribution pattern, restricted to wet tropical areas of the two regions but absent from the intervening drier regions of central Asia. Three main hypotheses are typically proposed to explain such biogeographical disjunctions.

(1) The large Gondwana land mass (consisting of India and the southern continents of South America, Africa, Antarctica and Australia) began to separate in the Middle Jurassic, with India ‘rafting’ northwards and colliding with the Asian plate in the middle Cenozoic, around 35 million years ago. This would have enabled unidirectional migration of ancestral lineages from Africa to Asia.

(2) The ‘Early Eocene thermal maximum’, which peaked around 52–50 million years ago, was associated with a major expansion of tropical forests beyond their current northern and southern limits. These ‘boreotropical forests’ extended into Europe and southern Asia, enabling migration of tropical floras and faunas between Africa and Asia in both directions.
In many plant and animal groups, however, long-distance dispersal has been hypothesized, in which individuals or propagules (such as seeds) are dispersed over great distances by rare, chance events. Transfer of plant propagules across the Indian Ocean, for example, could be achieved by oceanic currents or migrating birds.

In a recently published paper, we studied the evolutionary history of Uvaria, a genus of woody lianas with an African-Asian disjunction that forms an important component of tropical lowland forest ecosystems. We used differences in the nucleotide sequences of four DNA regions to reconstruct the evolutionary history of the genus, and showed that it originated in Africa with subsequent dispersal to Asia. We were able to estimate the ages of the various diversification events by calibrating the evolutionary tree with fossils of known age, and were able to demonstrate that the Africa-to-Asia migration probably occurred during the Miocene, between 21.4 and 16.1 million years ago. This age estimate is too young to be consistent with either the 'Indian rafting' or 'boreotropical' hypotheses described above. Although theories of long-distance dispersal are inherently immune to scientific falsification, Uvaria fruits and seeds are unlikely candidates for successful transoceanic dispersal as the relevant frugivores (and hence seed dispersers) are almost exclusively non-volant mammals (primates in particular) and because Indian Ocean currents during the Miocene were likely to have been dominated by an anticyclonic gyre that would have driven floating propagules into cold, southern waters.

We provided an alternative hypothesis for the African-Asian disjunction evident in Uvaria, involving dispersal through tropical forests associated with the late Middle Miocene thermal maximum (17–15 million years ago), with migration possible across a land bridge between Africa and western Asia due to the closure of the Tethys Sea. This study represents the strongest evidence yet available to show that organisms restricted to tropical forests were able to disperse overland from Africa to Asia via the more northerly tropical forests that existed during the Middle Miocene thermal maximum.