



The role of peninsular India in the South Asian monsoon

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Several studies have examined the role of the Tibetan Plateau and Himalayas in the initiation and maintenance of the South Asian summer monsoon, but few have looked at the impact of the Indian peninsula itself. In this study we describe the results of a series of novel experiments with the Met Office Unified Model (HadGEM3) run in atmosphere-only configuration, in which the role of the Indian peninsula is assessed. The contributions of the topography, orography and land surface properties to the monsoon circulation and distribution of precipitation in the tropical Indo-Pacific region are examined. While the model usually features a wet bias over the Western Ghats and Himalaya and a dry bias over the northern part of the peninsula, initial results in experiments removing the Indian peninsula and replacing it with sea surface boundary conditions suggest a large re-distribution of precipitation in the northern Indian Ocean: the region at Indian longitudes featuring enhanced precipitation. This may relate simply to the availability of moisture at the surface, however the diurnal cycle of sensible heating will also be reduced in the absence of the land surface. In a further experiment, the land surface characteristics of the peninsula are altered such that, while the land is present, there are no limitations to the supply of moisture to the monsoon. We speculate that this will help isolate the impact of the moisture constraint from that of the diurnal cycle of sensible heating.