



The formation of a dry-belt in the north side of central Himalaya Mountains

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South Asian monsoon crosses the Himalayan Mountains (HMs) and brings moisture for precipitations in the South Tibetan Plateau. A distinct dry-belt was found in the north of the central HMs region, where there are the highest and steepest mountains in the world. Through in-situ and remote-sensing observations and convection-permitting numerical experiments, the current study demonstrates that the formation of the dry-belt is mainly due to the depletion of water vapor when the monsoonal flow climbs the steep south-slope of the HMs. The foehn phenomenon is notable over the north-slope of the HMs, but the hot and dry downslope flow does not evidently reduce the amount of the precipitation; instead, it can postpone the diurnal cycle of the precipitation in the north side of the HMs.