

A Lagrangian Approach for Identifying the Major Sources of Moisture in the Hindu-Kush Himalayan Region

Robert Boschi (1) and Valerio Lucarini (1,2)

(1) Meteorologisches Institut, Universität Hamburg, Hamburg, Germany (robert.boschi@uni-hamburg.de), (2) Centre for the Mathematics of Planet Earth, University of Reading, Reading, UK

The Hindu Kush-Karakoram-Himalayan region directly supports the livelihood of 200,000 million people and provides water and ecosystem services to 1.3 billion people. Through rainfall and snow melt, agriculture and power generation are heavily dependent on reliable sources of water. This work examines the major sources of moisture over the Hindu Kush Himalayan region using a Lagrangian method which identifies the moisture contributions across the region using the ERA-Interim dataset over the period from 1980-2016. While many parts of this region are used to heavy precipitation during summer monsoon, in other regions such as Pakistan, these events are less frequent due to varying degrees of influence from mid-latitude weather systems in addition to those of the Tropics, over the course of the year. These findings show the impact of teleconnections on regional and seasonal changes of moisture sources across the Hindu Kush-Karakoram-Himalayan and provide insight into the related mechanisms. In particular, this analysis aims to show the moisture paths and sources which lead to extreme events and the climatology of this region, and in doing so, how these differ with respect to one another and nearby regions such as central India.