



## **Atmospheric Modelling for Air Quality Study over the complex Himalayas**

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An Atmospheric Modelling System has been set up at International Centre for Integrated Mountain Development (ICIMOD) for the assessment of Air Quality across the Himalaya mountain ranges. The Weather Research and Forecasting (WRF) model version 3.5 has been implemented over the regional domain, stretching across 4995 x 4455 km<sup>2</sup> centred at Ichhyakamana, the ICIMOD newly setting-up mountain-peak station (1860 m) in central Nepal, and covering terrains from sea-level to the Everest (8848 m). Simulation is carried out for the winter time period, i.e. December 2012 to February 2013, when there was an intensive field campaign SusKat, where at least 7 super stations were collecting meteorology and chemical parameters on various sites. The very complex terrain requires a high horizontal resolution (1 × 1 km<sup>2</sup>), which is achieved by nesting the domain of interest, e.g. Kathmandu Valley, into 3 coarser ones (27, 9, 3 km resolution). Model validation is performed against the field data as well as satellite data, and the challenge of capturing the necessary atmospheric processes is discussed, before moving forward with the fully coupled chemistry module (WRF-Chem), having local and regional emission databases as input. The effort aims at finding a better understanding of the atmospheric processes and air quality impact on the mountain population, as well as the impact of the long-range transport, particularly of Black Carbon aerosol deposition, to the radiative budget over the Himalayan glaciers. The higher rate of snowcap melting, and shrinkage of permafrost as noticed by glaciologists is a concern. Better prediction will supply crucial information to form the proper mitigation and adaptation strategies for saving people lives across the Himalayas in the changing climate.