

Project Title: Dynamical Downscaling

The project aims to first comprehensively assess and improve the fidelity of regional climate model experiments over different regions, particularly the complex mountainous terrains through incorporating fine-scale forcing and associated processes at their representative scales. Then, the high fidelity regional climate model setups will be employed to dynamically downscale: 1) the perfect boundary conditions at high resolution in order to understand the boundary layer and surface processes and their interactions and, 2) the coarse resolution global earth system model experiments in order to provide very high-resolution present and future climate change scenarios to input to the impact assessment and environmental models. Such scale-bridging hierarchical chain of climate and impact assessment models will allow robust assessment of adverse impacts of future climate on various development sectors and their overall influence on the economy of political entities and society. Overall, the project will immensely contribute towards the understanding of possible future for the regional economies and will provide a knowledge base for policy makers and resource managers for informed decisions in order to cope with and mitigate adverse impacts.

Specific project goal are as under:

- Comprehensive sensitivity analysis of the meso-scale climate models for different resolutions, convective closures, and microphysical parameterizations in multiple nested domains setup in order to improve model fidelity
- A modelling chain hierarchy setup for bridging the gap between climate models and impact assessment models for providing valid climate change scenarios at regional to local scale using integration of dynamical and statistical downscaling approaches
- Driving spatially explicit hydrological, land surface and environmental models with fine scale information about climate change and subsequent changes in the hydrological cycle for assessment of future changes and impacts on relevant social and development sectors