**Notes for the "ICRC-CORDEX 2019 International Conference On Regional Climate"**

**Session:** C2
**Theme:** High Mountain Environments
**Day and time:** 17th October, 2019. 8:30pm – 11:00pm
**Chair(s):** Jason Evans
**Rapporteur:** Anubhav Choudhary

## Top Highlights

1. High mountain regions are challenging to observe as well as model. There are various fine scale processes that needs to be studied. Future changes in climate are often enhanced in up slopes and over mountain regions.

2. Some of the talks showed that there are existing projects that are trying to address observational and modeling uncertainties (e.g. TPE, ANDEX, CORDEX Alps FPS, HyMEX, …) in various mountainous regions of the world

3. We need to represent some important processes in models which are currently missing or poorly represented such as, soil freezing/thawing, glaciers, topography, snow processes including snow packs etc.

## Additional Notes and Takeaways

**Speaker 1**

- *Land atmosphere interactions play key role in influencing the climate of a mountainous region*
- *Assimilation of remote sensing and in-situ measurements of soil moisture with model reveals new information*
- *e.g. Top soil layer has a main contribution to simulated brightness temperature (a case study over Tibetan Plateau based on various kinds of in-situ measurements and modeling experiments)*
- *Soil thawing process could be identified by RS products*

**Speaker 2**

- *GEWEX through its multiple projects across the different mountain ranges in the world, is working in diverse areas of environment for a 'process based understanding' of climatic changes which includes modeling and observation both*
- *Regional hydroclimatic projects (RHPs) like HyMEX, Baltic, Pannex and GLAFOs is one of such efforts, that aims to understand physical processes surrounding water and energy budgets regionally in a holistic way encompassing human environment interactions*

**Speaker 3**

- *Euro-CORDEX simulations show a strong signal of reduction in snow cover at low elevation areas in both Scandinavia and Alps- a finding which exists across all the RCPs, even for RCP 2.6*
- *RCP 8.5 shows much more stronger signal*

***Speaker 4***

- *Study of future changes in snow in mountains of Japan through an ensemble of high resolution ( 5 and 1km) regional climate simulations project an increasing contrast of mid-winter snow cover between heavy and light snow covered years*
- *Increasing mid-winter snowfall for heavy snow covered years due to increased convergence*

***Speaker 5***

- *Study of relationship between orography and precipitation over Ethiopian mountains*
- *CORDEX simulations from Africa and MENA domains overestimate precipitation at higher elevations and underestimate the same at lower elevation, the smoothed topography could be the reason*
- *With 4km simulations (from ALARO model) there is a better representation of local scale features with distribution of windward and leeward rainfall events explained*

***Speaker 6***

- *High resolution (5km) RCM simulations do add value in simulating characterisitic features of rainfall over mountains in Tasmania, Australia*
- *Winter season shows enhanced drying on upside slopes in future*
- *Majority of models agree among themselves and also with past trends*
- *Physical explanation is provided through the role/ accurate representation of convection*

***Speaker 7***

- *A snow model (CROCUS) is coupled with a weather-hydrological model (WRF) to simulate the future evolution of glaciers in Norway*
- *For one of the glaciers (Rembesdalskaka), the glacial mass balance shows a reduction of 2m per year in future (2055-2065) under RCP8.5 which will increase the run-off*
- *In a heavy glacialized environment, the summer runoff increases while in low glacialized environment it's the opposite*

***Speaker 8***

- *Latitudinal, altitudinal and mountainside dependency of climate change signals needs to be taken in to account while analysing multi model climate data over mountains*
- *A new objective methodology is proposed for reducing spatial incoherence between datasets for analysing climate change uncertainty which is more robust than simple interpolation*
- *The application of methodology over Andes based on CMIP5 models reveal wider thermal response along altitude, with stronger temperature rise over high altitudes*