

**PARALLEL SESSION B : FRONTIER DOWNSCALING TOOL
B3: A FOCUS ON ESD SPECIFIC OPPORTUNITIES**

**Selection of suitable predictors and predictor domain for statistical downscaling:
A case study over the Western Himalayan region of India**

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For statistical downscaling, selection of suitable predictors and predictor's domain is crucial and challenging issue as there is no general consensus regarding the methodology for the same. All available reanalysis dataset including ERA-Interim provide large numbers of predictor variables. Some of them have strong influence on the local scale meteorological predictant variables namely rainfall and temperature of target region which needs to be identified using any innovative techniques. Present study attempted to select a group of suitable predictors over one of the most highly topographic region of the Western Himalayan from the ERA-Interim reanalysis data sets. The method involves computation of the Principal Components of a group of available 16 temperature and 22 rain-gauge stations. For each large-scale gridded predictor field, EOF analysis has been performed and retained the first three leading EOFs, which could explain maximum variance of the data. A Step-wise Linear Multiple Regression method was employed to filter out the significant (95%) EOFs. In case of precipitation the suitable predictors are 10m V wind component, 10m wind speed, 2m surface air temperature (t2m), instantaneous moisture flux and synoptic monthly precipitation out of a probable 26 numbers of reanalysis predictor fields. Similarly the potential predictors for monthly mean temperature are t2m, 2m dew point temperature, vertical integral of divergence of geopotential flux, medium cloud cover and snow density out of 24-numbers of probable predictors.

For selection of the suitable predictor domain, we have followed different methods like, Canonical Correlation Analysis, spatial correlation analysis and temporal correlations of the mean seasonal cycles between the observation and the predictor fields. The size of domain is highly sensitive to get suitable downscaling results, which can be considered from a visual interpretation of the linear association between the observed climatic variable and the reanalysis predictor. Finally, the whole Indian domain (5-45 0N, 60-100 0E) is considered as a suitable predictor domain to provide reliable downscaling results both for rainfall and temperature over the Western Himalayan region.

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