

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

**PCA-based strategy to represent stations for empirical-statistical downscaling.**

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We test a strategy for downscaling seasonal mean temperature for many locations within a region, based on principal component analysis (PCA), and assess potential benefits of this strategy which include an enhancement of the signal-to-noise ratio, more efficient computations, and reduced sensitivity to the choice of predictor domain. These conditions are tested in some case studies for parts of Europe (northern and central) and northern China. Results show that the downscaling was not highly sensitive to whether a PCA-basis or a more traditional strategy was used. However, the results based on a PCA were associated with marginally and systematically higher correlation scores as well as lower root-mean-squared errors. The results were also consistent with the notion that PCA emphasises the large-scale dependency in the station data and an enhancement of the signal-to-noise ratio. Furthermore, the computations were more efficient when the predictands were represented in terms of principal components. An example of PCA-based ESD strategy will be presented that includes full CMIP5 ensembles (RCP2.6, RCP4.5, and RCP8.5) for the Barents Region, based on temperature and precipitation from the Arctic part of Norway, Sweden, Finland and Russia.

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