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GIS-based Interpolation and Downscaling of Climate data using topographic Data and Remote sensing

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Within the project 'scale-consistent two-way coupling of land-surface and atmospheric models' within the Transregional Collaborative Research Centre 32 'Pattern in Soil-Vegetation-Atmosphere Systems: Monitoring, Modelling, and Data Assimilation' of the Deutsche Forschungsgemeinschaft (DFG) the possibilities for extrapolation of station data and the downscaling of the output from a numerical weather forecast model based on topographic data and remote sensing data are investigated. The spatial and temporal patterns of noticeable deviations between stations are evaluated and assessed based on different relief situation, station environment and distinct synoptic-scale patterns. This step includes an analysis of land use, roughness parameters and statistical parameters such as heterogeneity and spatial texture within different remote sensing data sets, e.g. airborne laser scanning data, optical data (ASTER) and radar data (ERS-2). The deviations in climate elements are subsequently modelled using different geo-statistical approaches in order to extract major spatial structures that are responsible for the spatial variability observed. The poster will present preliminary results of the geo-statistical assessment of these spatial structures for the most relevant weather types. In a second project phase these findings will be transferred to a fuzzy-neuro-classification scheme that will automatically perform downscaling of the output from a numerical weather forecast model from 500 m spatial resolution to approximately 100 m based on weather types, season and daytime according to the downscaling rules extracted beforehand.