



Sensitivity of Regional Climate Model CLM in terms of varying parameters for spectral nudging technique

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At GKSS the regional climate model CLM, Climate version of LM (Lokal-Modell) the weather forecast model of the German Weather Service (DWD) is used. Beside the conventional forcing at the lateral boundaries the spectral nudging technique described in Feser and Storch is applied.

This spectral nudging method is also an interior forcing where inside the model area the regional model is forced to accept the analysis for large scales whereas it has no effect on the small scales. Usually the nudging is applied to the zonal and meridional wind components. The nudging terms depend on height so that the model is able to develop its own dynamics at the lower levels.

Via CLM namelists it is possible to switch on/off the spectral nudging function and to change the parameters for the spectral nudging like the nudging coefficient, wavenumbers in x- and y-direction, quantities used for spectral nudging and a lower level threshold.

At first one simulation will be carried out with spectral nudging and all parameters set to default values. According to this reference simulation always only one of the spectral nudging parameters will be changed to several values to analyse the sensitivity of the model to this change. The test area has a horizontal resolution of 0.5° (55km) with 81x91 gridpoints covering Europe. CLM is forced by ERA40. All simulations will be carried out for year 1998 starting from a stable situation. In addition in a last simulation no spectral nudging were used to see also these effects.

Model results for wind speed and direction, precipitation, mean sea level pressure and air temperature will be compared to gridded dataset from DWD. To analyse the effect

of changing parameters the simulated fields will be separated into large, medium and small scales by a spatial digital filter. It can be expected that the influence of the nudging coefficient is the highest of all parameters. Compared to the DWD dataset there are no differences in the large scale using the spectral nudging technique whereas we detect an added value in medium scale.