



Evaluating the effects of boundary condition update frequency on CCLMs climate

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In regional climate modelling it is common to update the boundary conditions of the model every six hours. This is mainly due to the fact, that reference data sets like ERA are only available every six hours. Additionally, for offline coupling procedures it would be too costly to store boundary data in higher temporal resolution for climate simulations. However, theoretically, the coupling frequency can be as high as the timestep of the driving model. It is however unclear if a more frequent update of the boundary conditions has a significant effect on the climate in the domain of the regional model.

This study uses COSMO/MESSy (Kerkweg and Jöckel, 2012) to couple CCLM offline to the GCM ECHAM5. For three update frequencies, namely six hours, one hour and six minutes a 30 year time slice experiment has been performed. The climate is evaluated by comparing means, standard deviations and PDFs of diagnostic and prognostic variables in the whole domain and in subdomains as defined in PRUDENCE.

The study shows only small deviations, some statistically significant though, of the means (2m temperature, sea level pressure, precipitation). The variable statistics do not differ much. Differences are slightly more pronounced when comparing the PRUDENCE regions. The precipitation bias at the domain borders, especially at the inflow boundary, is more pronounced in higher coupling frequencies. The deviations reach far into the model domain.