Geophysical Research Abstracts, Vol. 9, 00985, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-00985

Impact of spectral nudging on a regional spectral climate model

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The spectral nudging is a dynamical downscaling technique seen as a suitable approach to force the regional model to adopt prescribed large scale states over the entire domain, not just at the lateral boundaries, while developing realistic, detailed regional features consistent with the large scales. The aim is to reduce the differences between the global spectral climate model (ARPEGE-Climate) and the coupled regional spectral climate model (ALADIN-Climate) which could appear due to different geometries and especially due to the classical formulation of the lateral boundary conditions, in order to achieve a better representation of climate over the limited domain.

The implementation of a spectral nudging technique in the regional model and the evaluation of its performance by testing the ability to simulate the climate were realized. The results of the simulations with the proposed technique compared with the results obtained without it show that spectral nudging plays a significant role in reducing the deviation of the model solutions from large-scale driving forces.