**Geoscientific
Model Development
Discussions**

Interactive comment on "Impacts of using spectral nudging on regional climate model RCA4 simulations of the Arctic" *by* P. Berg et al.

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This paper is concise and well organized, with its topic fitting the journal well. My comments are as follows

1. The authors mentioned that a nudging strength factor is applied, which is a function of the model level, with linearly increasing values from the lowest level to highest level. Is there any reason to choose the linear increase, instead of other method to make it change smoothly with height? I brought up this point because the choice of nudging strength with height is supposed to be consistent with the relaxation time of introduced disturbances at different height. For example, the characteristic relaxation time of upper troposphere is a couple of hours. The key point is whether the nudging strength chosen in this paper is able to reflect the different relaxation time at different height according

to the time-step of RCA4 model ?

2 Has nudging also been applied to levels under PBL and why?

3, As to the tuning experiments shown in Fig.2, it would be interesting to include cases with T nudged, so that the test cases are more comparable with the final case (UVTs16w800) chosen for the simulation.

4. The authors mentioned that the performance of low-level clouds is worse with spectral nudging and possible explanation is that the temperature profile becomes deeper. However, I did not see this in Fig 4d and f. Could you please explain more about this? And if this is true, does it also mean there may be some problem with how the nudging coefficients change with height?

Interactive comment on Geosci. Model Dev. Discuss., 6, 495, 2013.