



1-km Eta model simulations over complex topography: horizontal diffusion and cloud microphysics tests

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The Eta Model is used operationally by INPE at the Centre for Weather Forecasts and Climate Studies (CPTEC) to produce weather forecasts over South America since 1997. The model has gone through upgrades along these years. Recently the CPTEC starts to run the model for very high resolution forecasts, configured over a region of complex topography located near the coast of Southeast Brazil. The Eta Model was configured with 1-km horizontal resolution and 50 layers. This Eta-1km version is driven by the Eta-15km, which in its turn is driven by CFSR reanalysis. In order to prepare the model to run at these very high resolutions, adjustments were made in model horizontal diffusion and in cloud microphysics scheme parameters. The objective of this work is to evaluate the high resolution model forecasts. Verification of model runs shows that the precipitation produced by the model was initially excessive in the region, especially over the mountain tops. One of the tests had the critical value of relative humidity to start condensation modified with respect to resolution, and another test had the terminal velocity of the snow modified. Both tests resulted in small reduction of the precipitation amount. Further tests to adjust some parameters in the cloud microphysics scheme are still ongoing. Mean sea level pressure output showed some noisiness at 1-km resolution. A factor proportional to horizontal diffusion was tested. The increase of the proportionality factor resulted in even noisier mean sea level pressure, but lower values of area averaged precipitation, this last process is not clear and further investigation is necessary.