



Evaluation of the 40-km Eta Model during a SACZ event at Serra do Mar (Southeast Brazil)

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During the first week of March 2005, the north portion of Serra do Mar (Southeast Brazil) received heavy rains (200-300 mm), causing some deaths, landslides and flooding. The event was caused by the South Atlantic Convergence Zone (SACZ), which is normally configured during the Southeast Brazil summer season. The aim of this work is to evaluate subjectively Eta Model's forecasts and to identify the major meteorological ingredients for heavy rainfall during SACZ events. The Eta Model (40-km) uses the Center for Weather Prediction and Climate Studies (CPTEC) Global Model as lateral boundary conditions. The results showed that Eta Model predicted rain over the affected area, although the maximum was predicted south of the observed region. At high levels (200 hPa) the position of the subtropical jetstream, the Bolivian High and the Northeast Cyclonic Vortex were very well predicted by the model. At 500 hPa the maximum of omega was correctly positioned at the SACZ area, but it was stronger (<-0.7 Pa.s⁻¹) than observed (between -0.5 and -0.4 Pa.s⁻¹). At low levels, the model underestimated the 850 hPa specific humidity (between 10 and 12 g.kg⁻¹), which was in fact between 12 and 14 g.kg⁻¹. The mean sea level pressure was correctly predicted (between 1012 and 1014 hPa). The humidity divergence at 1000 hPa (between -20 and -15 g.kg⁻¹.dia⁻¹) and the surface mass divergence (-20×10^{-6} s⁻¹) were also well predicted. In conclusion, the heavy rainfall was caused by Mesoscale Convective Systems (MCS) developed over Serra do Mar, and although the model is able to reproduce the supportive environment of the MCS, it fails to predict the exact heavy rain area. Large-scale analyses provided little insight into the causes of this severe weather event. Higher time and space resolution observational data may be needed to improve forecasts of some severe weather events over Serra do Mar area.