



## **Extreme precipitation cases simulated by the Regional Eta model at high resolution**

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Landslides in mountain regions affect several activities in nearby areas and cause serious material damage and loss of lives. The monitoring of the atmospheric and soil conditions, in events of intense precipitation, as well as weather forecasts using regional models are important to help actions of the Civil Defense. In this study, 3 cases of intense precipitation in a region of southeastern Brazil, close to the sea and close to mountains (Serra do Mar), are simulated by the Regional Eta Model at high resolution. The synoptic conditions are analyzed with NCEP/NCAR reanalysis data, and mesoscale features are identified from the model output. In the first case, the region was affected by a frontal system, and the synoptic situation indicated the Bolivian High and the Atlantic Upper Level Cyclone Vortex presence, which contributed to the high level divergence and ascent motion in the region. In the second case the synoptic system was also an intense frontal system with atmospheric conditions favorable to intense convection. The synoptic conditions in the third case presented an upper level short wave trough and an inverted trough at low levels, followed by an inverted comma system. The Eta model version with Kain-Fritsch convection scheme, 5 km horizontal resolution and 38 vertical levels was applied to simulate these three cases. Although the maximum precipitation location was not achieved by the model, intense precipitation was simulated close to the observations, and simulated atmospheric conditions were favorable to intense convection in the region. Mesoscale features could be identified in the high resolution model outputs, such as the sea breeze circulation, which contributed to the intense convective activity in the region. The results showed that the Eta model at high resolution can be used as a tool to forecast atmospheric

conditions associated with extreme precipitation episodes in the Serra do Mar region.