CASE STUDY OF CONVECTION INDUCED BY TOPOGRAPHY OVER SOUTHERN BRAZIL USING THE WRF MODEL

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CONCLUSIONS

- **This study seeks to contribute to the understanding of cases of nocturnal convection observed in southern Brazil. The case study allows us to propose a dynamic model on tropospheric lower levels that conceptually explain the emergence of physical conditions that are directly involved on the generation of nocturnal convection. The physical conditions are: topography and vertical/directional shear of the horizontal wind.**

- **The WRF model was able to represent effectively the vertical/directional shear, and vertical velocity acceleration below 900 hPa over the south-eastern region of Santa Catarina state and northeastern Rio Grande do Sul. That kind of wind shear profile at the lower levels induces strong confluence of mass and moisture. This behavior extends from the southern/eastern to the eastern sides of the mountains in Santa Catarina and Parana, organizing the convection over these regions.**

- **On the mesoscale level at lower levels, there was strong interaction between the planetary boundary layer (970 and 950 HPa) and lower levels (850hPa), and also influence on the mid-tropospheric levels (500 hPa).**

- **The conclusions presented here are based on a single case. Therefore, for future work, more cases could be studied. Moreover, the sensitivity of convection to different parameterization schemes and horizontal grid spacing could be evaluated. Finally, the use of a Large Eddy Simulation (LES) could be important to resolve turbulent structures relevant to PBL evolution.**

OBSERVATIONAL ANALYSIS

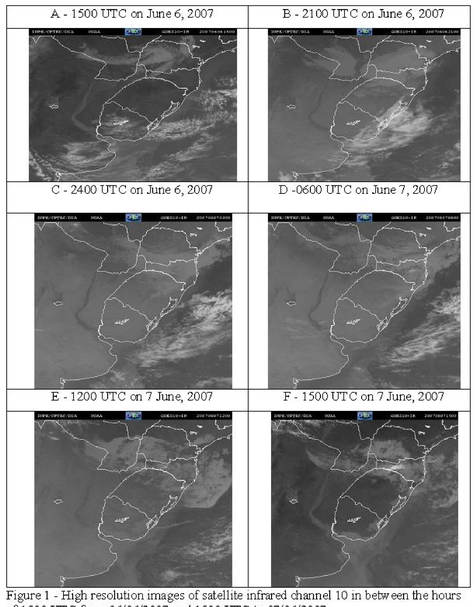

Figure 1 - High resolution images of satellite infrared channel 10 in between the hours of 1500 UTC from 06/06/2007 and 1500 UTC to 07/06/2007.

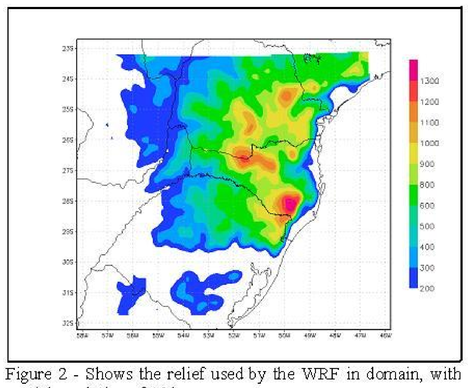

Figure 2 - Shows the relief used by the WRF in domain, with spatial resolution of 10 km.

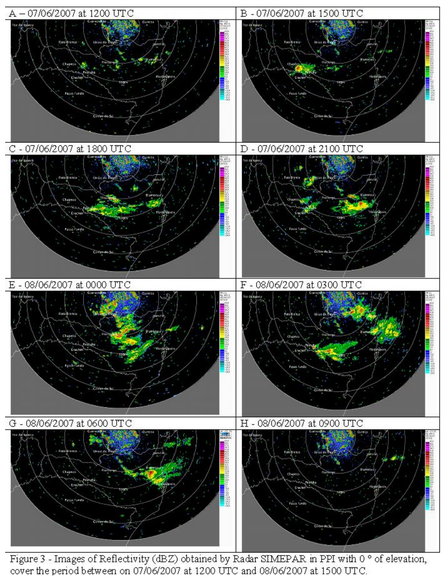

Figure 3 - Images of Reflectivity (dBZ) obtained by Radar SIMEPAR in PPI with 0 ° of elevation, cover the period between on 07/06/2007 at 1200 UTC and 08/06/2007 at 1500 UTC.

SIMULATIONS

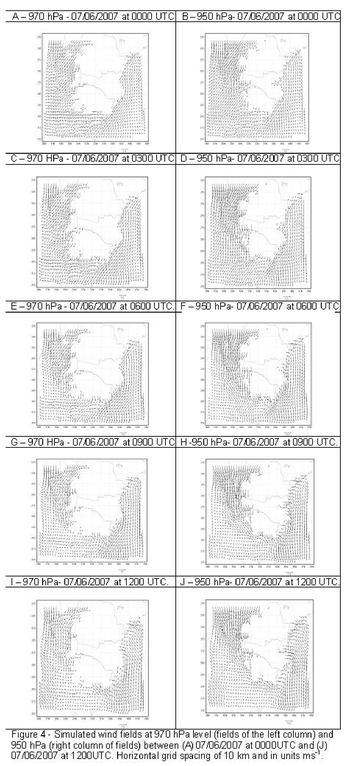

Figure 4 - Simulated wind fields at 970 hPa level (fields of the left column) and 950 hPa (right column of fields) between (A) 07/06/2007 at 0000UTC and (J) 07/06/2007 at 1200UTC. Horizontal grid spacing of 10 km and in units ms^{-1}.

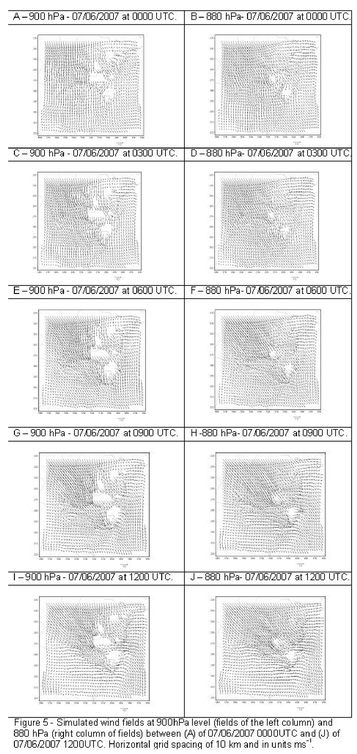

Figure 5 - Simulated wind fields at 900hPa level (fields of the left column) and 880 hPa (right column of fields) between (A) of 07/06/2007 0000UTC and (J) of 07/06/2007 1200UTC. Horizontal grid spacing of 10 km and in units ms^{-1}.

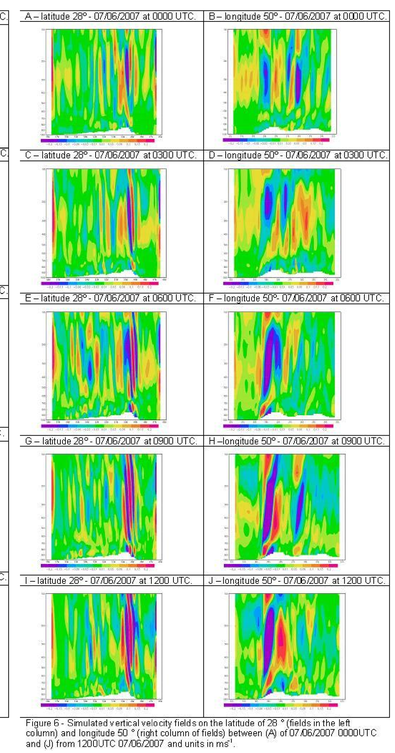

Figure 6 - Simulated vertical velocity fields on the latitude of 28 ° (fields in the left column) and longitude 50 ° (right column of fields) between (A) of 07/06/2007 0000UTC and (J) from 1200UTC 07/06/2007 and units in ms^{-1}.