Geophysical Research Abstracts,
Vol. 11, EGU2009-9001-3, 2009
EGU General Assembly 2009

Numerical simulation of a mesoscale convective system and a tornadic supercell storm in Marmara Region, Turkey

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Although there are not studies done in region, convective storms cause severe weather and significant damage in Turkey. In this study, a severe convection case of 15 August 2004 is simulated which occurred in the Marmara region, the most populated and industrialized region of Turkey. The convection was triggered by a mesoscale convective system (MCS) and a small tornadic supercell caused by pre-frontal instability. Despite the fact that the MCS had been indicated by forecast models and early warnings had been issued for Istanbul ahead of time, the supercellular convection which was responsible for the tornado in Yalova could not be predicted. The tornado caused no injuries, but there was substantial damage in fields and some buildings. In this study, Advanced Research WRF (WRF-ARW) is used for a fine-resolution simulation of the phenomena, initializated with GFS analysis data. Results are very encouraging, with the succesful capture of the mesoscale convective system and the small supercell. The mesocyclone and rotation of the cell is clear, and precipitation estimates are satisfying.