

# Dorita Rostkier-Edelstein



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## Research Interests

My research focuses on mesoscale meteorology and modeling and pursues to improve numerical weather and climate prediction at high spatial resolution, with special attention to planetary boundary layer (PBL) phenomena. I have put special emphasis on developing data assimilation (DA) approaches that can optimally improve model initial conditions in the PBL by assimilation of observations into the model. Moreover, much of my efforts have been devoted to developing and improving dynamical downscaling methods to efficiently achieve computationally expensive high resolution climatographies (model calculated climatology). In addition, I have developed analogues and weather-regimes based downscaling methods and applied them in seasonal forecasts and future climate predictions of precipitation. The use of observations and models provide me the tools to better understand the physical and dynamical processes responsible for the mesoscale phenomena of interest such as sea-land breeze, foehn and hydraulic jumps, among others. I have dedicated efforts to study meteorological phenomena beyond the PBL including transport of mineral dust.

Ongoing and future projects:

- Data assimilation of opportunistic observations to improve convection scale precipitation forecasts using WRF model and DART ensemble Kalman filter DA.
- Mesoscale modeling over urban areas for air pollution applications using WRF model with mesoscale urban parameterizations
- Analysis of Mediterranean cyclones in present and future global and regional climate models and their connection to precipitation using analogues downscaling methods.
- Improvement of atmospheric dust-aerosol model by incorporation of a turbulent thermal diffusion parameterization and improved dust-soil emission parameters using WRF-Chem model, laboratory and field measurements.

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