

## Abstract

This research project is motivated by the studies by Molini et al. (2009,2010). Molini et al. (2009) identified two types of severe rainfall events at mid-latitude by applying a novel methodology to raingauges (about 1700) all over Italy for the period 2006-2009: type I, long-lived and spatially distributed, that is lasting more than 12 hours and larger than 50x50 km<sup>2</sup>; type II, if having a shorter duration and a minor spatial extent. Subsequently Molini et al. (2010) examined the differences in predictability between these type I and II: type I events are associated with short convective adjustment timescales which indicate equilibrium convection and higher predictability, while type II events have long convective timescales, with lower predictability.

In this framework, the student will explore the hypothesis that the 2 types of events are associated to different microphysics characteristics (e.g. drop size distributions and dominant microphysics processes) by using high-resolution numerical simulations (0.1-1 km) and different data sources from remote sensing techniques. The implications for rainfall processes parameterization and rainfall stochastic downscaling will be addressed.

## References

Molini, L., A. Parodi and F. Siccardi, Dealing with uncertainty: an analysis of the severe weather events over Italy in 2006, *Nat. Hazards Earth Syst. Sci.*, 9, 1-13, 2009.

Molini, L., A. Parodi, N. Rebori and G.C. Craig, Classifying severe rainfall events over Italy by hydrometeorological and dynamical criteria, *QJRMS*, submitted, 2010.