# A Numerical Study of an in-situ Adriatic Mesocyclone: Formation and Development

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The Eastern Adriatic coast is often subject to the severe weather events, including heavy precipitation and strong winds, associated with land-falling cyclones. Most of these cyclones originate over the western Mediterranean Sea, northern Italy or northern Adriatic Sea. In this research, a class of meso-$\beta$ scale cyclones has been identified that forms over the middle Adriatic, to the lee of the Apennine mountains of Italy. These cyclones may trigger severe weather along the eastern Adriatic coastal region but because of their small size and the complexity of the terrain in the region they are often poorly resolved by numerical weather prediction models.

Herein, in this study we investigate the life-cycle of one of these meso-$\beta$ systems by a series of numerical simulations. The numerical analysis is aimed at isolating the effects of the mechanical forcing associated with the surrounding complex topography as well as the upper-level dynamical factors and surface sensible and latent heat fluxes on the formation and development of the mesocyclone. Our preliminary sensitivity experiments indicate that the cyclone is strongly modulated by both the Apennines and the Dinaric Alps and that the upper-level shortwave trough is the essential contributor to the cyclone deepening. Furthermore, sensitivity experiments that isolate the effects of surface sensible and latent heat fluxes over the Adriatic Sea on the initiation and deepening of this mesocyclone are also discussed.