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Quantifying the contribution of diabatic processes in the intensification of Mediterranean tropical-like cyclones (Medicanes)

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The classification of Mediterranean cyclones has always been a challenging task, especially when grouping warm-core and small-scale cyclones such as the Mediterranean tropical-like cyclones (Medicanes). The sudden intensity changes of Medicanes, the evolution of deep convection and the large spread of forecast tracks in numerical weather forecast models highlight the challenges in understanding the dynamics of these weather systems. In this study, numerical diagnostics are used to explain the evolution and contribution of diabatic processes in case studies of Medicanes. High-resolution simulations with WRF model are utilized and are evaluated against observations, before implementing the Pressure Tendency Equation (PTE). The decomposition of PTE shows interesting results about the contribution of diabatic processes and large-scale forcing during each Medicane. Moreover, an online Potential Vorticity (PV) tracer module is implemented in the WRF model, that provides another metric for the role of latent heating during the same Medicanes. Both approaches help to identify important differences among the case studies and shed a new light on a new pathway of Medicane development.