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Sensitivity of high resolution simulations over central Greece to WRF parameterisations

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Severe weather phenomena affect the agricultural production in the region of Thessaly in central Greece with adverse effects for farmers and the national economy. For this reason the project DAPHNE aims at tackling the problem of drought by means of weather modification through the development of the necessary tools to support the application of a rainfall enhancement program. In the present study the numerical weather prediction system WRF-ARW is used, to reveal the effect of different parameterisations to model results. WRF is integrated in three domains covering Europe, Eastern Mediterranean and Central-Northern Greece (Thessaly and a large part of Macedonia) using telescoping nesting with grid spacing of 15km, 5km and 1km, respectively. Different schemes are used for microphysics (Ferrier, WSM6, Goddard), boundary layer (YSU, MYJ) and cumulus convection (Kain-Fritsch, BMJ) parameterisation. The cases examined are days with intense thunderstorm activity. Results are compared between parameterisations and against surface observations and radar products to provide the best setup to be used for runs supporting the rainfall enhancement program. The model generally exhibits a potential to represent the occurrence of the convective activity. The spatiotemporal characteristics are captured in higher detail using parameterisations with more complex physics resulting to larger runtimes and problems in model stability.

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