EGU2020-19108
https://doi.org/10.5194/egusphere-egu2020-19108
EGU General Assembly 2020

A numerical study of dust particle effects on cloud microphysical processes and hail/precipitation impacts

Ioannis Chaniotis[1], Platon Patlakas[1,2], and **George Kallos**[1,2]
[1]National and Kapodistrian University of Athens, Greece
[2]Weather and Marine Engineering Technologies PC

The effects of natural aerosols on microphysical processes in clouds are quite important for their development and evolution and still pose some unresolved questions on the impact they have in the atmosphere and climate. The processes where they interfere, can lead to an uncertainty in the intensity of precipitation and the hydrometeor species as well as the temporal and spatial extent of the affected areas. Apart from the scientific interest of such studies, the outcome highly affects applications and early warning systems associated to water management, food security and agriculture.

For the needs of the study, the state of the art atmospheric modeling system RAMS-ICLAMS was used to investigate the effects of desert dust concentrations on microphysical processes in clouds. The model is able to run in very high resolutions in order to resolve cloud processes explicitly. Extreme case studies were selected, simulated and the model performance was evaluated showing satisfactory results. Sensitivity tests were performed in order to quantify the direct, indirect and semi-direct impact of CCN and IN concentrations. These tests showed notable effects on the cloud microphysical processes, as well as on hydrometeors. This further enhances the need for a more accurate description of aerosol feedbacks in regional and climate atmospheric models.