EMS Annual Meeting Abstracts
Vol. 14, EMS2017-395, 2017

Detection and analysis of convective cloud features using ground- and satellite - based remote sensing instrumentation

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Clouds represent one of the most important component of weather and climate system, having an extensive influence on Earth's radiation budget. Their evolution is determined by the balance between a multitude of dynamical, radiative and microphysical processes that define the manner in which the atmospheric radiation is modulated. Mixed-phase clouds, having both liquid particles in multiple phases and ice crystals, are frequently present in the Earth's atmosphere, being maintained alive by the atmospheric motions that transform aerosol particles to cloud droplets, cause ice crystals nucleation and remove water from the cloud. Remote sensing observations are often used to study different cloud types, their characteristic features such as liquid/ice water content, ice crystals formation, or precipitation. The present work is focused on the study of a convective cloud system using the synergy of ground based remote sensing instruments, satellite retrievals and meteorological reanalysis data. Cloud microphysical properties were examined by using lidar and ceilometer profiles, satellite data from SEVIRI and MODIS together with temperature and the specific cloud ice and liquid water content profiles derived from the ECMWF ERA Interim reanalysis data.