

Cloud observations over Limassol, Cyprus using CLOUDNET facilities

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Abstract

This study utilizes the results of the Cyprus Cloud Aerosol and Radiation Experiment (CyCARE) campaign that took place in Limassol, Cyprus, during the period October 2016 - March 2018. The cloudnet target classification scheme was followed for the retrieval of cloud geometrical and microphysical properties and a climatological statistical analysis was applied for the investigation of cloud seasonal variability and characteristics. Of the total number of 1,338,785 available vertical profiles 440,377 (33%) were found to contain hydrometeors. The applied statistical analysis revealed that, in the presence of clouds, ice phase has appeared in 86% of the cases, mixed phase was identified in 43% of the cases, and liquid phase was observed in 42% of the cases. Precipitation (drizzle or rain) occurred in 28% of the cases. The seasonal analysis showed that clouds over Limassol during the study period are more frequent during the winter season (60%) followed by spring (22%) and autumn (17%). The most frequent cloud type is mixed phased clouds (354,440 profiles), followed by pure ice clouds (251,402) and liquid phase clouds (125,838). Concerning the cloud geometrical characteristics, cloud base height ranged from a median value of 1478 m for liquid precipitable clouds during winter to 9803 m for ice clouds during summer. Cloud top height varied from a median value of 1977 m for liquid precipitable clouds during winter to 10271 m for ice clouds during summer. Cloud vertical thickness ranged from a median of 249 m for liquid clouds during spring to 5519 m for mixed phase precipitable clouds during spring. Since June 2024 a new permanent ground-based remote sensing station, namely Cyprus Aerosol Remote sensing Observatory (CARO), has been established in Limassol and the continuous observations will be used in future aerosol-cloud interaction relevant studies in the region of eastern Mediterranean.

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