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A study of the cloud cover and cloud top pressure weekly cycle over the region of Eastern Mediterranean with the use of MODIS satellite data

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In this work, the spatiotemporal variability of cloud cover (CC) and cloud top pressure (CTP) over the region of Eastern Mediterranean is presented. The analysis is based on level-2 data from MODIS TERRA and AQUA satellite sensors for the period 3/2000-12/2012 and 7/2002-12/2012, respectively. The data used here are from the 0.1-degree aerosol-cloud gridded dataset that was compiled within the framework of QUADIEEMS project for the investigation of the aerosol indirect effects. The Weekly Cycle Index (WCI) and the day of weekly maximum/minimum patterns are calculated on a seasonal basis and their possible connections with local aerosol sources and the regional aerosol patterns are investigated. To generalize our results, the day-of-the-week variability of CC and CTP for 9 sub-regions with different aerosol characteristics is examined. Among the most striking features is a summer CC midweek minimum over the Balkan Peninsula. Contrasting this, a weekend CC minimum appears over the Aegean and the Black Sea. In spring, we observe a statistically significant weekend CC maximum over the Balkan Peninsula and the sea regions around it. The synergistic use of various satellite, model and reanalysis products indicates that these regions are characterized by a strong presence of anthropogenic aerosols. The opposite behaviour is observed for CTP; however, the statistically significant weekly maxima and minima appear mostly over land. The QUADIEEMS project is co-financed by the European Social Fund (ESF) and national resources under the operational programme Education and Lifelong Learning (EdLL) within the framework of the Action "Supporting Postdoctoral Researchers".