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Exploiting the aerosol weekly cycle footprint with the use of TERRA MODIS 2000-2009 level-3 and level-2 datasets

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During the last years, a significant number of studies on the weekly cycle of several atmospheric parameters has been published. Concerning the satellite retrieved aerosol optical properties, only recently, the MODIS level-3 1x1 degree gridded AOD_{550nm} dataset has been used in conjunction with either ground-based measurements from the AERONET network or modeling results. These studies have been restricted to either spatially averaged values for an extended region or temporally averaged values for long periods. Here, the aerosol weekly cycle footprint for two areas with particular interest is exploited in order to show to what spatial extent the human activities affect the atmospheric aerosol loading. The first area of interest, Central Europe [-2.5^{o}W-22.5^{o}E, 42.5^{o}N-55^{o}N], is an area with a recorded aerosol weekly cycle while the second area, Southern Mediterranean [17.5^{o}E-37.5^{o}E, 30^{o}N-45^{o}N], consists a crossroad of different kinds of aerosols. The datasets used here include eight, unified for land and ocean where possible, aerosol parameters from the 2000-2009 level-3 MODIS TERRA 1x1 degree daily gridded dataset (MOD08_D3) (AOD_{550nm} for land and ocean, Fine mode $ratio_{550nm}$ for land and ocean, Aerosol mass concentration for land and Aerosol mass concentration for ocean, Ångström $exponent_{0.47-0.66\mu m}$ for land and Ångström $exponent_{0.55-0.86\mu m}$ for ocean, Aerosol effective $radius_{550nm}$ for ocean only, Asymmetry $factor_{550nm}$ for ocean only, Aerosol cloud mask fraction for land and ocean, Cloud condensation nuclei for ocean only) and the same parameters from the corresponding level-2 10x10 km (at nadir) dataset (MOD04_L2). The two datasets are jointly analyzed in order to study the spatial extent of the aerosol weekly cycles and the differences between the two datasets. The statistical significance of the weekly patterns is also examined, while the calculation of two separate aerosol masks allows for a potential elimination of the influence of non-urban aerosols (e.g. dust) on these patterns.