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Urban aerosol properties, their radiative effects and the verification of different satellite retrievals of urban aerosol pollution

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The effects of urban pollution on different aerosol properties and their year-to-year-changes in various atmospheric conditions were studied according to long-term simultaneous measurements by the collocated AERONET CIMEL sun/sky photometers in Moscow (large megacity) and at Zvenigorod (nearby clean area) for 2006-2012 year period. Additional measurements of PM10 and PM2.5, as well as soot content observations were used for evaluating the effects of local urban sources and their influence on columnar aerosol properties (single scattering albedo, aerosol optical thickness, etc.) and, hence, on radiative properties of aerosol. We discuss the results of the comparisons between RT modeling and high quality ground-based radiative measurements, which provide validation of the obtained urban radiative effects for different aerosols in clear-sky conditions. Special attention was paid to testing the retrievals of several aerosol parameters (AOT, single scattering albedo, Angstrom exponent, etc) over the urban area and the detection of the urban aerosol pollution by different satellite instruments (MISR, MODIS, SEAWIFS, OMI) against the data of collocated AERONET CIMEL sun/sky photometers in different atmospheric conditions over snow and snow-free surfaces.