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Consistency between satellite cloud/aerosol data and brightening trends

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Solar radiation at the Earth surface has increased since about 1990 ('global brightening'). An analysis of various satellite-derived global aerosol and cloud data sets ranging from about 1980 to the 2000s is performed to determine whether changes in these quantities concur with radiation changes, and to analyse the global distribution of these changes. Data sets used include PATMOS-x, GACP and ISCCP cloud and aerosol products. The analysis is based on numerical change point detection; the year, direction and significance of trend changes in each data set are identified for 15 degree boxes globally.

Aerosol optical depth is generally found to have started declining in the early 1990s almost globally. Different cloud data sets in contrast do not appear to agree on trends. Ångström exponent data seems to suggest changes in pollution as causes of total changes in aerosol. Local, hemispherical and global changes are discussed.