Geophysical Research Abstracts,
Vol. 10, EGU2008-A-02628, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-02628
EGU General Assembly 2008

TOA radiative forcing from aerosols and total ozone over the Eastern Mediterranean

K.Kelektsoglou(1), K.Kourtidis(1)

(1) Laboratory of Atmospheric Pollution and Pollution Control Engineering of Atmospheric Pollutants, department of Environmental Engineering, Democritus University of Thrace, Xanthi, Greece.

Using satellite instruments, we investigate the relationships between outgoing shortwave (SW, 0.3-5μm) and longwave (LW, 5-50μm) radiation fluxes at the top of the atmosphere (TOA) and aerosol optical properties as well as total ozone column, from September 2005 to July 2006 over the eastern Mediterranean (Aegean Sea, Greece).

The outgoing TOA radiative energy fluxes over the region of interest were derived using data sets from the Clouds and Earth's Radiant Energy System (CERES) satellite. Aerosol optical thickness and Angström exponent were obtained from Moderate–Resolution Imaging Spectroradiometer (MODIS) data, while ozone and Aerosol Index were from the Earth Probe TOMS daily global 1.0^ox1.25^o products and OMI TOMS-like daily global 1.0^ox1.25^o products.

SW fluxes on the one hand and total ozone, aerosol optical thickness and TOMS Aerosol Index on the other were found to be correlated, while an anticorrelation was observed between LW fluxes and total ozone, aerosol optical thickness, Aerosol Index and Angström exponent, the latter being also anticorrelated with SW fluxes.

The cloud fraction was the dominant factor affecting TOA SW and LW fluxes. An increase in the cloud fraction of 0.1 resulted in an increase in SW and decrease in LW fluxes of about 25 W m^{-2} and 10 W m^{-2}, respectively. For cloud cover fraction below 0.1, total ozone, aerosol optical thickness and aerosol Angström exponent all influenced SW fluxes, this influence being dominated by AOT (an increase in AOT by 0.1 resulting in an increase in SW flux of about 20 W m^{-2}). For cloud cover fraction

below 0.1, total ozone, aerosol optical thickness and aerosol Angström exponent all appear to be anticorrelated with LW fluxes, this anticorrelation, however, is not very compact. This might reflect the fact that LW fluxes are influenced by factors other than the cloud cover, the aerosol load and total ozone, for example the atmospheric water vapor content.

In conclusion, it appears that over the region of Eastern Mediterranean LW and SW fluxes are largely determined by cloud cover.