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Application of satellite remote sensing to assess springtime atmospheric aerosol loading over the South-West Asia

Samaneh Sabetghadam
Institute of Geophysics, University of Tehran, Iran

Assessment of atmospheric aerosol properties is crucial to understand impact of aerosols on Earth-atmosphere system, and satellite remote sensing is a key tool to assess the variation of aerosol properties. Aerosol optical depth, which is the vertical integral of the fraction of incident light either scattered or absorbed by aerosols, represents the amount of aerosol load in the column of the atmosphere. On the other hand, Angstrom exponent is an indicator of aerosol size distribution in the column of atmosphere.

This study, conducts a spatiotemporal analysis on the daily value of the collection 6 MODerate Resolution Imaging Spectroradiometer (MODIS) aerosol products to estimate aerosol loading and types during March, April and May 2019, over the south-west Asia. Different countries in this region have different sources of pollutants, therefore, aerosol properties have been extensively variable. Results show that the highest springtime value of aerosol load is found over the Arabian Peninsula, with the second largest aerosol concentration over Western and Southern Iraq. It is followed by a peak over Dashte-Kavir, Iran. Dominant aerosols in these regions are mainly characterized by coarse aerosols like dust particles. It is likely due to the presence of naturally produced dust particles over the drylands in the region. Instead, the lowest aerosol loads are found over countries in the northern part of the studied region including Turkmenistan, Western Uzbekistan, Armenia and Georgia, Eastern Turkey as well as some parts of North-Western Iran. Higher values of Angstrom exponent show the contribution of fine aerosols in the northern regions.