



Impacts of summer 2021 wildfire events in Southwestern Turkey on air quality with multi-pollutant satellite retrievals

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Climate change has several impacts on our Earth. Even though wildfires are natural processes to sustain structure of an ecosystem, there is a significant increase in the global fire cases and their extent in the recent years caused by the climate change. These wildfires have important impacts on air quality, climate and relatedly public health. Copernicus Atmospheric Monitoring Service (CAMS) indicated that Siberia, North America, and the Mediterranean regions are greatly impacted by wildfires and the intensities of these fires are expressed as Fire Radiative Power (FRP). Effect of wildfires can also be observed with gas pollutant satellite retrievals of CO, NO₂, and HCHO which is an important volatile organic carbon (VOC).

Turkey was challenged with wildfires that result in the destruction of forests, the death of animals and devastating impacts on local people in 2021. CAMS Global Fire Assimilation System (GFAS) indicated that the worst fire case observed in Turkey compared with other Mediterranean countries. Global Forest Watch fire counts showed that, fire counts reached up to 695 and 385 in summer (between June-August) 2021 for Antalya and Mugla provinces, respectively. However, fire counts did not exceed 165 fires in the summer season for either Antalya or Mugla in the last five years. Moreover, there was a significant increase in fires in the forested lands for Mersin province as well. Fire counts reached up to 171 per day (31st August) in Antalya province and fire smokes were observable from MODIS Corrected Reflectance images in the fire period. In addition, air pollutants caused by these fires were observable with high resolution TROPOMI retrievals.

In this study, multi-pollutant satellite retrievals were used to investigate the wildfires air quality impacts on the Southwestern Turkey. VIIRS S-NPP Fire Radiative Power product and TROPOMI CO, NO₂, and HCHO, products were used to analyze impacts of these extreme wildfire cases. Products were processed spatially and temporally for two months (July-August 2021). A specific attention was given on period of 28th July-12th August. A 1×1 km² gridded domain covering the impacted region was selected to investigate the spatial distribution of these pollutants. 29th and 31st of July were the days where the impacts of wildfires were analyzed specifically. Wind speed and direction were used to understand the relation between meteorological conditions and the pollution distribution caused by the wildfires. Aerosol signals will be also investigated using MODIS aerosol optical depth (AOD) and TROPOMI aerosol index (AI) retrievals.

