



Assessing an Haboob Event Triggered by Land Cover/Land Use Change: A Case Study of Polatlı, Türkiye

S. Yeşer Aslanoğlu and Gülen Güllü

Department of Environmental Engineering, Hacettepe University, Ankara, Türkiye (yaslanoglu@hacettepe.edu.tr)

An extreme mesoscale dust storm hit Türkiye's capital, Ankara, on 12th of September, 2020. During the storm, there was no long-range dust transport, particularly from the neighboring desert regions of North Africa and the Middle East. Instead, convective systems in the surroundings of Konya province, located south of Ankara, generated high-speed winds of up to 30 m/s, causing a significant amount of continental dust to rise from the district of Polatlı, situated about 70 km southwest of Ankara. Quickly evolving into a haboob, the storm brought life in Polatlı to a halt for approximately 20 minutes. As it progressed northeastward, the storm lost its haboob effect, but its impact on air quality persisted for about 24 hours, affecting not only Polatlı but also surrounding settlements, including central Ankara. MODIS Aqua overpass could catch the event partially but the observed AOD levels reached over 1. The air quality index reached hazardous levels, with the Polatlı air quality monitoring station recording a record hourly average PM₁₀ concentration of 5,446 µg/m³ during the event. The primary cause was a dramatic change in land cover. Polatlı, covering an area of approximately 22 thousand hectares, is predominantly engaged in dry farming, with 80% of the land dedicated to it. The prolonged absence of rainfall, coupled with improper farming practices, has led to desertification of the land cover and, consequently, its susceptibility to erosion by wind. This study analyzes the mechanisms leading to the formation, progression, and environmental impacts of the storm using data from the Turkish State Meteorological Institute's observations and the C-Band Doppler weather radar data; CALIPSO and MODIS aerosol observations; Sentinel moisture and normalized vegetation difference indices; and measurement data from air quality monitoring stations belonging to the Ministry of Environment, Urbanization, and Climate Change.