

Changing temporal patterns of Saharan dust events in Central Europe

GYÖRGY VARGA¹, CSILLA KIRÁLY¹, ZOLTÁN SZALAI^{1,2},
NADIA GAMMOUDI³

¹Research Centre for Astronomy and Earth Sciences MTA,
H-1112 Budapest, Budaörsi út 45.
varga.gyorgy@csfk.mta.hu

²Eötvös Loránd University, H-1117 Budapest, Pázmány
Péter sétány 1/C.

³Department of Geology & Meteorology, University of Pécs,
H-7624 Pécs, Ifjúság u. 6.

Long-term observations of Saharan dust events in the Carpathian Basin (Central Europe) revealed a clear seasonal pattern of dusty episodes. Multivariate analysis of different aerosol products from 1979 to 2018 indicated clear spring- and summertime maxima of these events.

Several unusual, out-of-season dust episodes with significant depositional events have been recorded from the end of 2013. The observed winter and early spring intense Saharan dust washout events indicated changing atmospheric mechanisms of dust transportation. Synoptic analyses confirmed that majority of the identified events have been connected to very similar atmospheric patterns: generally an upper level atmospheric trough (as the result of a remarkable meander of the jet stream) led to the development of a cut-off low over NE Africa, which deepened low pressure system transported large amounts of the mineral dust northward.

The driving mechanism of the increased frequency of these intense, unusual dust events could be connected to arctic amplification: as a result of decreasing temperature difference of Arctic and lower latitudes driven by the faster warming high latitudes, more meandering jet stream patterns have been developed.

Support of the National Research, Development and Innovation Office NKFIH KH130337 and KEP-8/2018 MTA Kiválósági Együttműködési Program are gratefully acknowledged.