



## **Statistical characteristics of mudflows in the piedmont areas of Uzbekistan and the role of the synoptic processes for the formation of mudflows**

Gavkhar Mamadjanova and Gregor C Leckebusch

University of Birmingham, School of Geography, Earth and Environmental Sciences, Birmingham, United Kingdom  
(gxm423@bham.ac.uk)

Mudflows are formed almost every year in the territory of Uzbekistan and neighbouring countries. They represent a major threat to human life and settlements and can significantly damage infrastructure. In general, in addition to elevated soil moisture conditions, severe local rainfall events (e.g., 15 mm of precipitation in 12 hours) and associated air temperature conditions are understood to be the main factors in the formation of mudflows in the piedmont areas of Uzbekistan.

The main purpose of this study is to understand factors on local and synoptic to hemispheric scales, which cause mudflow variability on interannual and longer time scales. To fulfil this objective, in a first step historical data of mudflow occurrences (mainly March to August) in Uzbekistan provided by the Centre of Hydro-meteorological Service of the Republic of Uzbekistan (Uzhydromet) for more than 140 years are statistically analysed. During the investigation period a total of around 3000 mudflow events were observed with about 21 events per year on average and a maximum of 168 mudflows in 1930.

To understand principle factors steering the variability of mudflow occurrences, synoptic scale circulation weather types (CWT) over Central Asia and Uzbekistan are investigated. The majority of mudflows (22%) occur during the advection of westerly airflow when moist air from Central and Southern Europe reaches Uzbekistan. This objectively classified synoptic situation can be related to one of the 15 primary synoptic circulation types over the Central Asia and Uzbekistan which were subjectively derived by Bugayev and Giorgio in 1930-40s (Bugayev et al., 1957), thus confirming the validity of this approach.

By means of the CWT approach, we further analyse that on mudflow-days the frequencies of cyclonic, westerly, south-westerly and north-westerly stream flows are increased in comparison to the climatological frequency of occurrence of these circulation weather types. Details of the necessary and sufficient meteorological conditions within a CWT class are investigated.

Further studies will investigate and identify key factors steering the variability in CWT frequency variability over Central Asia on longer timescales and how these are related to known major variability modes in the climate system.