



## **A new dust source map of Central Asia derived from MODIS Terra/Aqua data using dust enhancement techniques**

Mohamad Nobakht, Maria Shahgedanova, and Kevin White

Department of Geography & Environmental Science, The University of Reading, Reading, United Kingdom  
(m.nobakht@pgr.reading.ac.uk)

Central Asian deserts are a significant source of dust in the middle latitudes, where economic activity and health of millions of people are affected by dust storms. Detailed knowledge of sources of dust, controls over their activity, seasonality and atmospheric pathways are of crucial importance but to date, these data are limited. This paper presents a detailed database of sources of dust emissions in Central Asia, from western China to the Caspian Sea, obtained from the analysis of the Moderate Resolution Imaging Spectroradiometer (MODIS) data between 2003 and 2012. A dust enhancement algorithm was employed to obtain two composite images per day at 1 km resolution from MODIS Terra/Aqua acquisitions, from which dust point sources (DPS) were detected by visual analysis and recorded in a database together with meteorological variables at each DPS location. Spatial analysis of DPS has revealed several active source regions, including some which were not widely discussed in literature before (e.g. Northern Afghanistan sources, Betpak-Dala region in western Kazakhstan). Investigation of land surface characteristics and meteorological conditions at each source region revealed mechanisms for the formation of dust sources, including post-fire wind erosion (e.g. Lake Balkhash basin) and rapid desertification (e.g. the Aral Sea). Different seasonal patterns of dust emissions were observed as well as inter-annual trends. The most notable feature was an increase in dust activity in the Aral Kum.