Geophysical Research Abstracts
Vol. 15, EGU2013-2533, 2013
EGU General Assembly 2013


# Mid-Holocene stabilization of the Karakum and Kyzylkum sand seas, central Asia – evidence from OSL ages

Shimrit Maman, Haim Tsoar, Dan G. Blumberg, and Naomi Porat
Ben-Gurion University of the Negev, Israel (tiroshs@gmail.com)

Sand seas (ergs) are large areas of deserts covered by wind-swept sand with varying degrees of vegetation cover. The Kyzylkum and Karakum ergs have accumulated in the Turan basin, northwest of the Hindu Kush range, and span from south Turkmenistan to the Syrdarya River in Kazakhstan. These ergs are dissected by the Amudarya River; To the north lies the Kyzylkum (red sands) and to the south the Karakum (black sands). This area is understudied, and little information has been published regarding the sands stabilization processes and deposition ages.

This research focuses on identifying and mapping the ergs of Central Asia and analyzing the climate factors that set the dunes into motion and that stabilized them. A variety of spaceborne imagery with varying spectral and spatial resolutions was used. These images provide the basis for mapping sand distribution, dune forms, and vegetation cover. Wilson (1973) defined these ergs as active based on precipitation. Our results show that they are mostly stabilized, with an estimated area of $\sim$260,000 sq. Km for Kara-Kum , and $\sim$195,500 sq. Km for the Kyzyl-Kum . Meteorological analysis of wind and precipitation data indicate a low wind energy environment (DP<200) and sufficient rainfall (>100 mm) to which is essential for vegetation cover.

We present the first optically stimulated luminescence (OSL) ages from the upper meter of 14 exposed sections from both ergs. The age of the sand samples was determined as $\sim$Mid-Holocene by OSL, which provides an insight into past climate characteristics. These ages indicate extensive sand and dune stabilization during the Mid-Holocene. GIS analysis was performed in parallel with field work to validate and verify the results. The OSL ages, coupled with a compilation of regional palaeoclimatic data, corroborate and reinforce the previously proposed Mid-Holocene Liavliakan phase, known to reflect a warmer, wetter, less windy climate than persists today and that resulted in dune stabilization around Mid-Holocene. This study emphasizes the importance of regional climatic control on aeolian activity and is the first to show when these vast sand seas were stabilized.