Geophysical Research Abstracts
Vol. 16, EGU2014-7245, 2014
EGU General Assembly 2014

Aeolian processes and dune morphology in the Gobi and Badain Jaran Desert using LandSat Imagery.

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The Gobi and Badain Jaran Deserts are parts of the vast sand sea of the Alashan Region, one of the greatest dunefield in China [1]. They lie between the southern Mongolia and the northern China (latitude 37° 06'N - 41°50'N; longitude 99°10'E - 107°09'E) [2]. The studied area is characterized by an arid climate with low average annual rainfall between 50-60mm, extreme fluctuation in temperature, very strong winds and by the occurrence of mega dunes and permanent lakes within the dunefield [3].
According to our morphological analysis, wind action has been one of the main factors that have shaped the surface features inside the investigated area. We produce a detailed geomorphological map of the desertic zone, highlighting the aeolian morphologies, in order to characterize aeolian deposits and processes. The LandSat ETM+ data [4], providing a continuous coverage of the dune fields with no gaps, were processed using ENVI software and then ingested in a GIS project.
We also used DTMs (30m / pixel) from Aster data [5]. The dune morphology was classified using McKee criteria [6] and we interpreted the pattern of the complex ergs as the result of self – organization within complex systems [7].
Compound transverse mega dunes and barchanoid dunes developed under a variable wind regime, star dunes in the northern area near the mountain have been formed under a multi directional wind regime. The area covered by mega dunes suggests a complex evolution of these features dominated by the wind activity. Different episodes of deposition, erosion and motion, could explain the height of these dunes measured by the DTMs.
The diverse aeolian features identified in the investigated area suggest that aeolian activity play a key role for the evolution of the surface morphologies of the Gobi Desert.
To understand the local dynamics of aeolian processes, we are currently comparing these features with meteorological data from mesoscale wind models.

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