Geophysical Research Abstracts
Vol. 15, EGU2013-179, 2013
EGU General Assembly 2013

From new generation of remote sensing geological maps to 3-D model: the Central Kyzylkum (Western Uzbekistan) is taken as example

Elena Sidorova
Center RS and GIS-technologies, State Committee of Geology of the Republic of Uzbekistan

Geographic information systems (GIS) together with remote sensing (RS) have become powerful tools in geosciences. The application of GIS technologies in geological exploration including mapping of remote sensing geological bases represents new trend in space-geological studies. GIS technologies are a multifunctional tool of input, visualization, analysis and output of information necessary for achieving geological objectives. They enable a prompt processing of geological information for various territories and levels – from a province to ore area or deposit. A modern remote sensing geological map reflects a new level of organization of source data, and involves a vast territory and previously unknown or unused factors, which proceed from non-traditional methods of studies. This is the benefit of distance bases as they explain the structure of geological complexes but also contribute to revealing new elements that cannot be established using traditional methods of geological studies. Data obtained from computational analysis of Digital Elevation Models (DEM) and from plotting the remotely sensed geological structures are complemented by data acquired in the field using traditional mapping methods. In this paper, the new improved results are tested in the western part of Uzbekistan — the region of Central Kyzylkum, which include of numerous ore deposits. Landsat TM imagery was successfully used for geological structures recognition due to its synoptic view over large areas that allow the detection of regional geological features — faults, ring structures. Spatial information is crucial
for ore structure detection; nevertheless spectral data can also help in the geological interpretation of space images. In order to combine the spatial and spectral information of Landsat TM data, panchromatic and multispectral images were fused in a synergetic imagery using PCA analysis. Edge enhancement filtering techniques were also applied on the Landsat images to facilitate the recognition of linear and ring features. The features of geological interest detected during the interpretation process were digitized using raster based GIS software. As results of collaboration between GIS and RS data analysis the new prospect areas were extracted from the study areas. Were revealed the geological structures in 3-D model, associated with mineralization, lineaments and ring structures. The complex analysis of model allowed proposing new potential ore areas for statement of prospecting work.