Land Surface Monitoring in The Kyzyl Kum Desert, Central Asia

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Overcoming regional water problems requires an understanding of both natural hydrological conditions and social and historical changes in regional water policy. Central Asian nations face serious water problems, and we here review the circumstances surrounding water resources in the Syr Darya and Amu Darya River basins in terms of water management changes and climatic trends. Two major rivers – the Syr Darya and the Amu Darya – originally flowed into the Aral Sea, once an inland lake that was the world's fourth largest in water area. In the 1960s, the Soviet Union started large-scale irrigation projects in the vast dry steppes extending through the mid and downstream basins of these two rivers. By 1999, irrigated farmland occupied 7.90 million ha and water taken from the rivers ranged from 110 to 117 km3. The main crops promoted were water-consuming – cotton, rice, wheat, maize, and grass. The huge increase in water diverted to irrigated areas dramatically decreased water flowing into the Aral Sea, disturbing the balance between water inflow and evaporation from the lake, drastically reducing the lake area and rapidly raising the saline concentration from 10‰ to 35‰. The Aral Sea became divided into the Small Aral in the north and the Large Aral in the south, both of which continue to shrink.

The Kyzyl kum desert is located in the flatland between the rivers Amu Darya and Syr Darya. It is a typical desert area and has unique climate condition and ecosystems. There are small oases in this area and local people use them for crop irrigation. To understand the hydrological cycle is important for local people and sustainable farming, however there are not enough data for scientific analysis. Moreover, air temperature is increasing about 0.9-1.0 degree for 100 years and 0.4-0.5 degree for 25 years in Uzbekistan which is relatively higher than global averages. The object of this study is to understand the hydrological and ecological systems in this region including climate variation and change. We started the land surface observation since November 2006 in Kyzyk ke sek. Additionally, landcover and vegetation mapping using satellite remote sensing data are analyzed for large scale modeling.