Response of Vegetation Dynamics to Groundwater in Qaidam Basin, China

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Methodology

A time series analysis for 250m MODIS NDVI was used to present vegetation variation for Qaidam Basin, northwestern China[1]. The MODIS NDVI acquired from 2000 to 2013 were processed to determine vegetation cover fraction (VCF) for detecting the annual dynamics of didfferent types of vegetation cover in the basin and the products were validated by comparing field measurement in spatial distribution[2].

Discussion of Results

Basically, NDVI values increased with time and the basin interior is dominated by desert while mountainous area is mostly covered by alpine meadows. The NDVI threshold between bare soil and vegetation area is 0.055. VCF was evaluated and 74% of the basin area is covered by low density vegetation and bare soil. In general, bare soil and low density vegetation showed a decrease rate while other classes correspond with increase trends in vegetaiton cover.

The effect of water table depth on vegetation is more complex since some plants are dependent on groundwater while others are not[3]. In Qaidam Basin, *Phragmites australis* is showed to highly dependent on groundwater and the corresponding water table depth is shallower than 3 m. Shrubs of *Artemisia desertorum* and *Tamarix ramossissima Ledeb* are also sensitive to water table depth and the maximum NDVI occurred at the water table depth of 2 m. High height shrub as *Nitraria Schoberi L.* can extend roots to a depth of 12 m or more in Qaidam Basin. TDS is another important factor for limiting vegetation growth. Generally, no vegetation can survive in TDS over 8 g/L. It was investigated that the suitable TDS level for *Artemisia desertorum*, *Phragmites australis*, *Calligonum mongolicunl* and *Nitraria Schoberi L.* is between 0.1 and 3 g/L, whereas *Tamarix ramossissima Ledeb* and *Achnatherum splendens* is in range of 3-10 g/L.

[1] Le Marie *et al*. (2011) *Remote Sens Environ* **115**, 2613-2625. [2] Gutman & Ignatov (1998) *Int. J. Remote Sens* **19(8)**, 1533-1543. [3] Robinson *et al*. (2008) *Vadose Zone J*. **7**, 358-389.