

Abstract of Presentation

Presentation Title:

Mapping of estimated urban groundwater resource demand by using DMSP/OLS light intensity

Abstract :

The author attempted to describe structure of surface water use in the Yellow River Basin of China, whose situation was difficult to be understood with a lack of actual data. Local administrative authorities in China do not readily provide information, and generally they do not release data even to researchers in China. Nocturnal light intensity image data collected by DMSP/OLS US military meteorological satellites covers all of China at around 560-m resolution. Therefore, if it is possible to use light intensity values totaled according to counties to explain in advance the data for annual supply of tap water, then it would be possible to create intensities for estimated water resource demand according to counties, and thereby prepare a map of estimated water resource demand for the entire Yellow River Basin.

Annual agricultural use reached around 150,000 to 290,000 t (1120 m)⁻² in half region of the Northchina Plain, especially surroundings of major cities, and both of annual industrial and annual domestic use reached around 60,000 to 270,000 t (1120 m)⁻² at major cities in the Northchina Plain, Zhengzhou, Luoyang, Xi'an etc. Spatial data of groundwater use of China with high resolution is not accessible and this study shows a new approach to clarify this distribution through comparison of simulated groundwater level based on the authors' results and the actual data.

The author also directly compared structure of water resource demand and supply estimated by Onishi et al. (2006) and structure of ground water use estimated by the author in the each region. 35 municipalities which were almost included in the Yellow River Basin were picked up and they were classified into 12 small catchments in focusing on the geographical location and the similarity of shape of structure of water resource demand and supply. In the upstream areas surface water is mainly used and share of agricultural use is small, therefore, seasonal variability of ground water use is small. On the other hand, in the middle stream and the downstream areas share of ground water is large and share of agricultural use is large, therefore, seasonal variability of ground water use is large. Especially these characters are obvious in the Loess Plateau. In addition, surface water is mainly used again in the most downstream areas.