Deutscher Tropentag, October 11-13, 2005, Hohenheim

"The Global Food & Product Chain—
Dynamics, Innovations, Conflicts, Strategies"

Time Related Landscape Changes in Yutian Oasis at the Southern Fringe of Tarim Basin in NW China

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Abstract

Little is known about time-related changes in the agricultural structure of ancient melt-water oases along the silk road in the hyper-arid Taklamakan desert of Northwest China. Recently released, high-resolution b/w aerial photographs taken in 1956 and an ETM+ satellite image taken in 2002 were used to compare such changes in Yutian oasis at the northern fringe of the Kunlun mountains, where melt-water is used to produce crops on irrigated farmland. Image analysis showed a complete transformation of the oasis' agricultural setting over the time period studied from an extensive agriculture system with a total cultivated surface of 17,970 ha, a canal length of 3,133 km and a higher landscape diversity compared to today's 21,300 ha oasis surface and a canal length of 4,068 km in 2002. Whereas the modern-day agriculture structure with its chest-board type system of cement-lined irrigation canals may fit the need of intensive agriculture based on commodity crops such as maize (*Zea mays* L.), cotton (*Gossypium hirsutum* L.) or melon (*Cucumis melo* L.), it likely consumes much more water than the traditional system. This may lead to the reduction of melt-water available for the foreland vegetation protecting the oasis from encroaching sand dunes of the surrounding desert.

Keywords: GIS, image analysis, oasis transformation, Taklamakan

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