

Japan Geoscience Union Meeting 2011

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HGG001-P01

Room:Convention Hall

Time:May 26 14:00-16:30

Indigenous Ecological Knowledge and conservation in traditional agricultural landscape of Satoyama in Japan and Hani Ter

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Abstract: Indigenous ecological knowledge (IEK) can contribute to the management of local ecosystems and landscapes. Cultural landscapes are produced by, and reflected, the long-term interaction in indigenous societies of humans and nature. Taking the traditional agricultural landscape of Satoyama in Japan and Hani Terrace in Southwest China as case study, this paper summarize the IEK of the indigenous peoples in Japan and southwest China, including the management of water, forest, and soil resource, the vertical landscape pattern and resource-circulating system. The paper also stresses the challenges and threats facing the Hani IEK and cultural landscape of rice terraces, and discusses the potential integration of the IEK and cultural landscape conservation.

Keywords: Indigenous ecological knowledge, Conservation, Traditional agricultural landscapes, Rice Terraces

HGG001-P02

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Relationship between land surface condition and shallow groundwater in the Irrawaddy River delta, Myanmar

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Groundwater is widely used as a water resource in the Irrawaddy River delta. But, Groundwater has some chemical problem in part of the area. To use safety groundwater for health, it is important to make clear the actual conditions of physical and chemical characteristics of groundwater in this delta. Besides, Irrawaddy River delta is one of the most riskiest area by the flood and high waves through cyclone or monsoon. Especially, change of land surface condition by any disaster affect to the physical and chemical characteristics of shallow groundwater. So, it is necessary to make clear the actual condition of effect of land surface conditions to the shallow groundwater, to secure a good aquifer for sustainable shallow groundwater resource supply.

The purposes of this study are to analyze the physical and chemical characteristics of shallow groundwater quality related to geomorphology, geology and land use. Water samples are collected at 36 measurement points of river and groundwater in the dry season (January, 2010) and wet season (September, 2010), and analyzed dissolved major ions and oxygen and hydro-stable isotope compositions.

There are some groundwater flow systems and these water qualities are different in each area. Also, shallow groundwater quality composition showed Na-Cl-HCO³ type at central delta. This type is not similar to Irrawaddy River water which showed Ca-HCO³ type. According to the relation deuterium and d-excess, it is estimated that recharge area of shallow groundwater is Pegu and Alakan mountains or Irrawaddy River water. At the central delta, Shallow groundwater is mixed by both waters. These showed that Irrawaddy River water is recharge to the portion of shallow groundwater, but chemical characteristics is not affected to the shallow groundwater. So, chemical characteristics of shallow groundwater are closely related to geomorphological, geological and land use conditions. Land use is crops, paddy field and residential area in the delta, so it is possible that this water quality type is effect by any human activities. At the shallow depth of western area and the 10 to 40 m depth of central area, groundwater quality composition is similar to Irrawaddy River water. Seasonal change of groundwater qualities is different in each area.

It was summarized that shallow groundwater quality is affected by land surface conditions which is different in each area.

Keywords: Irrawaddy River delta, shallow groundwater, land surface condition, human activity, water quality

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HGG001-P03

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Environmental change of the middle and lower reaches of the Ayayawady river

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We focus to study of river morphology and natural environmental change for the middle and lower reaches of the Ayayawady river. Firstly, the meandering index was constructed referred with Szuki's methodology and reconstructed the meandering process on the Japan Army map published 1960's. After that the remote sensing data (ETM and TM images) produced by NASA in 2000 was analyzed meandering process and we compared with 60years river morphologic change of the Ayayawady river. Compared with geomorphologic land classification map of the Ayayawady river basin, the meandering index was evaluated for 11 segments and the changing ratio during recent 60years is clarified.

Keywords: Ayayawady river, meandering, environmental change

HGG001-P04

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Characterizing temporal vegetation dynamics of land use: Case of agricultural lands in Java Island, Indonesia

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Monitoring land surfaces continuously allows characterization of temporal vegetation dynamics. Considering seasonal vegetation dynamics in multi-year series data leads to a broader view of land surface information. In tropical regions, e.g. Java Island, a paddy field might undergo a sequence of covers through the year, such as: (1) paddy-bareland-secondary crops-bareland, (2) paddy-bareland-inundated-paddy-bareland-secondary crops, and (3) paddy-bareland-secondary crops-bareland-inundated-paddy, where the sequence is repeated year after year following the seasons.

Characterization of vegetation dynamics has often been made by using vegetation index values, either the normalized difference vegetation index (NDVI) or enhanced vegetation index (EVI). The temporal dynamics of those index values are useful for distinguishing land surface conditions by differentiating among vegetation types and their distributions. We characterized the temporal vegetation dynamics of long-term land use by using multi temporal MODIS EVI 16-day composite data from 2001 to 2007.

The temporal pattern analysis was able to provide information of the planting, heading and harvesting dates of the lands; and also identified the change in dynamic agricultural system, such as cropping system changed from triple cropping system to double cropping system, also delaying of seedling stage while the rain season start changed, and others phenomena; however, the mixed pixel issue is quite problematic when using MODIS data.

The results explained that the seasons, it was the most of important factor which affected the change of dynamics agricultural system. The long-term dry season or extreme season by global climate changed caused many agricultural lands become un-planting as well the planting time was postponed. In some areas, even if the irrigation infrastructure exists locally in these areas, if irrigated water is limited, double or triple cropping may not possible in a given year. However, there are many aspects that impact the agricultural system, such as social capital, farmer welfare, irrigated water, and the price of crops.

Characterizing of temporal vegetation dynamics patterns would provide sufficient, significant and useful information of regarding the patterns of land use; consequently it should be possible to consider the actual subtle of inter-annual land use change as well as overall land use.

Keywords: temporal vegetation dynamics, land use, agricultural land, MODIS, Java Island, Indonesia