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HTT29-P01

会場:コンベンションホール

## NDVI と NDWI 時系列データを用いた耕作放棄地の検出限界に関する予備的検討 Preliminary study on detection limits of abandoned farmlands using NDVI and NDWI time-series data

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Increase of abandoned farmlands is gaining attention in Japan as a problem causing difficulties such as: expansion of breeding habitat potentially preferred by vermin; increase of small parcels where illegal dumping occurs; and deterioration of rural land-scapes. To address this problem, it is important to periodically survey the extent and distribution of abandoned farmlands over a broad spatial range. However, conventional surveying methods are labor intensive and time-consuming, requiring surveyors to cover every parcel often situated in hostile locations.

Remote sensing provides us with a low cost, repeatable alternative means for broad-scale mapping of abandoned farmlands. A previous study suggested that Normalized Difference Vegetation Index (NDVI) derived from remotely-sensed data could have potential to discriminate an abandoned paddy from a paddy area since the difference in NDVI becomes significant at the periods of one month after planting and two months after harvesting. Normalized Difference Water Index (NDWI) was also applied successfully to detecting changes in agricultural activity in a paddy area. However, the success of previous studies depends on acquiring data not affected by cloud contamination at the suitable timing in terms of crop calendar.

The objective of this study is to assess the detection limit of an abandoned paddy using the time-series data derived from MODIS surface-reflectance products. Firstly we refined the time-series reflectance data by removing the effects of cloud contamination based on the Savitzky-Golay filter. Secondly a simple linear mixture model was adopted to estimate temporal signatures of underlying end-member landcover types and simulate mixed signatures at different end-member compositions. Thirdly we calculated NDVI and NDWI time series using the simulated signatures and explored the minimum fraction of abandoned paddy potentially including the signal relevant to cessation of agricultural activity. Preliminary results showed that successful detection is limited to the pixel dominated by abandoned paddy areas.

キーワード: 耕作放棄地, 時間分解能, 空間分解能, 時系列分析, 混合画素 Keywords: abandoned farmland, spatial resolution, temporal resolution, time-series analysis, mixed pixel

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HTT29-P02

会場:コンベンションホール



時間:5月24日18:15-19:30

## 耕作休止農地を対象とした土地被覆分類手法の評価 Evaluation of land cover classification methods targeting unmanaged farmland

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In order to reveal the impact of evacuation on biota, National Institute for Environmental Studies is monitoring biota in areas evacuated as a result of nuclear disaster, and the surrounding areas in Fukushima Prefecture, Japan. It includes the monitoring of "land cover" in the study area. This involves regular observation of areas that contain "residential area" and "arable land", where humans have historically performed regular maintenance. These are fundamental elements to discuss the change of local ecosystems due to abandonment. Areas of arable land in the study area are much greater than the residential areas. For this reason, priority should be given to the analysis of arable land. Environmental change in unattended farmland associated with evacuation is relatively quick. And the physical environment of arable land typified by moisture condition is different for each paddy and upland field plot. Therefore, it is necessary to monitor field plots with distinguishable spatial resolution in short cycles. This study evaluated land cover classification methods for arable land considering these requirements. Spaceborne satellite imagery was used with revisit time and spatial resolution matched to these conditions. Arable land in the study area was first defined by aerial photo interpretation. Then, using multi-temporal, multispectral imagery (RapidEye, spatial resolution = 5 m) and single polarization of L-band SAR imagery (PALSAR-2, spatial resolution = 3 m), land cover was categorized based on the machine learning classification methods with training data. Comparison of multiple methods and datasets revealed a classification technique that combines SAR data and multispectral imagery provided improved classification accuracy. Keywords: unmanaged farmland, land cover, remote sensing, machine learning, SAR

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HTT29-P03

会場:コンベンションホール

Monitoring and Analysis of Land use/cover change in Kashigar region Based on Landsat and Spot vegetation Data Monitoring and Analysis of Land use/cover change in Kashigar region Based on Landsat and Spot vegetation Data

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The spatio-temporal changes of land use / cover (LUCC) and its driving forces in Kashigar region, Xinjiang Province were analysed by satellite remote singing data. Main goal of this paper was to quantify drivers of LUCC using long term Landsat and Spot Vegetation data from 1972 to 2014. First ,we produced LUCC map by using Landsat images in 1972,1990,2000 and 2014. Land use information from Landsat data was collected using maximum likelihood classification method. A hierarchical classification system of 16 land cover subclasses was applied to the Landsat data. The 16 subclasses of land cover were further grouped into 6 aggregated classes of land cover: urban, cropland, water, grass, bare land and glacier. Land use change was studied based on the change detection method of land use types. Second, Normalised Difference Snow Index(NDSI) values was calculated by Spot Vegetation data from 1999 to 2014. According to the snow index confirmed snow conditions of study area which is used to screen the LUCC and climate changes after snow cover map drawn. Third, driving forces were analysed according to climate changes and socioeconomic development. The climate data was obtained from CRU TS 3.21 about temperature and precipitation data. According to these data climate changes were compared with NDSI value, while the socioeconomic data was from the Xinjiang Statistical Yearbook(1984-2014). The study indicates that the increase of land use benefits was given more attention. The study suggests that the land use should be based on the sustainable protection of arid environment on the Kashigar region.

 $\neq - \neg - ec{r}$ : Land use /cover change, driving force, snow index, Kashigar region Keywords: Land use /cover change, driving force, snow index, Kashigar region

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会場:コンベンションホール



時間:5月24日18:15-19:30

## 新疆における食糧生産の経年変化と水資源の関連性 The Relationship between the Food production and Water Resources of Xinjiang Provence

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本研究では、乾燥・半乾燥地域に位置する新疆の主な水資源である積雪と食糧生産の関連性を明らかにするため、SPOT VEGETATION(1999年-2012年)データセットから NDSI(Normalized Difference Snow Index) 画像を作成し、新疆におけ る積雪面積の時空間的な変化について検討を行った。また、新疆統計年鑑(1999年-2012年)に記載されている耕地面 積及び有効灌漑面積などのデータをデジタル化及び地理情報システム(GIS)により地図化し、新疆における食糧生産の 時空間的な変化について解析を行った。

積雪面積の時間的な変化の結果では、新疆における各年の積雪面積は 1999 年の 9636.5000km から 2012 年の 13957.2000km まで達し、14 年間で約 4320.5000km 増加していることがわかった。積雪面積の空間的な変化としては、南新疆の崑崙山脈周囲の積雪面積の増加が顕著で、天山山脈周囲では年々変動があることが確認出来た。

統計年鑑により解析結果では、新疆における耕地面積及び有効灌漑面積は、積雪面積と同様に南新疆の崑崙山脈周囲の扇状地で増加傾向であることが確認出来た。

キーワード: 新疆ウイグル自治区, 食糧生産, 積雪面積, 水資源, SPOT/VEGETATION, NDSI Keywords: Xinjiang uyghur autonomous region, Food production, Snow area, Water, SPOT/VEGETATION, NDSI