

A Study of Japanese Rice Production Using Satellite Data with Community Participation in GIS

-From the Development of Semi Real Time Automatic Analysis System-

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*** * J a p a n M a n n e d S p a c e S y s t e m s C
o r p o r a t i o n**

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Objective of this Study

To improve the quality and productivity of Japanese rice by using GIS and satellite Images

Data

MODIS (resolution level: 250m) and UK-DMC(resolution level: 22m)

Study area

Yoshijima zone in Kawanishi Machi in Yamagata Prefecture



Index

NDVI

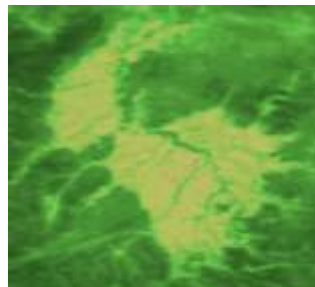
NDVI is a popular index to characterize the condition of vegetation. NDVI is calculated as follows

$$NDVI = (IR - R) / (IR + R)$$

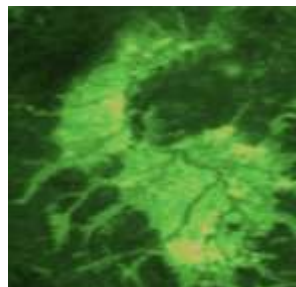
R: infrared wave IR: close infrared wave ($-1 \leq NDVI \leq +1$)
the condition of vegetation : low \rightarrow high



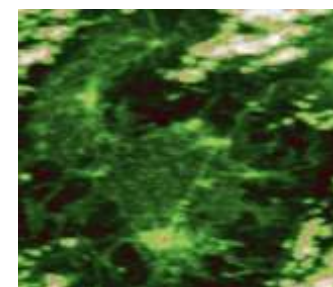
5/9/2009



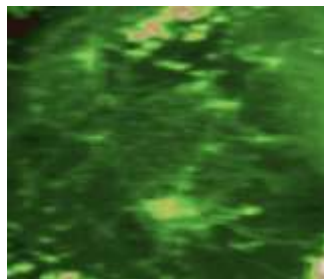
5/27/2009



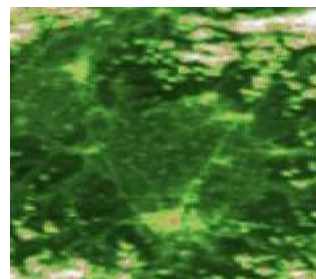
6/22/2009



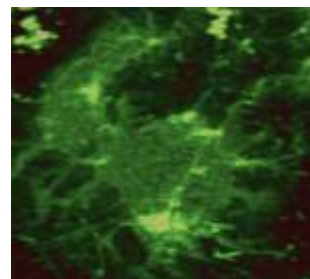
7/17/2009



8/26/2009



9/5/2009



9/7/2009

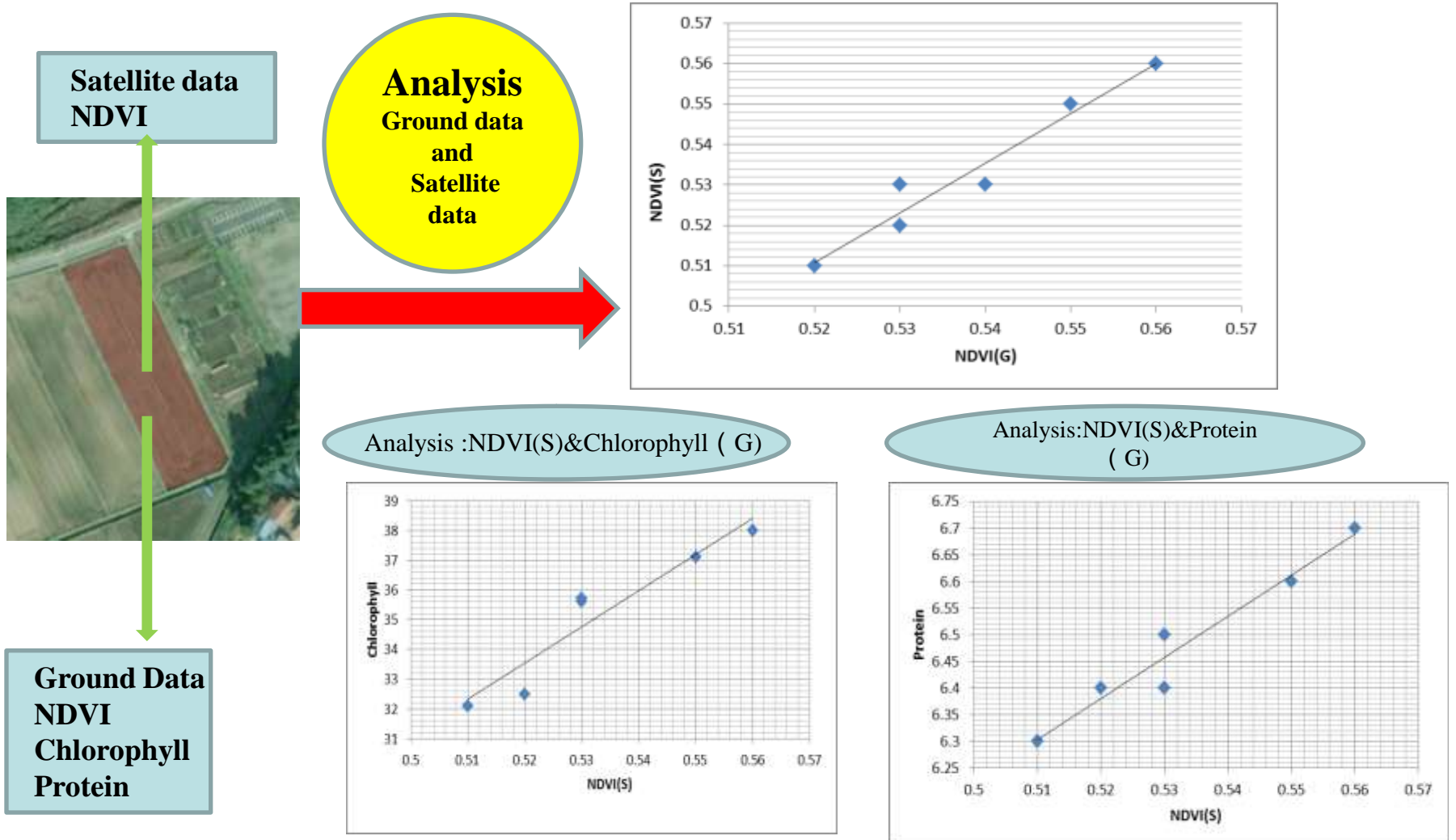


9/24/2009



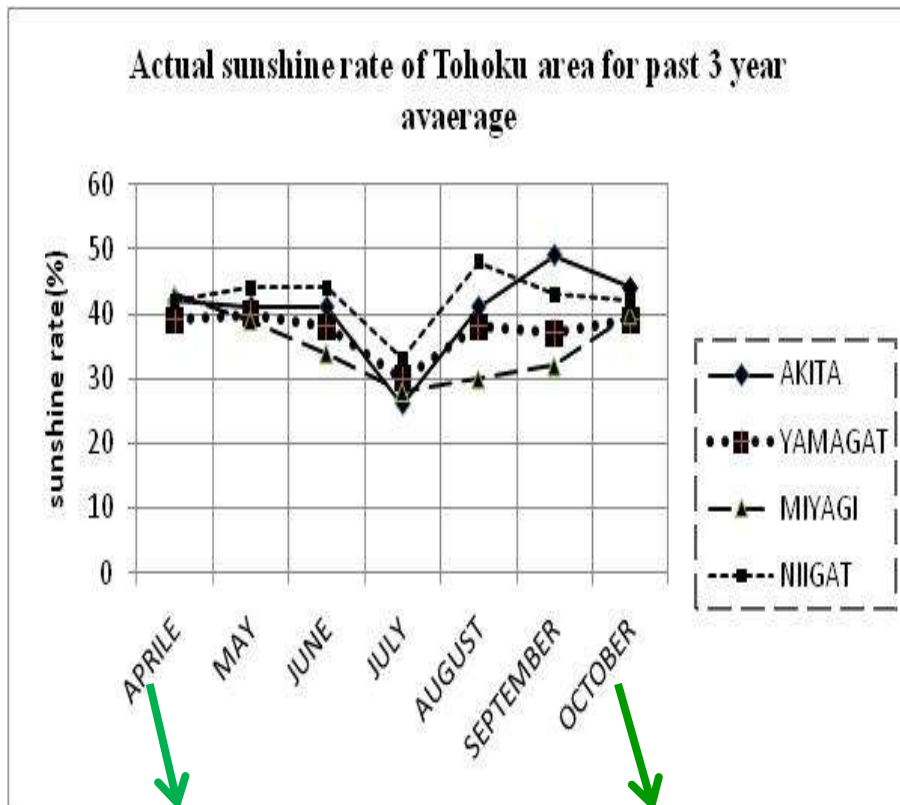
Method

Analysis of the relation between the ground measurement data and the satellite data **on the same time and the same position**



What is the optimal Satellite image data in the agricultural sector1

1. Need to consider Japanese meteorological characteristic



rice planting

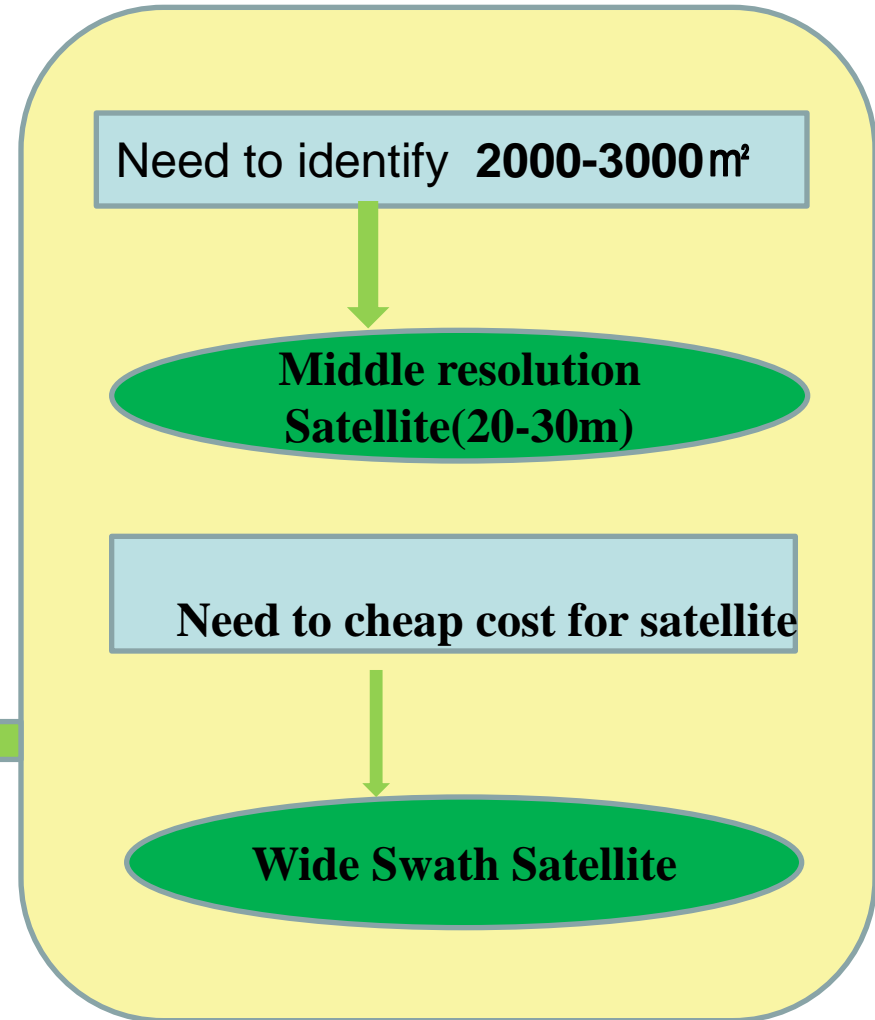
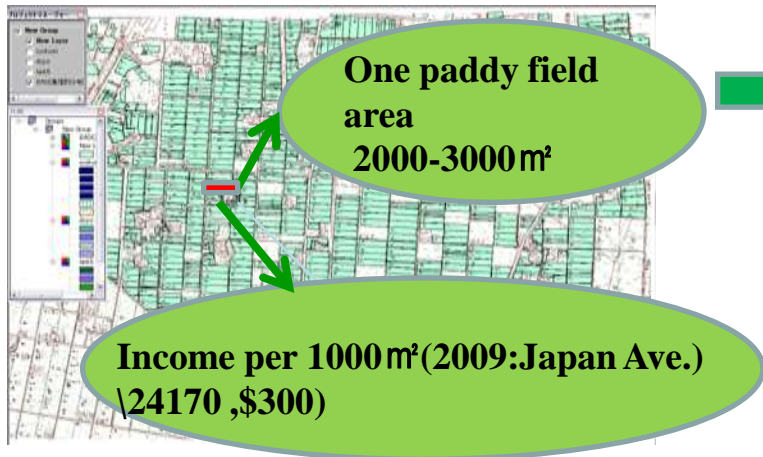
rice harvesting

- The actual percentage of sunshine can be found to be less than 50% throughout the entire period.
- Rice growing period is long from Apr. to Oct..

Time resolution
High:5-6 times for a week

What is the optimal Satellite image data in the agricultural sector2

2. Need to consider Japanese rice production characteristic



UK-DMC

(resolution: 22m, swath: 640km, price: \$0.5/k m²)
time resolution 5-6 times/week)

MODIS

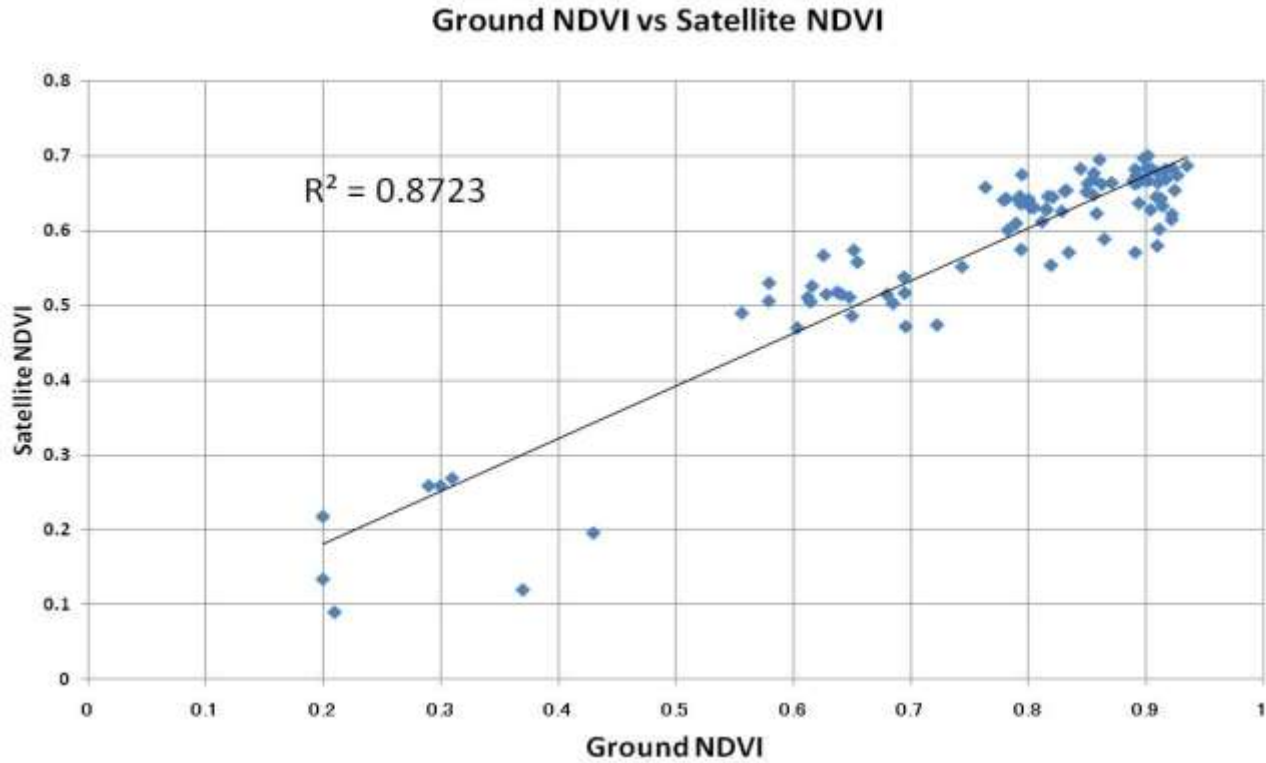
(resolution: 250m-6ha, swath: wide, price: free)
time resolution: 2 times/day)

Ref.

SPOT

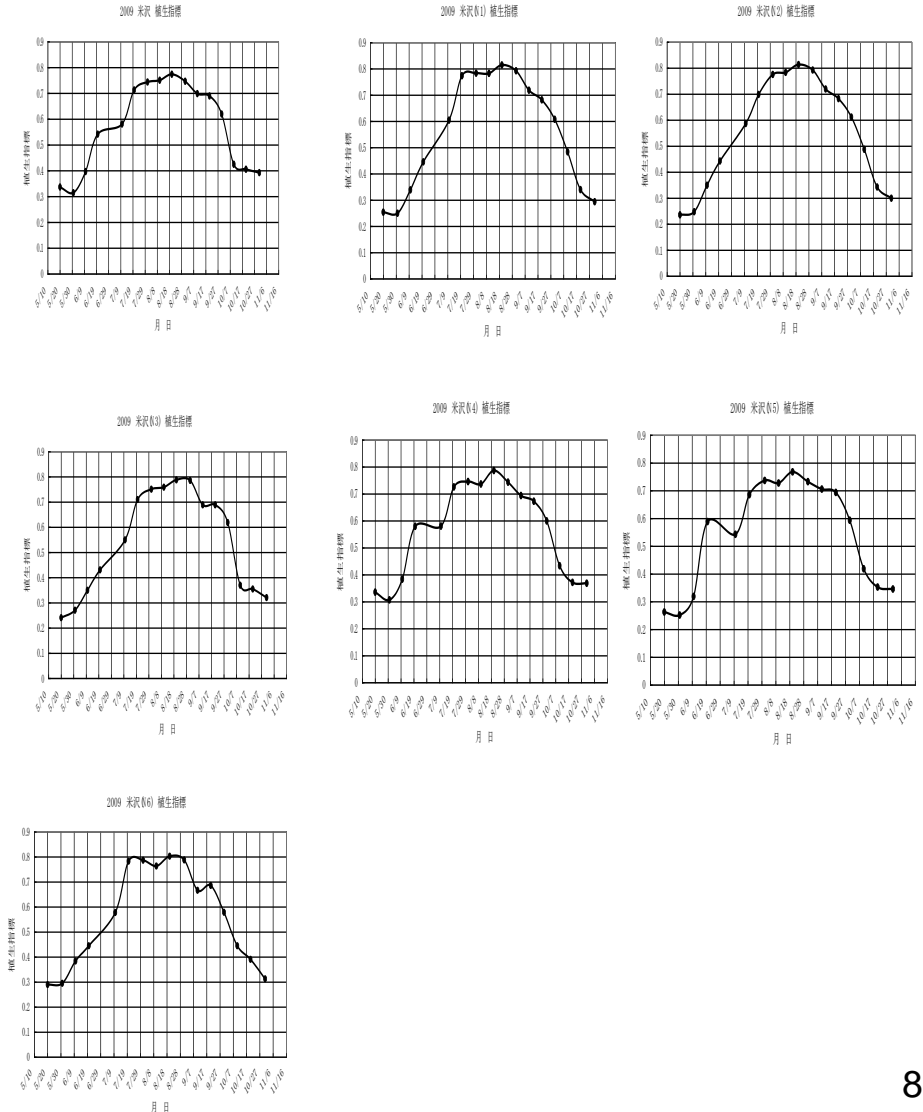
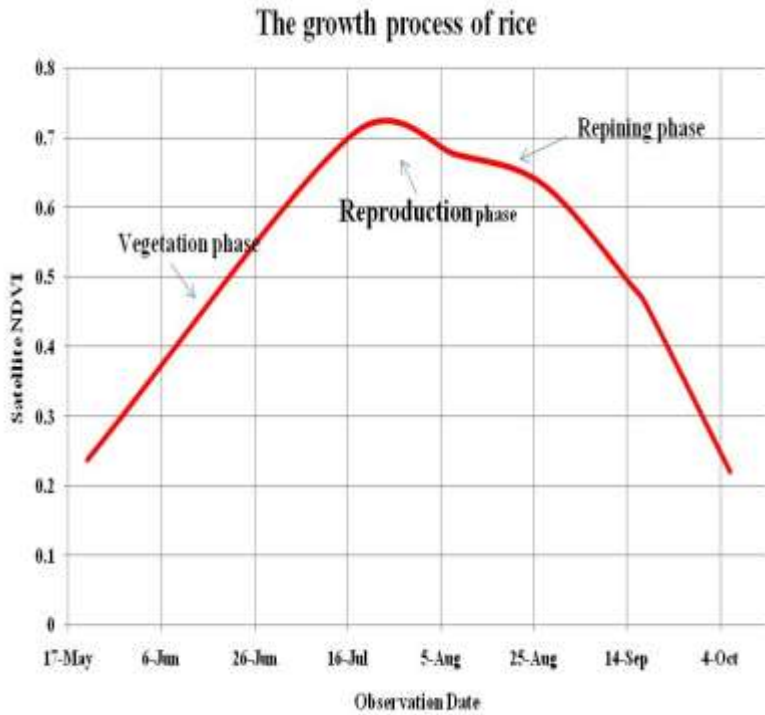
(resolution: 10m, swath: 60km, price: \$5/k m²)
time resolution 5-6 times/week)

The relation between the ground measurement NDVI and the satellite NDVI on the same time and the same position



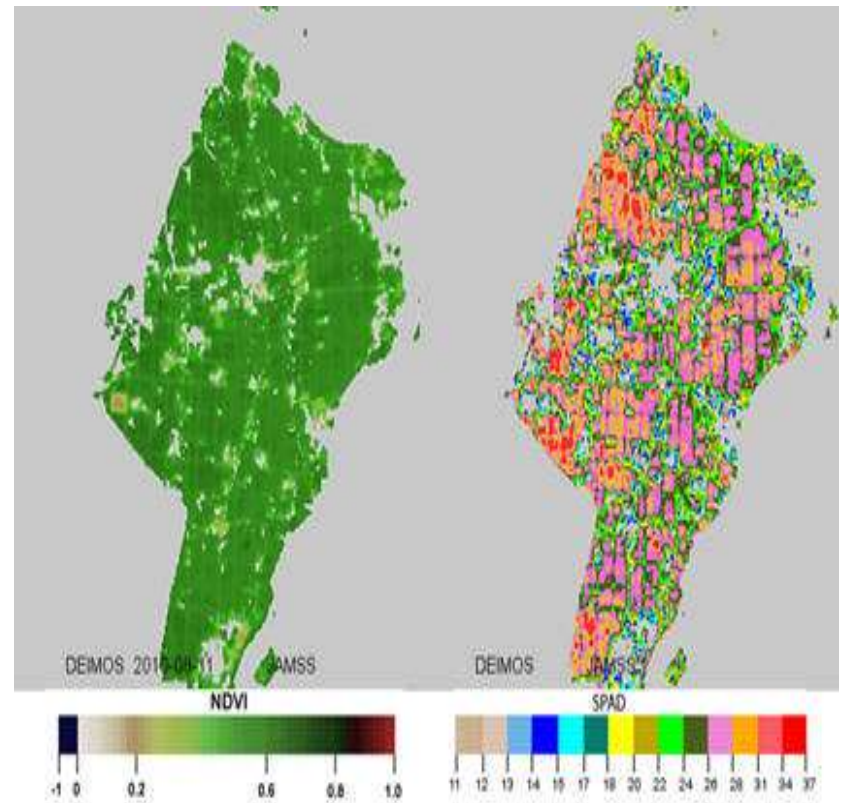
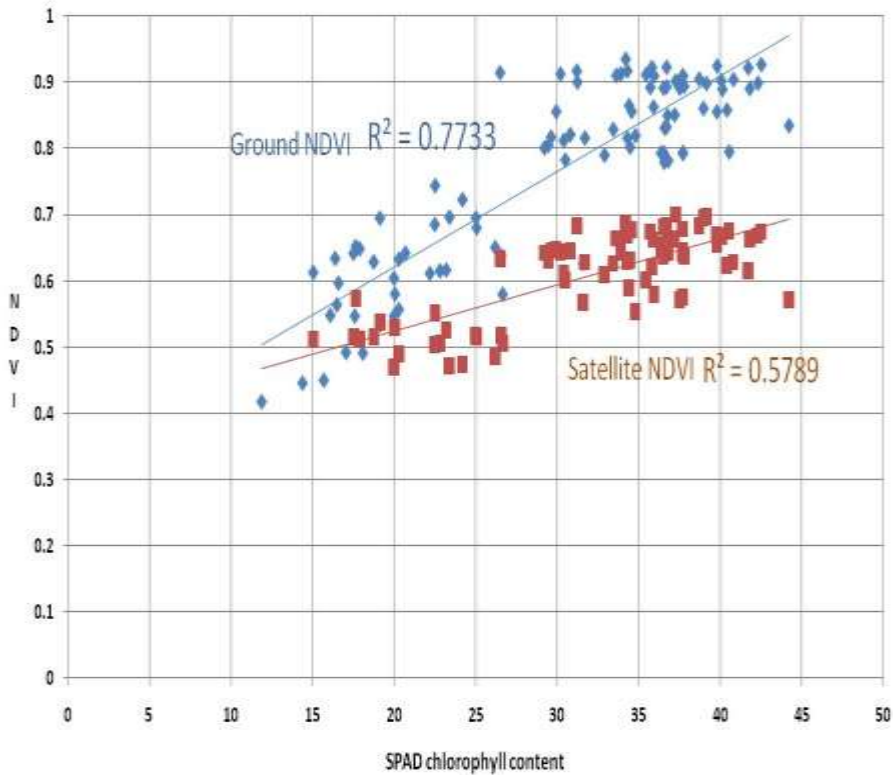
Data Analysis 2

2.The Growth process of rice



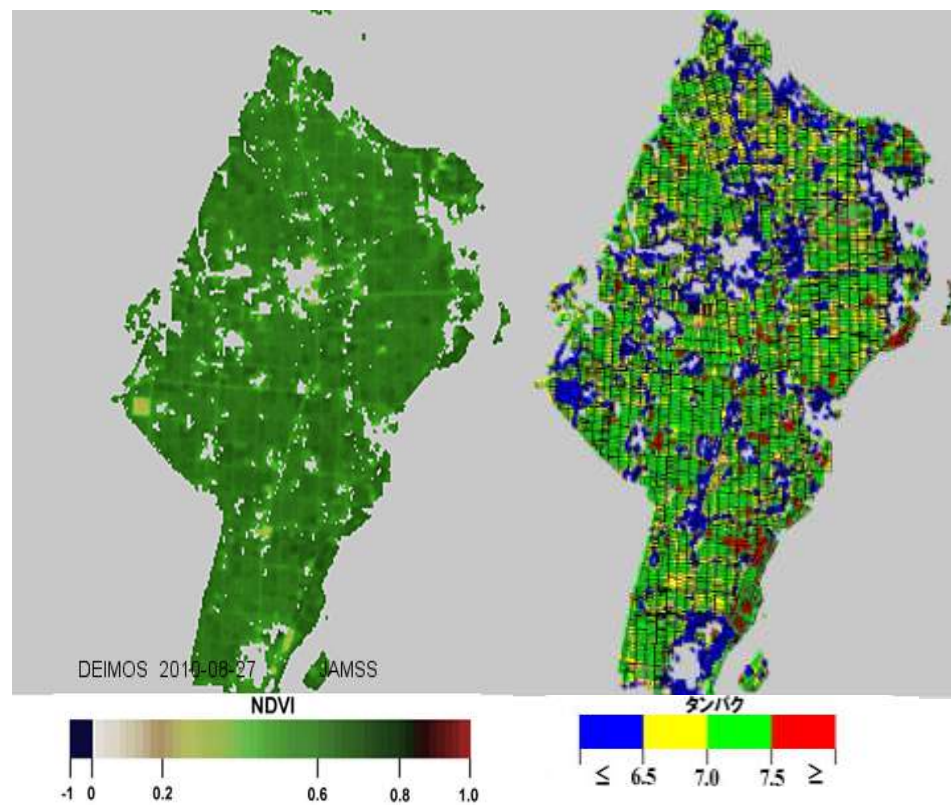
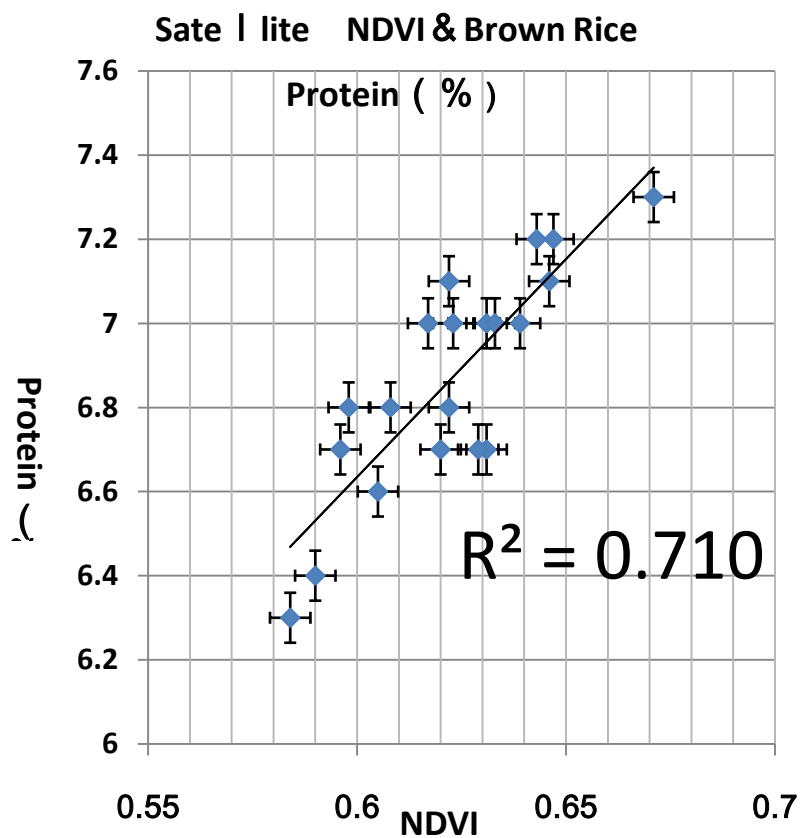
Data Analysis 3

3. SPAD(Chlorophyll) data analysis



Data Analysis 3

3. Protein data analysis



Thank you very much!

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