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Activities of the EMEA Project During 1999-2005

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Since forests play an important role in keeping environmental conditions suitable for life on Earth, management and protection of forest resources are important. Even though vegetation varies largely in spatial and temporal scales, there are signs of rapid degradation in East Asia due to human activities, which affects the climate.

To monitor vegetation characteristics, we conduct research by using several kinds of measuring systems and satellite imagery. Though remote sensing is a useful tool for obtaining data over large areas, there are problems in methodology and accuracy to overcome for the technique to be utilized successfully. Therefore, it is emphasized that *in situ* observation remains essential when applying remote sensing techniques.

International collaboration in the EMEA (Environmental Monitoring in East Asia) project has been designed to promote cooperation in vegetation research with a particular focus on the remote sensing and field research. It started originally in April 1999 and will last for a total of 7 years.

1 Field research

Spectral reflectance in the solar spectrum was measured synchronously and compared using different platforms: near ground, aerial and satellite. Spectral reflectance of ground vegetation was measured between 350 and 1050 nm using a portable spectrometer. Test sites for remote sensing of trees and grass were located in Japan, China and Korea.

1.1 Japan

We measured the spectra of trees at three different distances and scales:

1) individual leaves,

2) part of a tree seen from a distance of 40 m,

3) mixture of several different trees seen from a helicopter, and investigated what affects the data during the scaling up of the measurements.

1.2 China and Korea

We visited China six times and measured some different types of vegetation. Using a spectrometer, a digital video camera, and an infrared CCD camera, reflectance of the major plant species was measured from different distances (0.1 m, 1 m, 100 m, and 1000 m). We visited Korea every year to discuss about the topics of remote sensing and forests.

2 Analysis of vegetation using satellite data

Environmental phenomena often exhibit different characteristics depending on the scale of the observations. To detect environmental changes, determination of spatial and temporal resolution is important. To monitor vegetation characteristics, we conduct research by using of a several kinds satellite remote sensing such as NOAA, Landsat or IKONOS.

Temporal change of vegetation was analyzed using NOAA data and spatio-temporal change of vegetation was analyzed using Landsat data. IKONOS is one of the new high spatial resolution satellite. The sensor records one panchromatic channel with 1 m spatial resolution and four channels of multispectral data with 4 m spatial resolution. In order to detect individual trees and classify tree species, some image processing techniques was adapted.

3 International conferences

In 2004 and 2005, we attended the following five international conferences including two session organizations.

1) IEEE Geoscience and Remote Sensing Society, Anchorage, USA, 20 - 24 September 2004.
2) EAFES (East Asian Federation of Ecological Societies) Congress, Mokpo, Korea, 20 – 24 October 2004.
   Organizers: Ken-ichiro Muramoto, Kyu-Sung Lee, Dafang Zhuang and Naoto Kamata,
   Session title: Utilization of Remote sensing for monitoring of Vegetation Change,
   Presenters: Kyu-Sung Lee, Dafang Zhuang, Naoto Kamata, Ronggao Liu, Sun-Hwa Kim, Mamoru Kubo, Ryotaro Komura and Quanqin Shao.
3) IEEE Geoscience and Remote Sensing Society, Seoul, Korea, 25 - 29, July 2005.
   Session organizers: Ken-ichiro Muramoto and Kyu-Sung Lee,
   Session title: Utilization of Satellite Imagery for Analysis of Vegetation in East Asia,
   Presenters: Kyu-Sung Lee, Naoto Kamata, Mamoru Kubo, Ryotaro Komura, Ronggao Liu.
4) SICE (International Conference on Instrumentation, Control and Information Technology) Annual Conference, 8-10 August 2005, Okayama, Japan.
5) The 9th International Symposium on Physical Measurements and Signatures in Remote Sensing, IGSNRR, Beijing, China, 17 – 19 October 2005.
   Chairman: Jiyuan Liu, Vice-chairman: Dafang Zhuang, Secretary-general: Ronggao Liu,
   Presenters: Jiyuan Liu, Dafang Zhuang, Ronggao Liu, Kyu-Sung Lee, Naoto Kamata, Mamoru Kubo and Ryotaro Komura.

4 Organization of an international symposium and meetings

An International Symposium on Environmental Monitoring in East Asia has been held four times in Kanazawa and Beijing these six years. In 2005, the last year of this project, we have organized the meetings both in Beijing and Seoul, and symposium in Kanazawa.