

GOFC Data and Information for Tropical Forest Assessment and Management

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RESEARCH OBJECTIVES

The objectives of this project are 1) to support the GOFC project by providing new data and data products for the Southeast Asian's tropical forests, 2) to evaluate the application of data and products to tropical forest management needs, and 3) to promote and strengthen linkages with national resource and forest management services collaborators for better dissemination of GOFC products.

QUESTIONS, GOALS AND APPROACHES

Scientific Questions to Be Addressed:

What are the changes in land cover and/or land use in the tropical southeast Asian region? Can we use Landsat images to quantify LCLUC of the region and provide improved Landsat products to assess the social and environmental impacts.

Project Goals

The overall goal of this project is to support the GOFC project by providing new data and data products for the world's tropical forests. Specifically, we aim at developing improved remote sensing products to characterize tropical forest in the Southeast Asian region, and evaluating the applications of these products to tropical forest management needs by a series of demonstration meetings and site visits, through collaboration with several forestry management agencies in tropical countries. The *goals of this past year* were to 1) validate the forest density products with ground field data to quantify uncertainty, 2) test the usefulness of these products in forest management practices, and 3) continue examining scale dependency of these products with an aim to expanding from Landsat scale to VEGETATION scale.

PROGRESS

We have been progressing well in advance. We have developed the proposed products, organized user's meetings in Chiang Mai, Thailand and made another field trip to collect ground truthing data. The research activities include:

User's meeting: We organized two user's training meetings in Thailand in the past year. The first meeting was held in Chiang Mai, Thailand from 9th – 14th, August 2001, and second one was held from 1/13/2002 – 1/17/2002. During the meetings, we updated the products development and validation activities while the users presented their uses of these products provided to them for various forest applications.

Field Activities: Several trips were made to collect more seasonal forest characteristics in the past year sponsored by this project and an APN project. The sites and dates sampled included five countries:

- Mae Chaem Watershed and sub-watersheds, Chiang Mai, Thailand (August 2001)
- Mae Chaem Watershed and sub-watersheds, Chiang Mai, Thailand (January 2002)
- Tamdao National Park, Vietnam (August 2001)
- Luang Prabang – Sayaburi, Lao PDR (November 2001)
- Ratanakiri, Cambodia (November 2001)
- Berau, East Kalimantan, Indonesia (January 2002)

Continued Product Development:

- 1) Continued fine-tuning of the atmospheric correction by using the relationship between band 3 and band 7. It is expected that a set of slopes will be established for operational atmospheric corrections in the tropical Southeast Asia region in the next two months.
- 2) Used AIRSAR derived DEM data and corrected BRDF effect due to topography on the Landsat ETM+ images (Figure 1)
- 3) Scaled up from IKONOS to ETM+, and then to VEGETATION and MODIS (Figure 2).

Validation:

- 1) Forest density products have been compared with the field data and high resolution of IKONOS image (Figure 3 and 4).
- 2) Product usefulness validation has been an on-going activity. Forest density product is being evaluated in two aspects: a) fire damage assessment and b) forest management.

NEXT STEP

- 1) Continued Product Validation: A total of 10 IKONOS images have been acquired and processed. A full-scale validation by our collaborators will be conducted this coming dry season.
- 2) Scaling Up: Scaling up from IKONOS to VEGETATION spatial resolution is being investigated. This activity will continue for another six months.
- 3) Cross sensor comparison: Images from MODIS sensor were also obtained over the Southeast Asia. The fractional cover maps derived from VEGETATION appear to be in good agreement with those from high resolution images (Figure 5).

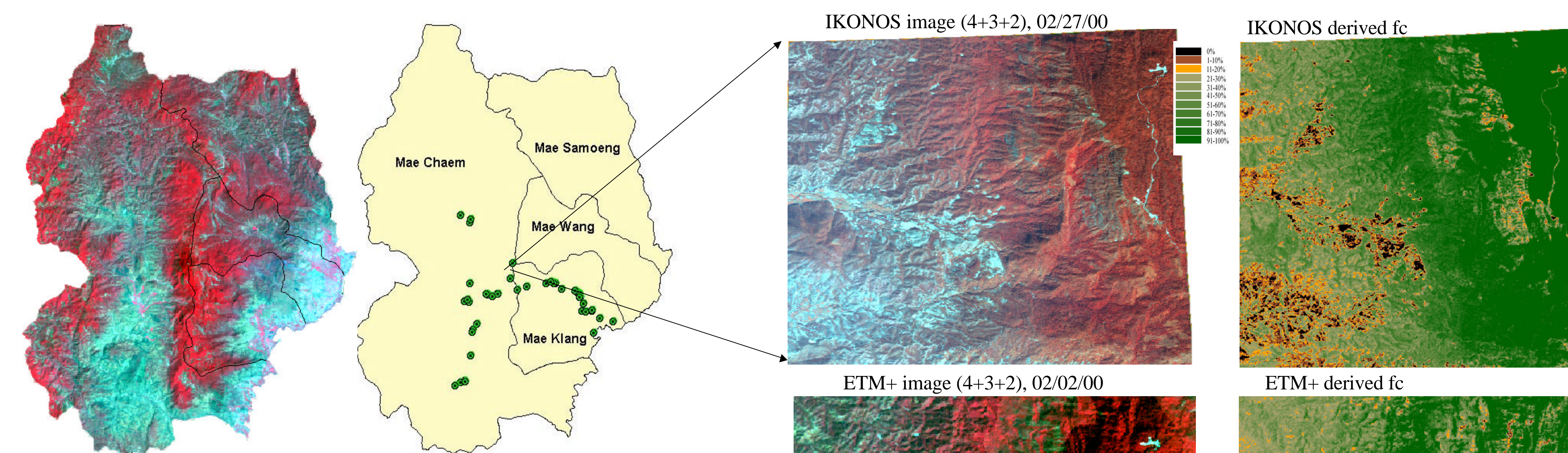


Figure 1. ETM+ image of Mae Chaem watershed (left) and field survey sites (right)

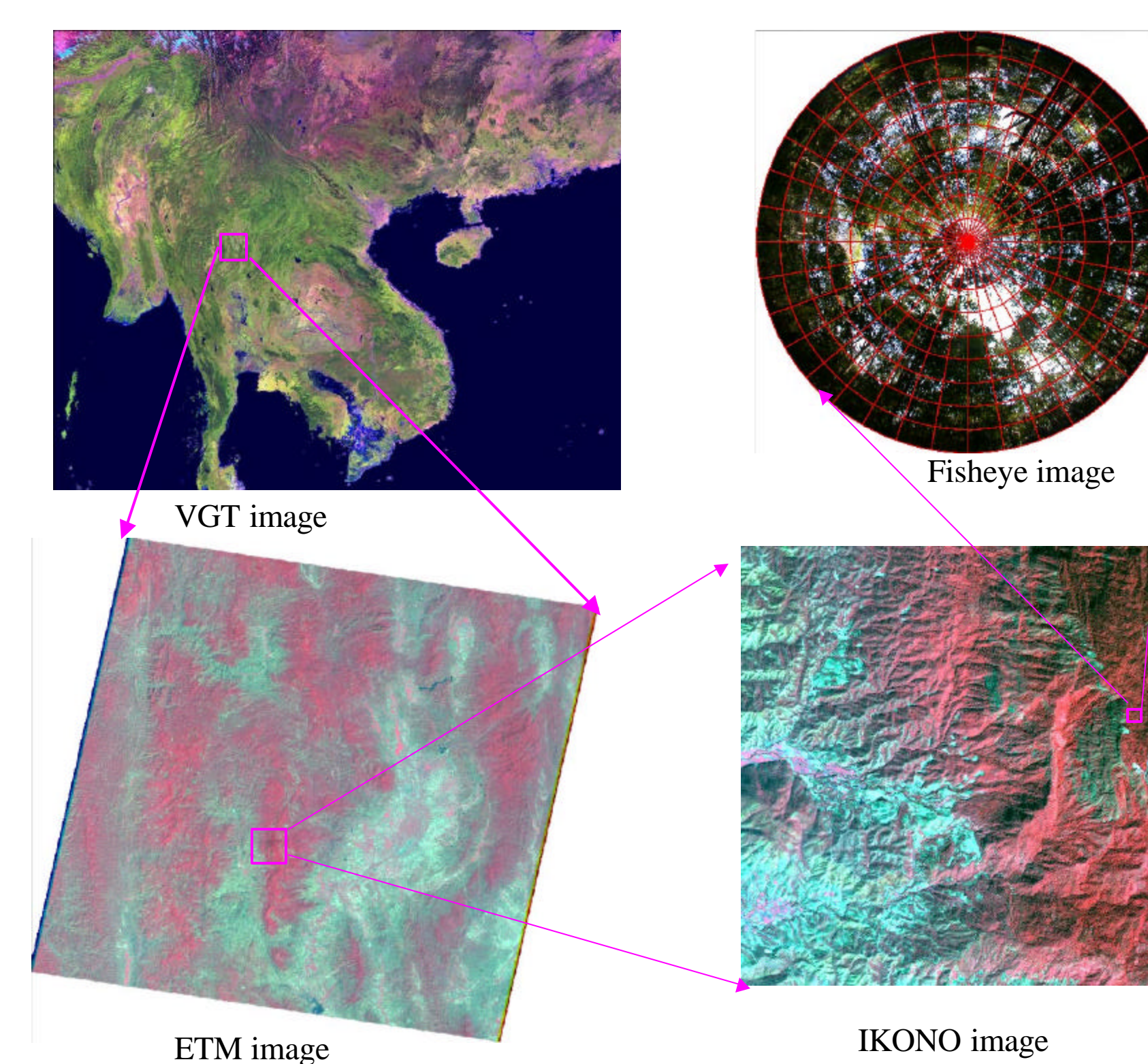


Figure 2. Scaling up from fisheye, Ikonos, ETM+ and VEGETATION scales

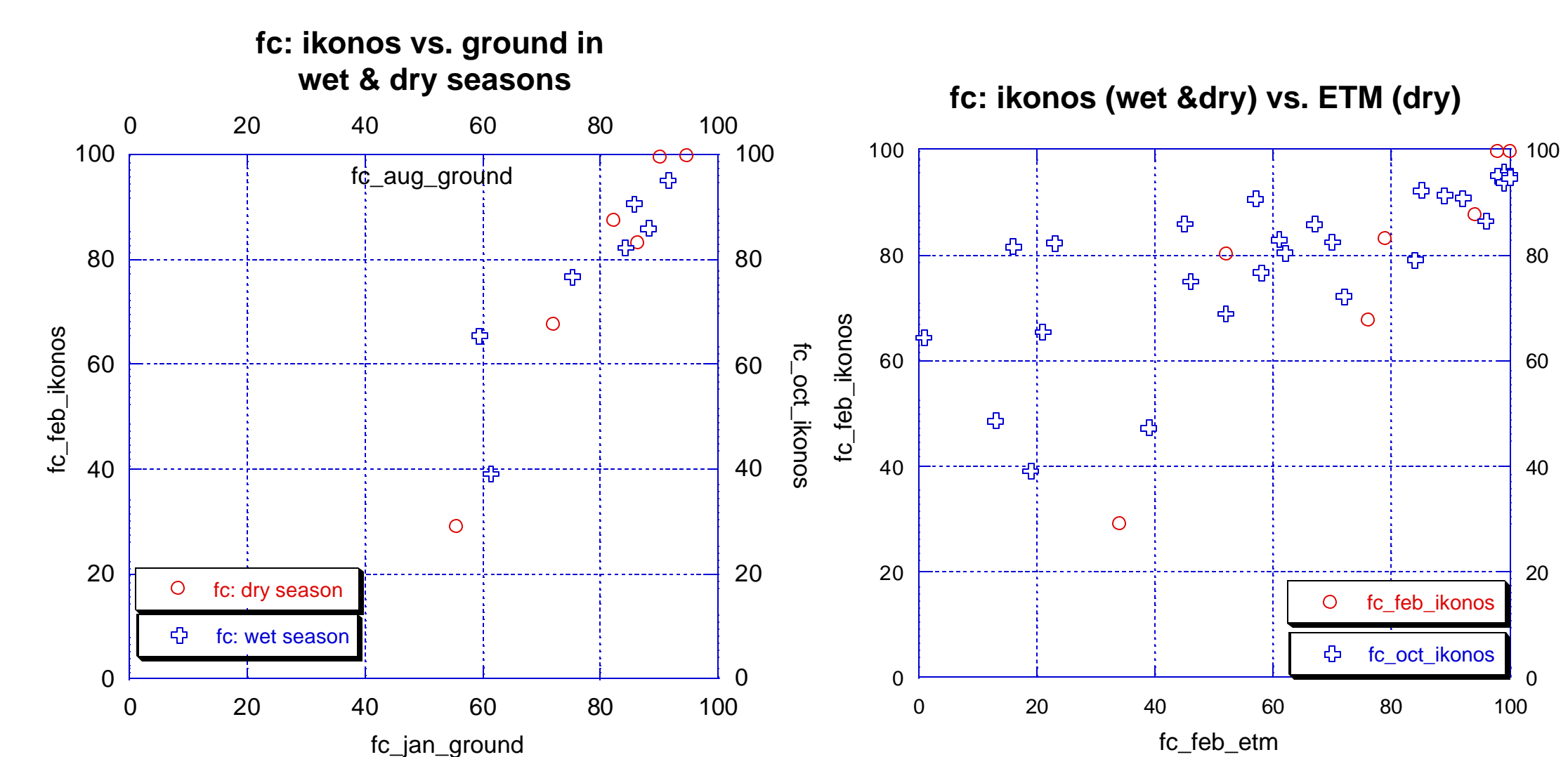


Figure 4. Cross comparison of fractional cover values derived from IKONOS and ETM+ images

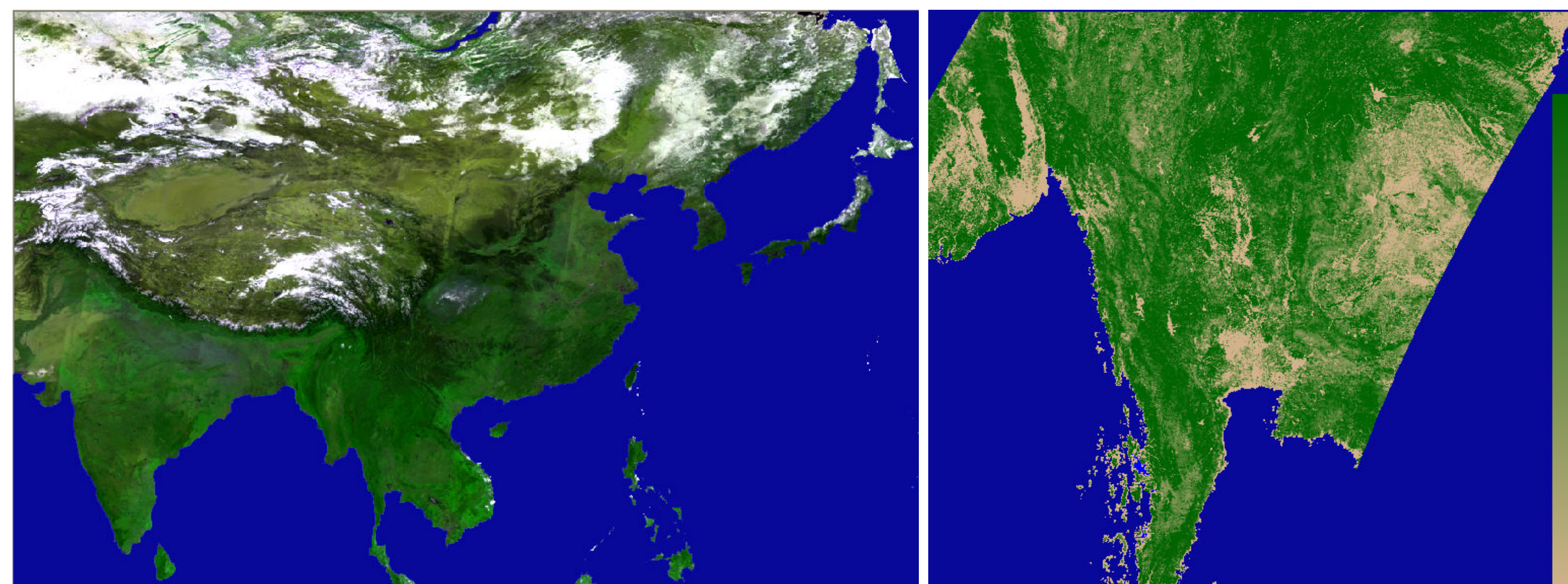


Figure 5. Regional fractional cover derived from VEGETATION (left) and MODIS (right)

CONCLUSIONS

In conclusion, we have made substantial progress towards our goal to develop improved land use and land cover products in the Southeast Asia region. We have acquired substantial ground data for validation. We have processed all VEGETATION images from our VEGA2000 project and regional fractional cover have been produced for some dates. We believe that we are on schedule to produce and delivery the GOFC products proposed in the initial proposal.

ACKNOWLEDGEMENT

This research was supported by NASA's LCLUC program