

## Development Study of the Global Forest Carbon Monitoring System

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[Abstract]

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In the project (FY2008–2010), we have conducted researches on a prototype of the Global Forest Carbon Monitoring System, which is expected to play a key role in operation of the monitoring, reporting, and verification (MRV) system for the Reduced Emission from Deforestation and forest degradation in Developing countries (REDD).

This project was composed of six sub-themes [STs]. ST-1 developed an accounting method for detecting deforestation and forest degradation, mainly using Synthetic Aperture Radar (SAR) images and the Partial Space Method. ST-2 developed effective algorithms for extracting deforestation and forest degradation from time-series L-band SAR images and for correction of the slope effect. The algorithm was applied to the Tomakomai site, indicating the limitation of applicability (e.g., signal saturation at dense stands) of this method. ST-3 conducted studies using forest inventory data. Forest survey data such as tree density and biomass were collected from Southeast Asia and Japan, in collaboration with the PlotNet activity. The data were compiled into a database with the standard format of the Long-Term Ecological Research, and merged with a geographic information system (e.g., GoogleEarth). ST-4 performed validation studies for the SAR-based algorithms, using airborne LiDAR and PiSAR observations. Intensive observations were conducted at the Tomakomai forest, where forest degradation was exemplified by the wind-fell impact of typhoon. Using a radiation transfer model, a series of simulations were conducted to make use of microwave signals for the detection of forest structural change. ST-5 developed a dataset of land-cover and wildfire maps in Southeast Asia, using SAR and optical remote sensing data (Landsat, AVHRR, VEGETATION, and MODIS). Since the optical method is less susceptible to the slope effect, the new land-cover dataset is particularly effective in mountainous Asian forests. ST-6 developed a process-based model to evaluate carbon emission after deforestation and forest degradation. To improve model accuracy for estimating long-term soil carbon dynamics, underground physical processes such as soil water flows were revised. Model validation was conducted at field sites in Malaysia and Thailand, by comparing observational data of soil CO<sub>2</sub> efflux.

リサイクル適性の表示：紙へリサイクル可  
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