Fuji Hokuroku
Flux Observation Site

Monitoring the Carbon Balance in a Larch Forest
in the Foothills of Mt. Fuji, Japan

Collaborators
- Forest Environment Section of Yamanashi Prefecture, Fujyoshida City
- Fujyoshida City and Two Other Villages Organization for the Protection of the Prefectual Estates Given by The Imperial Family
- Biodiversity Center of Japan, Ministry of Environment

Center for Global Environmental Research
National Institute for Environmental Studies
16-2 Onogawa, Tsukuba, Ibaraki 305-8506 JAPAN
tel:029-850-2384 Email:www-cger@nies.go.jp
Overview

The Center for Global Environmental Research (CGER) established the Tomakomai Flux Research Site in 1999 to carry out integrated monitoring on the carbon balance in forest ecosystems. However, the site was damaged by the strong winds accompanying a typhoon in 2004. For this reason we established the Fuji Hokuriku Flux Observation Site in the foothills of Mt. Fuji as an alternative base for monitoring, and began observations in January 2006. At this observation site, we apply various methodologies to estimate the carbon sequestration in forest ecosystems, such as the eddy covariance method, forest vegetation and soil function (photosynthesis, respiration) observations, tree growth and litter amount measurements, and remote sensing method. Recently, we also began measurements of methane and BVOC gases - which may directly or indirectly affect global warming - adopting a new measurement system. This integrated monitoring should be beneficial for further assessment and understanding of the exchanges of gas, heat, water and small particles between the land and atmosphere.

Objective

Our objective is to conduct integrated monitoring research on forest ecosystems such as carbon cycle as a part of global environment monitoring.

Observation Site

<table>
<thead>
<tr>
<th>Location</th>
<th>Aza Kawahara, Kamiyoshida, Fujiyoshida City, Yamanashi Pref.</th>
<th>Latitude and Longitude: 35° 26' N, 138° 45' E</th>
<th>Elevation: 1050-1150 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land</td>
<td>Gradient: 3-4 degrees</td>
<td>Soil type: Coarse-grain volcanic ash</td>
<td></td>
</tr>
<tr>
<td>Vegetation</td>
<td>Dominant species: Planted larches</td>
<td>Tree age: about 50-55 years old</td>
<td>Tree height: 20–25 m</td>
</tr>
<tr>
<td></td>
<td>Area: 150 ha</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spontaneous vegetation: Fujizakura (Prunus incisa)</td>
<td>Forest floor: Broad leaved plants</td>
<td></td>
</tr>
</tbody>
</table>

Mean annual air temperature: 8.8 degrees (average of 2006-2010)
Annual precipitation: 1716 mm (average of 2006-2010)

Observation Facilities

Monitoring tower
- Height: 32 m (aluminum)
- Elastic type pole is installed on the top

Micrometeorology (8 sets)
- Instruments are located on the forest floor to monitor micrometeorological phenomena and soil

Photosynthesis, Respiration monitoring system
- Chamber systems are installed to monitor CO2 balance of larch tree and soil

Monitoring office
- Portable cabin (10 m²) for data control systems

System | Item | Number | Height (m)
---|------|--------|----------------
Eddy covariance method
- Three-dimensional sonic anemometer-thermometer: 1, 35
- Open-path systems (CO2 and H2O flux): 1, 35
- Closed-path systems (CO2 and H2O flux): 1, 35
- Enclosed-path systems (CO2 flux, latent heat flux): 1, 35

Concentration
- CO2 profile: 10, 35, 32, 27, 22, 16, 10, 4.5, 2, 1, 0.5

Soil respiration
- Continuous (automated chambers): 24, Forest floor

Phenology
- Fisheye lens camera: 6, 32, 22, 2 (rotate)
- Digital Camera: 4, 26 (N), 24 (E, N), 23 (W)

Meteorology
- Global solar radiation (incoming): 6, 32, 2 (5)
- Global solar radiation (outgoing): 3, 30, 2 (2)
- Net radiation: 3, 32, 2 (2)
- PPFD (incoming): 6, 32, 2 (5)
- PPFD (outgoing): 4, 30, 2 (3)
- Direct/diffuse spectral radiation: 1, 32
- Spectral radiation (incoming): 2, 32, 2 (rotate)
- Spectral radiation (outgoing): 2, 30, 2 (rotate)
- Spectral direct solar radiation: 1, 32
- Air temperature and humidity: 10, 35, 32, 27, 22, 16, 10, 4.5, 2, 1, 0.5
- Two-dimensional wind: 7, 32, 27, 22