

# Long-Term Monitoring of CO<sub>2</sub> Flux Over Forest Ecosystems

**Nobuko SAIGUSA**

Institute for  
Environmental  
Management Technology  
e-mail:  
n.saigusa@aist.go.jp  
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Forest plays an important role on the global carbon cycle. We have developed a measurement system for a long-term monitoring of CO<sub>2</sub> flux over forest ecosystems. The CO<sub>2</sub> flux is measured by the eddy covariance method, which is one of the micrometeorological methods based on a theory of atmospheric turbulence. We have now several monitoring sites in the East Asia, such as Japan, China, Thailand, and Indonesia. Observational networks of greenhouse gas fluxes have been established for global (FLUXNET) and for Asian countries (AsiaFlux). We are now trying to clarify the carbon budget of Asian forests in collaboration with participants of the flux-monitoring network.



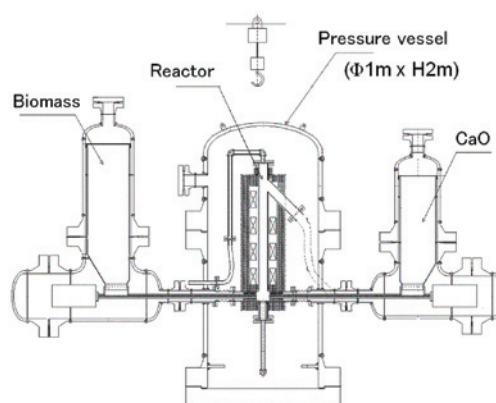
A database of greenhouse gas fluxes over terrestrial ecosystems

# Direct Production of Hydrogen from Woody Biomass

**Tomoaki MINOWA**

Biomass Technology  
Research Laboratory  
e-mail:  
minowa.tom@aist.go.jp  
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Biomass is a renewable and carbon neutral. The project, funded by METI, aims to develop the technical feasibility of hydrogen production from woody biomass by steam gasification using CO<sub>2</sub> absorber. The theoretical formula of the reaction is  $C+2H_2O+CaO \rightarrow 2H_2+CaCO_3$ , and AIST and CCUJ (Center for Coal Utilization, Japan) observed this phenomenon. Until now, a continuous bench scale unit of 10 – 20 kg biomass per day was designed and is being constructed (see Figure). It will be operated from the summer, 2003. At laboratory scale batch-test, obtained product gas consisted mainly of hydrogen (>80 mol%) and methane (<20 mol%), and all of CO<sub>2</sub> was absorbed in CaO as CO<sub>2</sub> absorber; no CO<sub>2</sub> was detected in the product gas. The clean gas could be produced in close to theoretical yield.



Continuous bench scale unit (reactor is set in a pressure vessel)