Geophysical Research Abstracts,
Vol. 10, EGU2008-A-09638, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-09638
EGU General Assembly 2008

European and global assessment of gross primary production using the SeaWiFS FAPAR product from the EU-Joint Research Centre and FLUXNET data

Martin Jung (1), Markus Reichstein (1), Nadine Gobron (2), Michel Verstraete (2), Dario Papale (3), Alberte Bondeau (4), Monica Robustelli (2), Bernard Pinty (2), FLUXNET Pis

(1) Max Planck Institute for Biogeochemistry, Jena, Germany

(2) European Commission – DG Joint Research Centre, Institute for Environment and Sustainability, Global Environment Monitoring Unit, Ispra (VA), Italy.

(3) Department of Forest Environment and Resources, DISAFRI, University of Tuscia, Viterbo, Italy

(4) Potsdam Institute for Climate Impact Research (PIK), Potsdam, Germany

We show that characteristics of the **J**oint **R**esearch **C**entre product of the **F**raction of **A**bsorbed **P**hotosynthetic **A**ctive **R**adiation (JRC-FAPAR) such as the cumulative growing season FAPAR serves as a reliable indicator of gross primary production (GPP) on annual time scale. Using GPP data from the FLUXNET eddy co-variance measurement network we construct regression models that allow estimating GPP on the large scale using only the remote sensing data. We propose this model as an alternative to commonly used radiation use efficiency models and call it **F**APAR based **P**roductivity **A**ssessment (FPA). Upscaling results for Europe are corroborated against two state-of-the art diagnostic GPP models, the radiation use efficiency model MOD17+ and a neural network upscaling, and simulations of the LPJmL biosphere model. Regarding the mean annual GPP pattern the four models compare reasonably well while larger differences are apparent when analysing the spatial pattern of the 2003 heat wave anomaly. Capturing the physiological effects of water stress seems to be a considerable source of uncertainty in diagnostic GPP models. On global scale

FPA yields realistic patterns and a total GPP flux consistent with the IPCC estimate. We conclude that the FPA approach is an accurate alternative to existing state-of-the art diagnostic GPP models and particularly attractive given its simplicity. Moreover, it does not require meteorological input data which constitutes a major source of uncertainty in all other models.