Local modeling of Gross Primary Productivity: application of a simple model with GRASS Open Source GIS

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Gross Primary Production (GPP) is one of the fundamental parameters in characterizing the carbon cycle, both at an ecosystem and at a global scale. The evaluation of this parameter with good to a high level of confidence is of great theoretical and practical importance in the carbon cycle research. Simple models are applied to evaluate annual GPP for small study areas. This is useful for local carbon cycle analysis and in particular for regional inventories. The GPP C-Fix model (Veroustraete et al., 1996) was applied. The parameters of the model were distinguished for each vegetation pattern according to the management policy. The global incoming radiation was calculated with the GRASS module r.sun. The fraction of photosynthetically active radiation was measured in summer 2004 before the hay and the pattern during the growing season was simply modeled with a logistic curve fitting. The GPP dependence on daily mean temperature is formalized according to Johnson (1954). The comparison between GPP C-Fix model output and data from the Mt. Bondone eddy tower is briefly discussed.