



Chlorophyll induced fluorescence retrieved from GOME2 for improving gross primary productivity estimates of vegetation

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Mapping terrestrial chlorophyll fluorescence is a crucial activity to obtain information on the functional status of vegetation and to improve estimates of light-use efficiency (LUE) and global primary productivity (GPP). GPP quantifies carbon fixation by plant ecosystems and is therefore an important parameter for budgeting terrestrial carbon cycles. Satellite remote sensing offers an excellent tool for investigating GPP in a spatially explicit fashion across different scales of observation. The GPP estimates, however, still remain largely uncertain due to biotic and abiotic factors that influence plant production. Sun-induced fluorescence has the ability to enhance our knowledge on how environmentally induced changes affect the LUE. This can be linked to optical derived remote sensing parameters thereby reducing the uncertainty in GPP estimates.

Satellite measurements provide a relatively new perspective on global sun-induced fluorescence, enabling us to quantify spatial distributions and changes over time. Techniques have recently been developed to retrieve fluorescence emissions from hyperspectral satellite measurements. We use data from the Global Ozone Monitoring Instrument 2 (GOME2) to infer terrestrial fluorescence. The spectral signatures of three basic components atmospheric: absorption, surface reflectance, and fluorescence radiance are separated using reference measurements of non-fluorescent surfaces (deserts, deep oceans and ice) to solve for the atmospheric absorption. An empirically based principal component analysis (PCA) approach is applied similar to that of Joiner et al. (2013, ACP).

Here we show our first global maps of the GOME2 retrievals of chlorophyll fluorescence. First results indicate fluorescence distributions that are similar with that obtained by GOSAT and GOME2 as reported by Joiner et al. (2013, ACP), although we find slightly higher values. In view of optimizing the fluorescence retrieval, we will show the effect of the references selection procedure on the retrieval product.