

Interactive comment on “Chlorophyll fluorescence remote sensing from space in scattering atmospheres: implications for its retrieval and interferences with atmospheric CO₂ retrievals” by C. Frankenberg et al.

C. Frankenberg et al.

christian.frankenberg@jpl.nasa.gov

Received and published: 7 June 2012

Dear Wouter Verhoef,

Regarding your comment about the cloud problem:

But my main point is the next step, namely the one suggesting that F_s would be a proxy for photosynthesis. This relationship is certainly not as direct as you seem to suggest, and for the 755 nm region it is even doubtful whether F_s can actually be

related to photosynthesis, see point 3) above. So altogether your picture of sensing photosynthesis through clouds is imaginative but also based on much speculation I am afraid.

Our main point in the discussion of the cloud problem was that retrieval of F_s under cloudy conditions is indeed feasible. The statement was more related to the retrieval aspect than to GPP itself. We consider this fact as very important and it was indeed also surprising to us. Why is it important? Many optical remote sensing parameters such as NDVI or LAI can be heavily contaminated by atmospheric aerosols, thin cirrus, etc. Hence, they will also provide a biased APAR and greenness estimate. If F_s is rather unbiased by thinner clouds, it is important to state that as many researchers may be skeptical about the robustness of the F_s retrieval in scattering atmospheres. Here, we made that point very clear but also underlined that this robustness is only valid if the retrieval is based on the Fraunhofer lines only (and we removed the reference to FLEX here).

Some more personal thoughts on the cloud problem: You refer to the possibility that F_s is not really a good indicator for GPP and that we are overstating the value. It may be true that F_s correlates so well with global GPP because it is a good index for "greenness". In fact, one reason why it is better than other optical parameters may well be that the true APAR is implicitly included in F_s while $fPAR$ derived from EVI and/or LAI may be prone to error (see numerous Turner et al papers comparing remotely sensed $fPAR$ with ground-based observations). Especially in the presence of clouds, the true APAR should be highly uncertain and just having this sort of information included in F_s is, in my opinion, highly valuable.

Sincerely, Christian

Interactive comment on Atmos. Meas. Tech. Discuss., 5, 2487, 2012.

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)