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Biogeosciences Discussions

Interactive comment on "CEFLES2: the remote sensing component to quantify photosynthetic efficiency from the leaf to the region by measuring sun-induced fluorescence in the oxygen absorption bands" *by* U. Rascher et al.

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Dear Sirs, We highly appreciate the comments of the two reviewers. Both comments were constructive and very helpful. We will include the suggestions in the revised manuscript. In the following I want to comment on the single points.

General points of both reviewers:

Both reviewers pointed out that the terminology of fluorescence is not consistent within the paper. We agree with the reviewers and apologize for the chaos in the previ-

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ous version. We revised the terminology of the different fluorescence measurements throughout. Additionally we add a new paragraph at the end of chapter 2 defining and explaining the terminology for fluorescence. A list of abbreviations is also added at the beginning to guide the reader and text and figures were changed throughout the manuscript for consistent terms of fluorescence. We hope that by doing so we may be able to move towards a consistent terminology for sun-induced fluorescence. We suggest adding the following paragraph to the manuscript after the introduction:

There is no standardised terminology for sun-induced fluorescence available, yet. Thus, we will define fluorescence parameters as follows: sun-induced fluorescence will be termed Fs, laser induced fluorescence FL. Fluorescence yield, i.e. the fraction of fluorescence normalized for incoming PPFD will be termed Fs-yield (Fs-yield = Fs / PPFD). Most of the time fluorescence will be determined at a specific wavelength, e.g. within the oxygen absorption bands, in this case we will use subscript numbers to define the wavelength of determination. E.g. sun-induced fluorescence in the O2-A band will be termed Fs760. A list of the fluorescence abbreviations is also given at the beginning of this article.

Additionally we propose including a list of abbreviations used in the manuscript.

Comments of reviewer #1:

1. The reviewer suggests including a table, summarizing the different activities during the three campaigns. We appreciate this comment and will include such a table in the revised version (see Table1). The former Table 1 will become Table 2.

2. Our mistake in the NDVI (see comment below) is corrected. We apologize for this.

General comments of reviewer #2:

3. The reviewer suggests shortening the particular details of the measurement instrumentation and to spend a little more room on the physical and photochemical background of the measurements. We are currently working on the different paragraphs to

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focus more on the scientific background and the quantitative results. The instrumental details will be shortened accordingly.

4. The reviewer suggests giving absolute values that are standardized instead of relative data. We greatly appreciate this comment. We will change the terminology throughout (see above) and provide comparable data in the revised manuscript. Additionally arbitrary units in Figure 5 will be replaced by physical units. However, we won't be able to give physical units in Figure 12. The incomplete radiometric calibration unfortunately does not allow retrieval of physical units, yet.

Specific comments of reviewer #2:

All the specific comments of reviewer 2 will be picked up and included in the revised version of the manuscript.

The single points are:

5. Page 2222, line 6: the confusing expression is changed to 'in the field (. . .)'

6. Page 2222, line 13ff: The reviewer is right, the quantitative data of 1-5% is not correct in this general paragraph. The sentence is rewritten and the arguable numbers are omitted.

7. Section 2.2.3: We appreciate the suggestion of the reviewer. The paragraph 2.2.3 fits much better after the introduction. The paragraph is moved and Figures 1 and 2 are swapped.

8. Page 2237, line 8: the vague term 'environmentally moderate' is omitted

9. Page 2240, line 18: the term 'hyperbolic' is omitted and we edit the paragraph describing the non-linear behavior.

10. Page 2244, line 21-22: we agree with the reviewer, in Fig. 11 sun-induced fluorescence at 760nm (Fs760) is shown. We change the text and Fig. 11 according to the now consistent terminology for fluorescence.

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11. Page 2245, line 14: the reviewer is right, atmospheric scattering occurs especially in the short VIS and thus the sentences was misleading. We rephrase these sentences.

12. Page 2246, line 5-8: We fundamentally rephrase these sentences.

13. Page 2249, line 16-18: We apologize for this reference that is not cited in the text. The references will be omitted.

14. All technical corrections were applied. We greatly appreciate the careful reading and editing of the manuscript

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Interactive comment on Biogeosciences Discuss., 6, 2217, 2009.

Table 1 Overview about the different methodological approaches during the three CEFLES2 campaigns in Southern France. In the first line the relevant chapters are given that describe the methods; the reference to the Figures indicates the measurement period during which data for the corresponding Figure were acquired, 'x' indicates measurements that are not presented in this publication

Campaign windows (focus on the vegetation type)	**Leaf-level fluorescence and gas-exchange measurements (3.1; 4.1)**	**Active, laser-induced canopy fluorescence (3.2.1; 4.2.3)**	**Passive sun-induced canopy fluorescence on the ground (3.2.2; 4.2.1; 4.2.2)**	**Daycourses of AirFLEX flights (3.3.1; 4.3.1)**	**Simultaneous overpasses of AirFLEX, HYPER and Dimona (3.3; 4.3.2)**
April *(Winter wheat and pine)*	Fig 1 Fig 2A Fig 4	(winter wheat) Fig 2B	Fig 2E Fig 5 Fig 6	Fig 11	X
June *(Several agricultural crops)*	Fig 4		Fig 6		Fig 12
September *(corn and other other crops, pine)*	Fig 2H Fig 4	(corn) Fig 2C, D Figs 7, 8, 9	Fig 2F, G Fig 6 Fig 9		Fig 10

Fig. 1. Table 1

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