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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Satellite monitoring of different vegetation types by differential optical absorption spectroscopy (DOAS) in the red spectral range" *by* T. Wagner et al.

Anonymous Referee #2

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General comments

The paper presents a new approach to investigation of the ground vegetation and the ocean biological activity using differential spectroscopy method. The authors obtained promising results showing that spatio-temporal patterns of vegetation fitting coefficients are similar to patterns of different types of vegetation. They also discuss limitations revealed in the DOAS analysis using available vegetation reflection spectra.

The authors gave proper credit to previous works.

Specific comments

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Interactive Discussion
Discussion Paper

The title of paper ("Satellite monitoring of d i f f e r e n t t y p e s by differential optical absorption spectroscopy (DOAS) in the red spectral range") differ from one send by editor. Is it complete? I thing that "different" may be omitted, "monitoring of vegetation types" or "monitoring of vegetation" is enough.

Abstract

"The inclusion of the vegetation spectra also significantly improves the results of the trace gas retrieval."

A: The paper shows changes in the trace gas retrieval only for one specific sample and even without validation of the result. I thing that proposed conclusion is likely, but hasn't enough background in the currently presented form of the paper.

"Our results indicate that improved sets of vegetation spectra might lead to more accurate and more specific identification of vegetation type in the future."

It is unclear here what it is "improved sets of vegetation spectra ". Obtained results show only that used set of vegetation spectra have some shortages, but can't give any information on properties of analysis with use of another set. We may only formulate hypotheses on causes of revealed shortages.

I. Introdcution

"Over this wavelength range, the reflectivity of vegetation changes strongly (Fig. 1), caused by the absorption of various kinds of chlorophyll and pigments."

I thing that a reference to Fig.2 is more appropriate than to Fig.1.

3 Data analysis

Fig.1

The caption of the figure ("Results of a spectral DOAS analysis") is very fuzzy. I guess that it shows the estimation of the optical depth by the DOAS method. It is unclear

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what the values are shown by the red and black curves in the figure.

Fig.2

Please give parameters of the high pass filter used to produce the differential spectral albedo.

P.7949. "It is interesting to note that in the red spectral range not only the absolute values of the albedo, but also the narrow-band spectral structures (for the spectral resolution of about 8 nm, see http://speclib.jpl.nasa.gov/ gov/) are very weak ($<$1%). For the corresponding weak variations of the observed radiance, it is thus possible to include the vegetation spectra directly in the DOAS fitting procedure (like the trace gas reference spectra)."

I don't thing that it is enough theoretical proof on the linear dependence of radiance (or logarithm of radiance) on the vegetation spectra. Nevertheless, such an assumption may be used like a hypothesis in this paper.

P.7950. "We also found that the results are sensitive to variations of the selected wavelength range."

In general, the results of the DOAS analysis are not stable with respect to arbitrary variation of wavelengths. Please specify more details on used wavelength ranges. In current wording it is unclear what a reader should conclude from this statement.

P.7952. "Besides a significant improvement of the fitting results for the atmospheric trace gases, "

See comment A to Abstract.

"Our results indicate that the currently available vegetation spectra are not of sufficient quality to obtain optimum DOAS fitting results, "

It is unclear what is "optimum" DOAS fitting results.

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