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Atmospheric Measurement Techniques Discussions

Interactive comment on "A remote sensing technique for global monitoring of power plant CO_2 emissions from space and related applications" *by* H. Bovensmann et al.

Anonymous Referee #1

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Review of Bovensmann et al., "A remote sensing technique for global monitoring of power plant CO2 emissions from space and related applications".

Bovensmann et al. describe an approach for monitoring CO2 emissions from large stationary sources using broad swath NIR reflectance measurements. They show that with spatial scales similar to OCO and spectral dispersion significantly lower than OCO, enhancements in CO2 downwind of power plants can be observed and quantified.

The manuscript needs significant editing prior to publication. I do not have sufficient time list line-by-line suggested edits, but rather expect that the authors will in revision take the necessary effort to improve the text. I suggest that the authors attempt to

reduce by 1/3 the number of words by streamlining the introduction and discussion – there is a lot of non-relevant information presented.

I have three scientific concerns:

1. The authors do not adequately describe the challenge of converting the measured concentration fields to fluxes. Although it is mentioned that error in the retrieved flux will scale linearly with error in the wind speed, there is no attempt to quantify how large these errors are likely to be. Some attempt is required. I believe that an honest roll up of the uncertainly will demand that the total flux uncertainty of 2-20% described in the text and abstract for large plants be revised.

2. The authors do not discuss the how cloud and aerosol in the plumes (particularly during winter when the RH in the plume is high) will impact the analysis. Some attempt to quantify these errors is required.

3. The suggestion that CH4 can be used for constraining the boundary layer CO2 airmass is not obvious given that the vertical gradients of CO2 and CH4 are often of opposite sign in the boundary layer.

In summary, I would like to see the authors do a more thorough job in the error analysis and undertake a detailed edit to improve the readability.

Interactive comment on Atmos. Meas. Tech. Discuss., 3, 55, 2010.