**Biogeosciences
Discussions**

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Interactive comment on "Detailed validation of the bidirectional effect in various Case 1 waters for application to Ocean Color imagery" *by* K. J. Voss et al.

Anonymous Referee #1

Received and published: 31 July 2007

General Comments:

This paper is effectively an update and extension to previous work (Voss and Morel, 2005), wherein model estimates for Q (or actually Lu(view)/Lu(nadir)) were validated against field measurements obtained from the RADS instrument. This latest paper presents results from an updated instrument (nuRADS), and extends the investigation to a wider range of geophysical conditions (solar geometries and chlorophyll concentrations). The paper has relevance both in terms of our understanding of the bio-optical properties of ocean waters and as a practical test of the Q model that is actively used in ocean color remote sensing applications to normalize for the effects of solar illumi-

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nation geometry. The manuscript is fairly well written, but the analysis is confusing and requires some clarifications as listed below.

Specific Comments:

In the abstract, for example, you refer to average error of "1%" with RMS of "0.02 - 0.03". I believe this refers to comparisons of Lview/Lnadir (modeled) versus Lview/Lnadir (measured), but that should be stated in some concise way.

p.2075, l.1: it is not clear why the number of images available to average would vary. Please clarify what is the exclusion criteria or limitation that results in only one image

Fig.3: it was not obvious to this reviewer how one interprets this image. A more complete caption would be helpful. e.g., the antisolar point is seen as bright pixels in the upper left quadrant, wave focusing effects are evident as a subtle starburst pattern, and the small dark circles are ... what? bad pixels?

Fig.5, Fig.6, Eq.3: I assume you have normalized the Lview data in Fig.3 to Lnadir before computing Figs.4 and 5. This is not explicitly stated. The x in Eq.3 is actually Lview/Lnadir, right? The way it is written, one would think sigma has units of radiance, in which case the subsequent comparison to Eq.6 (e.g., Fig.8) makes no sense.

Eq. 6: this is a generic equation for RMS, and in the abstract and p.2077 you refer to the results as RMS, so why call it Std here? Just use RMS everywhere. Also, following this equation it might help to say something like: "where again we will be comparing ratios of Lview/Lnadir derived from both the model and the field measurments (data)."

Fig.8: here you have switched from fractional errors to % errors. say so or be consistent.

Technical Comments:

p.2075, l. 3: "images" should not be plural.

p.2078, l.10: should be "Eqs.(7) and (8)"

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p.2078, l.13: should be "Eqs.(7) and (8)"

p.2078, l.14: RMS defined here, but used earlier.

p.2078, l.20: should be "Eq.(9)"

p.2078, l.26: units missing "(close to 5 steradians)"

Table 1, Fig, 10, Fig. 11: when referring to Q directly, specify units of steradians.

Interactive comment on Biogeosciences Discuss., 4, 2069, 2007.

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