

Interactive comment on “Sky radiance at a coastline and effects of land and ocean reflectivities” by Axel Kreuter et al.

Anonymous Referee #3

Received and published: 19 September 2017

The Review of the paper “Manuscript ID: ACPD-2017-622 Title: Sky radiance at a coastline and effects of land and ocean reflectivities Authors: Axel Kreuter et al.,

The article describes spectral radiance measurements with a 3D-model comparison to analyse the effect of a heterogeneous albedo environment over them. This is the case of sites in the coast where sea water and land surface reflectivities impact over solar irradiance and sky radiance measurements. The authors analyse the different contribution of these surface reflectances and the subsequent influence over the morning/afternoon and left/right radiance data of the coastline site (radiance measured at 70 viewing zenith angle (almucantar data) as well zenith radiances). Six paragraphs are developed in the Results section which also includes a paragraph (3.4) to analyse the model sensitivity to BRDFs water and land changes and aerosol variability. The other

C1

two paragraphs (3.5 and 3.6) are dedicated to zenith radiances. The radiance measurements at 70 degrees or almucantar measurements are carried out with Pandora spectroradiometer and the zenith radiances with the DA1 and DA2 spectroradiometers. It is not clear in section 2 that DA1 and DA2 cannot measure almucantar data and in reality they measure diffuse irradiance. What is the field of view (FOV) of DA1 and DA2 when they measure the zenith radiance? Is this FOV 60 degrees? Clarify better these points in section 2, only at the end (Page 9) this is clear.

Otherwise most of the data are carried out for SZA larger than 60 degrees, which are of interest for high latitude sites but of relative interest for, i.e., the Mediterranean area where precisely the experiment was carried out. Certainly these effects have the mayor influence for high SZA but because of the scarce published radiance data values for lower SZA are of interest (in general most of the scientific community working in these topics of solar radiation, remote sensing, etc., is not so much familiar with radiance data). SZA of 41.9° is 1.2 hours from local noon, why not to include 0.5 hours from local noon?

In appearance to section 2 describing spectroradiometers I'm waiting to see radiance spectra in the results section but only values at three specific wavelengths are shown. I consider of interest to see and to analyse the changes of the radiance spectra for some of the items analyzed.

Below, only minor considerations

1. It would be recommendable to add a new figure to Figure 1 as a) or c) showing the geometry of the measurements, observer, sun, sky, to help the reader.
2. Although in the text, in the caption of Figure 2 it must be added that sky radiances correspond to 70° viewing zenith angle. Furthermore, it should be mentioned in some part of the text that this type of sky radiance measurements are also called almucantar measurements, it would help to some readers not so familiar with radiance data.

C2

3. Page 3, line 39: Clarify what type of sun-photometer was used. If this was a Cimel sun-photometer, a comparison of radiances with this instrument will be required. This comparison will be a good assessment of the uncertainty or error of measurements (because of the differences between instruments) and hence the observed differences between the measured and model data. Otherwise, specify the type/model and the wavelengths/filters of the sun-photometer.

4. Page 7, line 2: Why the authors model the spectral radiance with the alpha-beta turbidity parameters when they only show the data for three specific wavelengths: 450, 650 and 850 nm (not a given spectrum), why they do not use the AOD for these specific wavelengths (this point is related with my previous comment about the wavelengths of the sun-photometer). In this case the error of simulated data will be minor. However, I can imagine that the differences will be absorbed by the grey band uncertainties shown later in Figure 5.

5. Page 9, line 10. I cannot understand what means “ratio modelled with a constant AOD”. Refers it to wavelength or time variation?

In general the paper is near ready for acceptance, it is well structured and written but above considerations must be also taken into account

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2017-622>, 2017.