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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Downscaling of METEOSAT SEVIRI 0.6 and 0.8 micron channel radiances utilizing the high-resolution visible channel" *by* H. M. Deneke and R. Roebling

Anonymous Referee #2

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Review of Downscaling of METEOSAT SEVIRI 0.6 and 0.8 micron channel radiances utilizing the high-resolution visible channel, H. Deneke and R. Roebeling

General: In this manuscript an algorithm for the downscaling of Meteosat SEVIRIs solar lores channels 0.6 and 0.8 using the hires broadband visible channel is presented. The authors present an algorithm accounting for spatial image coregistration (0.6,0.8,and HRV) including spatial response functions and a successive downscaling through finding linear regression solution for an assumed linear combination of narrow band channels 0.6 and 0.8 to obtain broadband HRV data.

The manuscript is of good quality. The topic is of current interest and the presentation

is clear and complete. Nonetheless a major point regarding the use of the spatial response functions arises which has to be addressed (first two points in specific issues). In addition it is not fully clear, wether all the methods which are introduced are needed or even used in the paper. I suggest publication after consideration of these issues.

Specific Issues:

Section 3.3, Spatial response functions:

1) Do you only use the spatial response function (point spread, PSF) for the lores data to re-sample hires data? That is, do you smooth HRV data with the original SEVIRI lores PSF? This would mean an "over-smoothing" of the image. Lores and hires PSF both describe the collection of the real spatial radiance distribution into lores or hires pixels. That means, starting from a hires image you would have to deconvolve the image with the hires PSF, which would give you an estimate of the original radiance distribution measured by the sensor. Only then you could apply the lowres PSF to re-sample the data to produce a lores HRV version comparable to the other two channels. If you consider all of this and I just didn't get it, please clarify this in the section. Otherwise please correct it or explain why you don't have to do it.

2) Don't the MTF/PSF you use only apply for the sub-satellite point? The averaging for Western Europe must be much coarser? For Europe it might even be much better to average over 3x3 HRV pixels instead of using a much too narrow sub-satellite PSF. You have to discuss that. If your use of the PSF doesn't introduce noticeable errors for your method, you might not need to consider the PSF at all. Then you would hardly need section 3.3!

page 10714/ line 18: introduce the term "Nyquist" frequency in section 3.1

10718/ 25f: Does that mean that you do not use the elegant Fourier space possibilities you introduce but just find the solution by trying out? Do not discuss methods you don't use (sec. 3.2 needed?).

10719/ sec. 4. in general: You do use the statistical terminology which is introduced only in Appendix B. E.g. "slope" is hardly mentioned in section 3.5, but prominently discussed in sec. 4. This way it is hard to follow without reading the appendix, exactly which should not happen when you decide to use an appendix. You either have to give the reader more information first (from the appendix) or you have to shorten the discussion at these points (and maybe move things into the appendix).

Technical corrections:

page 10736/ Fig 2: "res1" fragment

10716/ 13: the term "FIR" is not introduced

10718/4 No sentence. Obviously this sentence is a bit too long.

10722/1 Typo. "0.5x4.8" -> "4.8x4.8"

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 10707, 2010.