

Interactive comment on “A fast method for the retrieval of integrated longwave and shortwave top-of-atmosphere irradiances from MSG/SEVIRI (RRUMS)” by M. Vázquez-Navarro et al.

Anonymous Referee #2

Received and published: 17 September 2012

The goal of this paper is to describe a fast method to invert SEVIRI narrowband pixel radiances to broadband SW and LW irradiances at the same spatial and temporal resolution as SEVIRI (3 km x 3 km; 15 min). The prime motivation for the high-resolution irradiances is to study the ³radiative effects of small scale features such as cirrus clouds and aircraft contrails.² The basic idea is to develop a large database of narrowband radiances and broadband irradiances from a radiative transfer model for a range of conditions and determine coefficients to convert observed SEVIRI pixel radiances to broadband irradiances. Both linear regression and neural network approaches are considered.

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1) The methodology is neither novel nor original. As noted in the paper, several other studies have developed theoretical narrow-to-broadband approaches to determine broadband irradiances (in fact, the GERB team has a SEVIRI-based irradiance data product at 3x3 SEVIRI pixel resolution (9 km x 9 km) that isn't even mentioned in the paper). The present approach does not advance the state-of-the-art in this area. In fact, the scheme used in the LW (Eq. 1) is a major step backward, employing the Stefan-Boltzmann formulation for all scenes, including thin cirrus.

2) There is no tie between the accuracy that can be realized with this approach and the accuracy required to address the science the retrieval method is intended for. The authors repeatedly note that this work was motivated by a need to directly quantify the radiative impact of aircraft contrails and contrail cirrus. In fact, this work is a follow-up to a previous paper by the same authors where an automatic contrail tracking algorithm (Vázquez-Navarro et al., 2010) was developed. According to the IPCC, the radiative forcing by contrails lies somewhere between 0.003 and 0.03 Wm⁻², small by any standard. Given the combined uncertainty in contrail detection scheme from the previous paper and in the retrieval of broadband irradiances from SEVIRI using the methodology in this paper, the reader is left wondering if the current approach is at all capable of reducing the uncertainty in aircraft contrail and contrail cirrus radiative forcing. The authors completely ignore this critical point and focus instead on the higher spatial and temporal resolution of SEVIRI compared to GERB and CERES to somehow justify the work. In fact, one could question if 3 km x 3 km is even sufficient spatial resolution. Furthermore, it is unclear why a ³fast² method is even necessary. This requirement means the approach must remain simple, which places a limit on the accuracy that can be achieved. Is there an operational requirement for broadband irradiances of small-scale features that is driving the requirement for a ³fast² method?

Because the work fails to provide any concrete advances in the area of broadband irradiance estimation from narrowband instruments, and because of the absence of any focus on the accuracy of the method in relation to the intended science, I cannot

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recommend publication of this work.

Interactive comment on Atmos. Meas. Tech. Discuss., 5, 4969, 2012.

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