

# ***Interactive comment on “Comparison of hourly surface downwelling solar radiation estimated from MSG/SEVIRI and forecast by RAMS model with pyranometers over Italy” by Stefano Federico et al.***

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Received and published: 15 March 2017

Dear authors,

I wanted to offer a few comments and suggestions regarding the RAMS model that may offer improvements to your forecasts.

1. There is a much newer and supported version of RAMS maintained at Colorado State University (CSU-RAMS) that is freely available at the following URL:

<http://vandenheever.atmos.colostate.edu/vdhp/rams.php>

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2. This version is based on RAMS-6 and is consistently improved and updated.
3. This version has the Harrington (1997) aerosol- and hydrometeor-sensitive radiation scheme. This radiation representation would be much more realistic since it accounts for radiative impacts of each liquid and ice hydrometeor species.
4. The RAMS microphysics is an excellent and well-proven microphysics scheme. The microphysics in the latest CSU-RAMS has undergone great improvements in recent years. A list of model development references can be found at:

[http://vandenheever.atmos.colostate.edu/vdhp/rams/rams\\_dev\\_pubs.php](http://vandenheever.atmos.colostate.edu/vdhp/rams/rams_dev_pubs.php)

And an updated list of RAMS scientific usage references can be found at:

[http://vandenheever.atmos.colostate.edu/vdhp/rams/rams\\_use\\_pubs.php](http://vandenheever.atmos.colostate.edu/vdhp/rams/rams_use_pubs.php)

Using a two-moment microphysics package for studying radiative effective of clouds may have been a better choice than using the interfaced WRF single moment scheme. The single moment scheme doesn't account for changes in hydrometeor number concentration which can be important for radiation scattering and absorption.

See the following paper discussing 1 vs 2 moment microphysics schemes:

Igel, A.L., M.R. Igel, and S.C. van den Heever, 2015: Make it a double? Sobering results from simulations using single-moment microphysics schemes. *J. Atmos. Sci.*, 72, 910-925.

I think many of the model deficiencies in your study could be linked to use of the simplified Chen-Cotton radiation, Kuo convective parameterization, and WRF single-moment micro.

I would suggest usage of Harrington radiation, Kain-Fritsch cumulus parameterization (where appropriate), and RAMS 2-moment micro. Each of these is available in the CSU RAMS version.

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Perhaps a comparison between your version of RAMS and the latest CSU-RAMS would offer insight into both versions of RAMS and assist in model improvement in either version and potentially lead to improved forecasts of radiative quantities.

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Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2017-9, 2017.

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