

Geosci. Model Dev. Discuss., author comment AC3
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Reply on RC2

Sebastien Massart et al.

Author comment on "Multi-sensor analyses of the skin temperature for the assimilation of satellite radiances in the European Centre for Medium-Range Weather Forecasts (ECMWF) Integrated Forecasting System (IFS, cycle 47R1)" by Sebastien Massart et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2021-37-AC3>, 2021

Dear reviewer,

Thank you for your comments. Please find below a first reply to one of your specific comment:

However, radiance observation used for the skin temperature is the data set used for atmospheric analysis and surface sensitive channels are not sufficiently used. Therefore, it is unclear whether the consideration of spatial and temporal consistency in SKTACV is better than TOVSCV under the limited surface sensitive radiance data use.

Reply:

As a first step, we chose to have a conservative approach with a SKTACV configuration as close as possible to the TOVSCV configuration (apart over sea-ice, see reply to Reviewer 1). The purpose of this "model evaluation" paper was to assess the impact of the new approach before further improving it. We demonstrated that the new approach is mostly neutral in term of standard data assimilation and forecast skill measures, which gives us confidence in further developing it.

As mentioned in the paper, the spectral channels are carefully selected to avoid those which are very sensitive to the surface, and at the same time to keep those which have a significant positive forecast impact in the ECMWF system (Bormann et al., 2017). We believe that with the SKTACV approach we will be able to add more surface sensitive channels in the near future and then we will be able to further assess in what measure the spatial, temporal and instrumental consistency of this approach is beneficial compared to the current one.