

Interactive comment on “South African Weather Service operational satellite based precipitation estimation technique: applications and improvements” by E. de Coning and E. R. Poolman

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Thank you for your very positive and constructive suggestions. 1. Reducing the first (background) part of the article can be done without effort. 2. Statistical evaluation of the products can be extended. I have started to process the data calculating the POD etc. based on grid boxes of 0.5 and/or 1 degree. I have started to do the statistical evaluation of the various fields against the gauge totals for the entire 2 year period on a daily scale. Hopefully this will show the advantages of the new product. 3. The reasoning for the ten days chosen for evaluation was simply that one some of those

days extensive falls did occur (Feb 2009 and June 2008) while on other days there were less significant/light falls... In other words to look at days with significant as well as insignificant falls. Using more cases for statistics such as mentioned in (2) would of course be better, as you suggested. 4. The suggestion to test for 1, 6 and 24 hours separately (and not just 24 hours) is valid. Unfortunately we don't have enough automatic rain gauges over SA to use that for hourly evaluation that is why I only used 24 hours. 5. Structural changes can be done. 6. The reason why no applications in the SAFFG is shown, is that the SAFFG only became operational in SA in October 2010. The paper is not intended to focus so much on the SAFFG itself, but more on the new hourly precipitation product (which has use in the SAFFG). Extensive testing of the SAFFG falls outside the scope of this paper and will be much more involved since hydrological factors, radar rainfall and model input are also taken into account before a flash flood warning is created. I agree that the focus/scope of the paper should be stated clearer in this regard. 7. You are correct in saying that the goal of the paper was to show the advantages of the new combined precipitation product and yes, it can be stated clearer. 8. "Unified Model" is the South African version of the UK Met Office model, running locally at a 12km resolution. A definition was provided in paragraph 2.3. 9. Smoothing is applied in the initial calculation of the HE, yes. These area statistics (max/min etc.) can be seen as a measure whether a given pixel belongs to the same "cloud family" – there is a threshold test to test whether a pixel IR10.8 temperature is close to the box centre temperature (and this threshold depends on the local minimum temperature). If the pixel passes this threshold test, it then computes to the cloud top temperature standard deviation in the box, which then goes into the rain rate computation. The original HE code then does the same thing for a small box (60 x 60 pixel). Tests, including this smaller box, showed results were not very different (fields just looked less smooth, but the differences were really very very small). Even if an individual storm is fairly small, it will also be picked up in the larger box. 10. A map of provinces can be added. 11. HE bias correction – The HE is best at convective events, but also sometimes captures the stratiform rain, as well as convection embedded in

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stratiform rainfall areas (example June 2008). If observations of rainfall could be split into convective and stratiform rainfall, it would be perfect! This, to my mind, is only possible if one uses rainfall rate and/or radar rainfall rate. Another possibility is to use the UM's total precipitation, stratiform and convective fields and determine ratios... as I have done for the stratiform rainfall in order to distinguish areas where only one of the two occurred. Along the coast lines of South Africa we get the influence of frontal systems and ridging highs/lows, which mostly results in stratiform rainfall. Over the interior I believe the situation would be more "mixed"..... i.e. stratiform and convective rainfall occur at the same time/in the same system. I thus used the total gauge rainfall to evaluate the HE against. 12. The 150mm division was used since this more or less agrees with the areas where the UM stratiform precipitation contributes more than 50% (>0.5 in Fig 8) of the total rainfall. 13. Your comment on using the maximum of the HE or stratiform is a positive suggestion. I will look into this. 14. Editorial comments can all be addressed. 15. I would appreciate the opportunity to work on the mentioned areas and re-submit the article. I am very enthusiastic about this and am convinced it can be an improved hourly satellite/model based precipitation estimation.

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