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Hydrology and Earth System Sciences Discussions

Interactive comment on "Water resource monitoring systems and the role of satellite observations" *by* A. I. J. M. van Dijk and L. J. Renzullo

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OVERALL RESPONSE: The referee is thanked for the comments and positive review provided. The referee suggested several minor corrections, which we have made without comment or as explained below:

COMMENT: For me, the paper failed to evaluate so many parameters used in SWRMS. You'd better give us a example to show the good results. For example, you mentioned the LST, albedo and so on, do you validate the results in Australia? The model can be used in Australia irrigation area and give us a general results.

RESPONSE: It was not the intention of this paper to evaluate SWRMS predictions in general or those from AWRA in particular against independent observations. However we did attempt to briefly report on those aspects as we appreciate that this is likely an important aspect when forming an opinion on the realism of simulations. We provided references so that the interested reader can find further details but we were concerned about expanding the text too much, also given the referees suggestion to reduce text length.

COMMENT: The author have a review of operational and research applications demonstrates that satellite observations can improve accuracy and spatial detail in hydrological model estimation. That is very important for you model. Unfortunately you don't say if it suit in Australia?

RESPONSE: We were unsure what the referee meant by the last sentence. However in the text we emphasise that the on-ground measurement network in Australia is sparse and hence we do indeed rely on satellite data.

COMMENT: Over all the paper is too long, especially for instruction for Spatial hydrological models part. Each part you referred many references, for reader we have no any idea except we read the reference again. You have to tell us a general information then give a reference.

RESPONSE: We appreciate that the paper is not short. However we considered it inevitable for a review paper that aims to be fairly complete; the many references are a logical consequence. We did try to find a balance between describing what is in those references provided versus keeping the text as short possible, but appreciate others might make different choices. We did go through the text to try to identify text that could be shortened or references that could be removed or needed to be explained.

COMMENT: Data assimilation is a important work for your model, but the author only talk about the advantages and disadvantages. You'd better give a proper way to your model operation stably.

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RESPONSE: We are unsure of what aspect of stable operation the referee refers to, but we appreciate that in operational application there are several issues that can affect stable performance, including improper error specification, poor choice of data assimilation approach and unreliable observational data sources and services. However, although we briefly refer to some of these issues, it was beyond the scope of this paper to discuss them in depth.

COMMENT: How do you think the daily or monthly ET is accurate? Also you mentioned many ways to get ET, here I want to say the detailed work is very important for future model. As we know, only ETa's calculation has many problems in observation sites. To validate the ETa, so many papers published in recent years. I am not sure the author's group can do all of the work, such as numerical model, remote sensing for land surface parameters, ET etc (You mentioned use the results directly, but you have to do the validation firstly), data assimilation.

RESPONSE: We are unsure which section the referee is commenting on here. However we acknowledge the challenges in measuring ET accurately and have made some comments on this towards the end of both Sections 3.2 and 4.4.

COMMENT: 2.2 Operational monitoring systems, this part is too long and affect the later parts.

RESPONSE: We felt that it was important for the interpretation of the remainder of the paper to introduce existing SWRMS, but we tried to limit the length of these descriptions. We did not see an obvious way to considerably shorten this section without leaving out important background however.

COMMENT: p6312, line23 "These include flood and drought monitoring systems based on atmospheric model output". You need to tell reader what model to be used?

RESPONSE: We did not include this level of detail as these types of systems were outside our definition of SWRMS. We did consider deleting this whole paragraph to

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save space but felt it necessary to acknowledge the existence of alternative approaches to providing hydrological information.

COMMENT: p6316, line17 "Prior estimates for all parameters were based on literature review or analyses carried out as part of model development." Here you have to illustrate the suitable factor in Australia.

RESPONSE: We appreciate that in data analysis or literature review one must consider whether the observations on which they are based are relevant for the environment one studies. This was done mostly implicitly but sometimes explicitly in parameterising AWRA; but in the interest of paper length we needed to refer to the (publicly available) technical report by Van Dijk (2010) for details.

COMMENT: p6318, line21 "Optical observations of albedo and thermal infrared (TIR) and microwave brightness temperatures or derived land surface temperatures (LSTs) can be assimilated into surface radiation and energy balance models to improve the accuracy of ET estimates". Just mentioned in former part. In this part you need say what remote sensing results? If it is right to get the accuracy of ETa?

RESPONSE: The statements to which this comment relate were a summary from published reviews, references for which are listed at the beginning of the section. Hence, again to keep the length of the paper within limits, we repeated as little of these references as possible.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 6305, 2010.