

## ***Interactive comment on “Reservoir storage and hydrologic responses to droughts in the Paraná River Basin, Southeast Brazil” by D. C. D. Melo et al.***

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### General comments

The paper proposes an interesting study related to two major droughts in the Paraná river Basin, until the confluence (and including) the Iguaçu River, inside the Brazilian territory. The study is especially interesting for Brazilian water management, given the focus of the work. However, as a methodological contribution, it shows how the used data and techniques could be applied for these kind of prospection. Linkages between the different kinds of droughts are also explored, which is also motivating. Learning more about a physical system is always motivating. About language, the paper is well written and English usage is good.

C1

However, I believe that at some points the paper could be improved, what would improve the whole work contributions. Following I specify my comments and suggestions.

### Specific comments

Page 2, lines 5-10: This paragraph is not clear. Why authors just give the name of GRACE satellite and do not talk about the others satellites whose measure precipitation, evapotranspiration and etc..? And after authors are talking about TRMM without presenting it before. I suggest to improve it.

Page 3, lines 21-30: I missed the citation from other works that addressed the Parana basin in the literature review. I believe that the authors could include some researches mentioning that this basin is or has been studied by other researchers in other hydrology research. This will give more importance to the work, allowing to understand how this work fits within the existing studies on the basin.

Page 4, line 15: I was not able to identify clearly in which depth was considered for soil moisture using GLDAS, the GLDAS product that the author used contains soil moisture information for various bands (0-10cm, 10-40cm, rootzone, etc). Is it possible to make it more clear in the text?

Page 4, lines 20-30: If possible I would suggest to transfer more information about SPI/SDI Drought indices from supplementary material to the main text. It would be interesting to give some more detail about the methodology for calculating the SPI/SDI or at least cite the original work that proposed methodology.

Page 5, lines 5-20: One of the study objectives was to identify the intensity, duration and extent of the droughts at the Parana watershed. It was clear what the periods of 2000 and 2014 had droughts and its duration and intensity (analyzing Figure 2). But for the spatial extent I think it could have been made a simple figure showing the spatial variation of the SDI/ SDI within the period of each drought, showing yet an outline of the area affected by the drought.

C2

Page 10, lines 25-30: In the conclusions authors shows a summary of results and emphasize as conclusions of the research the importance of integrating remote sensing, modelling and monitoring data and that the analysis highlights the importance of reservoir location. I think those statements are indeed true. But I also think they are kind of trivial, and they are not necessarily innovative conclusions of this single research. I suggest the authors to remove those conclusions (or shorten) and add a conclusion with inverted reasoning: how these results can be useful for the analyzed system? What they mean going for future management of water resources in the basin? How can we evolve with these used techniques for practical or more research purposes?

Pages 9 and 10: At the discussions or conclusions I also miss a paragraph, a scheme, a flowchart or something else highlighting the comprehensive understanding of the linkages between meteorological and hydrological droughts for future management proposed in the study objectives. Who are them? Is it possible to make them more clear?

Technical corrections

Page 3, line 7: Please keep verbs tenses consistent. In this case, in the past.

Page 5, lines 23-25: I suggest to rewritten this paragraph to avoid the triple "The Grace..."

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