

## ***Interactive comment on “Conceptual and numerical modeling of the Guaraní Aquifer System” by L. Rodríguez et al.***

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Review of doi:10.5194/hessd-9-9885-2012: Conceptual and numerical modeling of the Guaraní Aquifer System The choice of me as a reviewer is a bit difficult, because I'm not investigating the GAS in any way and my experience in tropical hydrology is quite weak. But the background of regional scale modeling and the arising questions of lacks in data support give me a feeling for the big problems arising in this transboundary aquifer system. In general more research and investigations on this big transboundary aquifer system is necessary and every publication about this topic is helpful at this status of investigation. The approach of the authors is very helpful and important to publish. The title in the end promises a bit more than this paper can hold: The con-

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ceptual model is described quite good but the numerical modeling is carried out poorly (as the authors also admit) due to the lack of information and the tools applied here. The attempt to test methods within this approach makes the overloading complete. Let's begin with the title: As stated above, the conceptual modeling is carried out in an adequate and profound way. The numerical model at the moment is quite weak. The application of statistical methods to overcome data lacks is honorable but it hardly covers the severe problems at this point. Considering the preliminary status of the work on the GAS, a better title would be perhaps: "Conceptual model and numerical modeling approach of the Guaraní Aquifer System". The introduction already shows one scientific dilemma for the reader to follow up the investigation results: The reports of the PSAG are not available, so that in the consequence some of the data should have been presented in the paper. The groundwater recharge conditions remain quite unclear: This parameter is most important for the conceptual model and a distribution map should therefore be shown in the figures. Another very important parameter is the hydraulic conductivity/transmissivity. Why did you choose the zonation method instead of a regionalization of measured values? How does the distribution of measured values look like (map of measurements)? How do the resulting values of the zones fit to the measured values in the same zones? The correction of hydraulic conductivities according to the temperature is quite good and helpful, but what is the result of it? Is the correction overcompensated by the rough zonation of the hydraulic conductivities/transmissivities? The mesh and the pumping areas are to a certain extent connected to each other, therefore a map of pumping wells or at least the mentioned pumping zones (if possible with extraction rates) would be helpful. A map of observation points would be helpful, too (or does fig. 7 show the observation points?). For the rivers, even for the conceptual model it would be helpful to differentiate between parts where effluent and where influent conditions are observed or can be assumed. Fig. 8 only roughly summarizes the values for certain model parts. It would be also helpful for the conceptual model if a differentiation for the pumping is made for areas, where the extraction leads to bank filtration. Is it really a good idea to have a factor for the

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precipitation to get the recharge value? In most parts of the world it is better to subtract a certain value for the evapotranspiration and the surface discharge. Perhaps a mixture of both would be more helpful in your area? It would be better to have chapter 6.4 (Hydraulic conductivity) before chapter 6.3 (Model structure) so that the range of the values for the zones can be assessed better by the reader. To the figures: Fig. 4: What do the colors in the left part of the figure mean? Fig. 5: The figure needs more explanation: It should be made clear, that ratios between a steady state and the transient state of the new modeling approach are meant.

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