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Hydrology and Earth System Sciences Discussions

Interactive comment on "Climate model based consensus on the hydrologic impacts of climate change to the Rio Lempa basin of Central America" *by* E. P. Maurer et al.

Anonymous Referee #2

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Review: Climate Model based consensus on the hydrological impacts of climate change on the Rio Lempa basin of Central America by E.P. Maurer, J.C. Adam and A.W. Wood

Summary: The article investigates the effects of climate change on the hydrology of the Rio Lempa Basin, focusing on the effects of these hydrological changes on the hydropower supply of and inflow to the major reservoirs. In the study an ensemble of hydrological model runs, based on climate forecasts from 16 GCM's, is used.

Overall: The structure of the article is clear and well ordered. The study is very prac-

tical. However because of the application of an ensemble of climate model forecasts and the number of statistical methods applied for taking into account the GCM uncertainties, it is also of scientific relevance.

Detailed: The abstract is a complete summary, already giving the main results.

The introduction poses the study in clear contents, multiple relevant references are used. Also it states the relevance and discerning features of this study.

Description of study area (2), GCMs (3.1) and hydrological model (3.2) are clear and the datasets used are well described and referenced.

The description of the observed meteorology (3.3) is complex, it takes a reader several times reading before understanding. Maybe a table with the meteodatasets used, clarifies this. The choices for the datasets could be better clarified. Why have the monthly datasets of Willmott and Matsuura (2001) and the dataset of New et al. (2000) been used, while daily values were available from Sheffield et al. (2006) and Nijssen et al. (2001)? It is stated that the daily variability is established from the latter sets, has this daily variability been used to downscale the monthly sets in time?

Paragraph 3.4 is clear and the applied method to identify significant change is well chosen.

Results and discussion (4) are clear and the statistic methods are used very well to quantify the results. Figure 4 (4.3) is interesting; however the graph contains less information than the authors have available and that might be interesting for the reader and make the study scientifically more interesting. There is only a distinguishment between the dots into which scenario they belong. However it would also be interesting to see which dots belong to which GCM. Are temperature and precipitation changes maybe linearly related within the separate models? Has the ANOVA analysis been applied to the complete set of GCMs at once or have the results of the ANOVA analysis of the different models been combined.

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There is little agreement between the GCM based calculated inflows to the reservoirs in september-december (4.4), is their an explanation for this?

In paragraph 4.4 it is stated that "the phenomenon of precipitation changes having an amplified effect in runoff, when direct CO2 effects on vegetation are ignored, is well known". It is not well known to me and that may be the reason why I can't follow the next part of this paragraph dealing with CO2 and evaporation. The direct CO2 effects are explained here, although they were well known. The authors concludes that the two CO2 effects cancel each other out. So there is no amplified effect on direct runoff in this case? I suggest rewriting this paragraph, to make it more clear to a reader less familiar with this phenomenon.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 3099, 2008.

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