**Hydrology and
Earth System
Sciences
Discussions**

Interactive
Comment

Interactive comment on "Prioritization of water management under climate change and urbanization using multi-criteria decision making methods" *by* J.-S. Yang et al.

Anonymous Referee #2

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General comments:

The subject of the paper is relevant for HESS and the special issue "Assessing the impact of climate change for adaptive water management in coastal regions", it is well written and generally well organised, and the selection and application of methods appear to be sound. However, more emphasis should be put on describing the hydrological setting and relevant climate change impact issues. I have personally no experience with multi-criteria decision analysis or the applied models, but although the approach appears to be sound, I find that the description of the approach and the investigated

setting need to be clarified and improved, significantly. It is necessary to improve the manuscript in several ways for readers to better understand why and how the study were conducted, the hydrological setting and how the methods were applied before final publication.

Specific comments:

There are many tables (11) and fewer figures (4) in the paper, - I suggest changing 3-5 tables to figures. This would make the paper easier and more interesting to read – see section on specific comments for concrete suggestions.

Figures are generally of acceptable quality except for Fig. 2 - see next section on specific comments.

To better understand and clarify the objectives of the study, the projected climate change and urbanization impacts and the investigated setting, further details and clarification on the following subjects are needed:

1) How are the target instream flow needs and BOD defined – what are the projected ("feared") impacts of climate change and urbanization on instream flow and BOD, water resources and ecological status of relevant ecosystems? – please elaborate further in general terms 2) What is the actual use of groundwater collected by subway stations, how/why is it collected and how can it be used for mitigating negative effects of climate change and urbanization?). 3) The structure of the water supply systems in the investigated area (the ratio between the amounts of surface water and groundwater used for water supply) 4) Threats to water supply and relevant ecosystems in and associated with the investigated watershed(s) – what are the main concerns? It appears to be both quantitative and chemical/ecological status, but this should be clarified further. If data are available for indicators of chemical status other than BOD such as e.g. nutrients please provide a table showing these even though they are not included in the analysis. Such data would be important for comparison with other related watershed studies. Information on the major sources to and components of the BOD would also

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be relevant information to include. 5) Additional information on results of downscaled GCMs should be presented and illustrated in section 4.2

Point 1 and 2 should probably be described in the introduction while point 3 and 4 should be included in the current section 3 describing the investigated watershed(s). However, I suggest moving section 3 up before the methodology descriptions in order to better understand the investigated system before presenting the different applied methods

Tables:

As mentioned under general comments I suggest to change 3-5 tables e.g. Table 1, 2, 4, 6 and 11 to figures.

Figures:

Figure 2 must be improved as it is hard to see exactly where the study site(s) are located in South Korea and some text is very hard/impossible to read. Hence, the size of the map of South Korea with the location of the study site should be increased including the fonts of the geographical coordinates. Fonts in the maps of the different sub-watersheds and the scale bar should be increased in size especially for the DR watershed.

Figure 3. EIR below the figure should be changed to EIF

A figure in section 4.2 illustrating the downscaled projected changes of SRES scenario A1B and A2 would be helpful

Comments to specific lines in manuscript:

P9890, L15: Change "Since" to "As"

P9890, L15-17: It is unclear to me what a cost component above 0.127 is, and how the collected groundwater is used – this should be clarified (note! Also that another measure apparently is preferred in the conclusion)

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P9891, L21: change "Many research have studied…" to: "Many studies have investigated…"

P9893, L1-2: Change "target instreamflow requirements.." to "target instream flow needs.." and consider describing how this and the target BOD were defined

P9894, L25: Change "measurers taken into.." to "measures taken to…"

P9898, L15-17: Describe what the most important quality and quantity problems are and whether it is in relation to water supply or ecosystem needs

P9899, L9-17: Consider presenting the data from the different watersheds in a figure preferably also with additional quality data on e.g. nutrients if available

P9900, L 11-20: It would be very helpful to show the projected climate change in a figure for easier overview

P9901, L2: Change (no more urbanization) to (no increase in urbanization)

P9901, L12-15: More details on the setup, results and performance of the HSPF model described in Chung et al. (2011b) are needed e.g. the RMSEs

P9907, L1: this is not in agreement with the abstract??

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 9889, 2011.