

## ***Interactive comment on “Water use scenarios as a tool for adaptation to climate change of a water supply company” by R. Jacinto et al.***

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Reply to Anonymous Referee #1 comments.

We would like to thank Referee#1 for its comments and interest on our paper. Bellow we address each of his comments: 1) “First, adaptation is not addressed in the methods and results of the paper, while it is only briefly mentioned in introduction and conclusions, so the title should be changed or adaptation issues should be properly discussed.” Response: the title of the work is “Water use scenarios as a tool for adaptation to climate change of a water supply company”, it is explicit that the scenarios are a tool for adaptation; although the article doesn’t address specifically adaptation, it shows clearly that considering socio-economic scenarios can be very useful for an effective adaptation strategy. The title can be changed to “Development of water use

C331

scenarios as a tool for adaptation to climate change”. 2) “The scenarios described in the paper are mostly derived from literature and are further explored by the authors; the methodology of this “exploration” is very poorly explained. Throughout the methodology and results the authors refer to literature, while it remains unclear how literature values have been used and what information or analyses the authors have added. The results section is very brief and lacks a structured discussion of results and uncertainties.” Response: we consider that the methodology is short but well explained, although it is more synthetic than in first versions due to space limitations; we hope that the changes suggested by referee #2 have increased the detail and clarity of this section. We would also like to refer that this paper is not dedicated to uncertainties but focused on downscaling and methods for obtaining socioeconomic scenarios. The way literature have been used is implicit on the description of the table 1 and on the section 3 Water use projections, especially on the same section lines 21 to 29. 3) “The overall recommendation is to restructure and reduce the methodology part and to extend the results part with a proper presentation of the results of the study and restrict the discussion to the value of these results.” Response: this a contradictory comment compared to the previous comment, claiming for an extension and improvement on the methodology, where the Referee mentioned that methodology is “poorly explained”. 4) “In the conclusion new information is presented, which should have been discussed in the previous section.”, we would like to have more details from Referee #1 on the information that should be discussed in previous sections.

Reply to Anonymous Referee #2 comments.

We would like to thank Referee#2 for its comments and interest on our paper. We will now answer to each comment/request from referee #2: 1. “- Pg 266; be more general in the abstract and less specific and change the term “scenarios” after “SRES”, according to referee #2 comment number 9. 2. “Pg 267, line 2: “policy” must be “political”, the term policy relates to the political tool such has planning or regulation diplomas, which

C332

lead to a more practical and applied of the referred interest than if it was generally political, therefore we will maintain the term “policy”. 3. – “Pg 267, line 11: must be “households’ and industrial efficiency” - we agree on changing “industry efficiency” to “industrial efficiency”. 4. “Pg 267, line 22: introduce EPAL” - EPAL is already referred in that line: “(…) or indirectly by EPAL, and the west aquifers of continental territory of Portugal.”. 5. “Pg 267, line 26: insert “future” before “water availability” - the word future before climate also stands for climate availability, “(…) future climate and water availability”. 6. “Pg 267, line 28: “will evaluate” should be “evaluated”” - we propose “In this paper potential future water stress for EPAL is evaluated (…)”. 7. “Pg 268, line 4: delete footnote (does not give extra information)” - it might not give much more information, although we find useful to have this distinction somewhere, therefore we prefer to maintain it in order to better clarify the readers. 8. “Pg 268, line 5-6: “all other systems” only refers to one: “agriculture”, give more examples” - we agree on changing the sentence to: “but also for other sectors, namely agriculture or industry”. 9. “Pg 268, line 6: introduce “ICPP SRES” (not only in abstract) and avoid to times “scenarios” in one sentence.”- we agree on using the expression “IPCC SRES” only, without the word scenarios after, here and in the abstract. 10. “Pg 268, line 7-8: delete “These... our results”” (no extra information) - we agree on deleting the sentence. 11. “Pg 268, line 15: explain what is meant by “linear regionalization”.” - we accept the propose of denifying linear regionalization “Linear regionalization (Fig. 2) of the SRES for the study area was applied, because it is the most transparent and simple method available; it assumes that the evolution on the study area will be similar to the evolution on the biggest area (i.e. Portugal) (Vuuren et al., 2007, 2010).” 12. “Pg 268, line 17-22: avoid numbering here (insert bullets) and diminish line spacing.” - we agree on using bullets instead of numbers for diminishing line spacing. 13. “Pg 269, line 1-5: delete “the evolution... consumer behaviour” (repetition).” - we don’t agree on deleting this sentence as we find it useful and a synthesis for the following sections of the article. 14. “Pg 269, line 6: explain what is meant by “downscaling”” - the sentence will be change to the following “Downscaling methods transform worldwide, continental

C333

or country level scenarios on useful and applicable scenarios at more detailed scales of analysis. The Downscaling for water use (...)” 15. “Pg 269, line 14: insert “future” before “water consumption”” - the suggestion will be included. 16. “Pg 269, line 14: “is” should be “was” (simple past when done by authors).” - the suggestion will be included. 17. “Pg 269, line 16: avoid numbering (see above).” - in this case, these were sequential steps on appliance of this methodology and, therefore, we would prefer to keep the numbering on the following format: i) Population, ii) Land use, iii) Water use efficiency, and so on. 18. “Pg 269, line 8: “base population” should be “population database””, as we meant the population on the baseline, we will change the expression to “population on the baseline year”. 19. “Pg 269, line 22-25: unclear what is meant by this sentence. “ - as described on 11th point above, the linear downscaling “assumes that the evolution on the study area will be similar to the evolution on the biggest area (i.e. Portugal)”, we expect that including that description before will make this sentence clear. 20. “Pg 270, line 1: insert “(CLC, 2000)” after “Corine Land Cover” and delete footnote. “ the suggestion will be included. 21. “Pg 270, line 9: delete “mostly”” - in Lisbon metropolitan area, there are other kinds of land use, that’s why the “mostly” term is used, but it can be changed to “almost only urban”. 22. “Pg 271: Make “water use projections” part of Materials and Methods section, thus 2.3.”, we didn’t understand this suggestion. If this means that table 1 should be in the methods section, we agree. 23. “Pg 271, line 3: “applicable” should be “applied” and “in this project” should be “to this region.”” - the suggestions will be included on the next version of the paper. 24. “Pg 271, line 11: “were made” should be “was done” and delete “presented”” - the suggestions will be included on the next version of the paper. 25. “Pg 271, line 17: delete “significant” (there is no statistical proof).” - the suggestion will be included on the next version of the paper. 26. “Pg 271, line 21: Explain scenarios and refer to table”, the sentence will be changed to “Scenarios A1 and A2 have the highest temperature increases (and larger extensions of dry periods) and thus the largest increases in water consumption needs (Table 1);” 27. “Pg 272, line 23; “by” should be “per”, we didn’t find “by” in the referred line, as the written sentence is “Cb =consumption of water in

C334

the base year". 28. "Pg 273, line 9: delete "significănt" (no statistical proof)" - the proposed change will be included on the next final version of the paper. 29. "Pg 273, line 10: indicate how much reduction of agricultural land and increase in urban area." - the sentence will be changed to "(...) agricultural area (34.19%) and an increase in urban area (0.40%) (Fig. 6)". 30. "Pg 273, line 11-14: This is not part of the "results" but rather something to mention with the scenarios (see above). ", we consider table 3 a result of the compiled information. 31. "Pg 273, line 15: "in the" should be "from"." - the proposed change will be included in the final version of the paper. 32. "Pg 273, line 17: "in" should be "from" and "is possible to see" should be "can be concluded"." - the proposed change will be included in the final version of the paper. 33. "Pg 273, line 18: "are coincident" should be "coincide"." - the proposed change will be included in the final version of the paper. 34. "Pg 273, line 19-20: "to maintain" should be something like "grassland will be maintained on the same level" - the sentence will be changed to "(...) while the European SRES tendencies for grassland will be maintained on the same level.". 35. "Pg 273, line 24: "shows" should be "showed"." - the proposed change will be included in the final version of the paper. 36. "Pg 273, line 25: delete "also" and "significănt" should be "large"." - the proposed change will be included in the final version of the paper. 37. "Pg 274, Line 3: "are" should be "were"." - the proposed change will be included in the final version of the paper. 38. "Pg 274, line 5-6: delete "which....developments" (this is obvious and inherent to scenarios)." - we find that the sentence without this last part will be very poor and almost senseless. 39. "Pg 274, line 6: "project" should be "projected"." - the sentence will be changed to "All the projected scenarios show a reduction in water use in the analyzed sectors(...)". 40. "Pg 274, line 7: "sectors analysed" should be "analysed sectors"." - the proposed change will be included in the final version of the paper. 41. "Pg 274, line 9: delete "for example"." - the proposed change will be included in the final version of the paper. 42. "Pg 274, Line 11: "are" should be "were"." - the proposed change will be included in the final version of the paper. 43. "Pg 274, Line 13: "decrease" should be "decreased"." - the proposed change will be included in the

C335

final version of the paper. 44. "Pg 274, Line 20: "analysis" should be "account"." - the proposed change will be included in the final version of the paper. 45. "Pg 274, line 22: delete "the"." - the proposed change will be included in the final version of the paper. 46. "Pg 274, line 24: insert "the" before "summer"."- the proposed change will be included in the final version of the paper. 47. "Pg 274, line 20 and Pg 275, line 3-5: there is a contradiction, first is said "the results need to be considered carefully" and afterwards "the result show..previously expected". - this is not a contradiction, because on page 274 we referred generally to the application of scenarios and on page 275 we are specifically commenting on our results. Nevertheless we can change on page 275 to "Our results support that socioeconomic...". 48. "Pg 274: What is missing is a discussion about the impact for EPAL and the water supply (see title the paper)."- as this paper focus only on the socioeconomic scenarios we plan to change the title to "Development of water use scenarios as a tool for adaptation to climate change". 49. "Pg 275, line 7: start the conclusions part with a small summary of the work done."- we find that including a summary of the developed work might be redundant when comparing with the abstract. 50. "Pg 275, line 7: delete "considered"."- the word will be deleted from line 7. 51. "Pg 275, Line 8: "Another..that" should be "Mainly"."- the sentence will be changed to "One of the main results is that (...)". 52. "Pg 275, line 10-21: this is more a discussion than a conclusion. In the conclusion you should state the most important findings from the results and discussion section." - being the focus of this paper the socioeconomic scenarios and the methods applied, we consider this part of the conclusions because it also relates to the next steps on using the produced scenarios.

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C336