

***Interactive comment on “Development of an Open-GIS decision aid system for ecological and economical management of surface and groundwater resources in the Bistrita River Basin (Romania)” by M. C. Trifu et al.***

**Anonymous Referee #2**

Received and published: 13 August 2007

General comments

1. The paper is very good and addresses relevant scientific questions within the scope of HESS. It presents the results of a large project involving a tremendous work. 2. Among the most important achievements is the realisation of an open web-based tool, coupled with mathematical models integrating hydrological, hydrogeological, environmental and economical analyses. 3) The conclusions are substantial and well documented. 4) The scientific methods and assumptions are valid and clearly outlined. 5) The results are sufficient to support the interpretations and conclusions. 6) The

description of experiments and calculations is very clear, being sufficiently complete and precise. 7) The authors give proper credit to related work (which mostly belong to them) and clearly indicate their own new contribution. 8) The title clearly reflects the contents of the paper. 9) The abstract provides a concise and complete summary. 10) The overall presentation is well structured and clear. 11) The language used in the paper could be improved. 12) There are no mathematical formulae. The units are correctly used. Concerning the symbols, see the observation 34. 13) Some parts of the paper (text, figures) have to be clarified - see the observations 1, 2, 5, 7 (specific comments). 14) The number and quality of references is appropriate. 15) The amount and quality of supplementary material is appropriate.

## Specific comments

Despite the good quality of the paper, there are still some missing or unclear explanations, which can be solved easily. Among these, one can mention the following:

1. P. 2043 - r. 12. After "variables of the system" to introduce a short description related to the RIVE model: what processes are modelled and what are the main variables.
2. P. 2043 - r. 23-24 - the idea of stream-order according to the Strahler scheme and its use in the mathematical modelling is not adequately explained.
3. P. 2045 - r. 28-29 No mention is made concerning the aquifer pollution due to water exchanges between Bistritza river and the aquifer; the exchange is important because of the water abstraction from the alluvial aquifer. A balance of the aquifer would have been useful to estimate the importance of these exchanges.
4. P. 2050 - r. 20-24 It is mentioned that the social effect does not intervene in the cost evaluation of the different measures. Still, it is not clear what is taken into account. For instance, the difference of the income in different scenarios is considered?
5. P. 2051 - r. 8-9 It is stated that, based on the cost of the reduction measures of the nutrients in surface waters, the most efficient measure is the reduction of the diffuse sources. Still, does this measure lead alone to a good status? There is not necessary to upgrade the existing treatment stations (generalization of the tertiary treatment technology) or to realize new wastewater treatment plants? In other

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words, does the economic efficiency fully guarantee the fulfilment of the environmental objectives? 6. P. 2052 r. 14-16. The environmental cost is considered equal with the fertilizer cost (in contradiction with the definition given at the page 2046 r. 13-14). The reduction of the fertilizers quantity involves a reduction of the income. To be consistent with the definition given at page 2046, the environmental costs should be equal with the cost of the reduced quantity of fertilizers plus the economic losses due to income reduction. At the limit, in the case of an ecological agriculture (zero kg of nitrates per ha), the environmental cost is composed only by the economic losses due to production reduction. 7. P. 2064 - Fig. 6 - The Legend is not correct: Not only the sub-basins were analyzed by the Diminish system, but also the aquifer situated in the lower part of the basin (see r. 9 - page 2044). 8. P. 2066 Fig. 8 - I do not understand why the total nitrogen and phosphorus budget (not concentrations) depends on the hydrological conditions; thus, during the dry year 2000 the total Nitrogen is about 80 ktone (approximately 3 times greater than in 2002, a wet year). As it is mentioned at the page 2048 r. 9, this reduction is a consequence of the closure of some industrial units.

## Technical corrections

There are also some minor faults or inconsistencies, like: 9. P. 2037 - r. 1-2 "The Bistrita River Basin (..) is one of the most important tributary" - to replace "tributary" by "sub-basin" 10. P. 2037 - r. 3-4 "...Siret River, which is the second major affluent of the Danube river" - on the Romanian territory or of the whole Danube basin ? 11. P. 2037 - r. 8 - "and to combat..." - I suggest to replace "to combat" by "to diminish" 12. P. 2038 - r. 12 "...at improving water quality" - I suggest to replace "improving: by supervising" 13. P. 2039 - r. 4-5. It is not clear that the characteristics given in the brackets concern Bistrita River and not Siret River. 14. P. 2039 - r. 5 - I suggest to move "(Fig. 1)" at the end of the previous sentence (r. 4), or after... "at the Eastern part of Romania" - r. 3. 15. P. 2039 - r. 18 - I suggest to replace "hydrologic management" by "water resources management", or even to delete it. 16. P. 2039 - r. 24 - To move "(Fig. 2)" at the r. 23, after "Bistrita basin". 17. P. 2040 - r. 1 - To reformulate: "The on-

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line Diminish system allows the establishment of a complex database”. Suggestion: “The on-line Diminish system is based on a complex database”. 18. P. 2040 - r. 8-9 - “series of the meteorological and hydrological parameters...” - to replace “parameters” by “data”. The input data (precipitations, discharges) are not parameters. 19. P. 2040 - r. 5 - To reformulate: “GIS database has been planned for the study of the evaluation and”. Suggestion: “GIS database has been planned for the evaluation and..”. 20. P. 2040 - r. 19-25 - The phrase is too long; to split it into 2-3 shorter phrases. 21. P. 2041 - r. 4-9. The phrase is not clear. 22. P. 2041 - r. 18-20 “in addition the information can be updated, data restored, thematic documents elaborated” - phrase not very clear. 23. P. 2042 - r. 5 - “ - to replace “download” by “downloaded”. 24. P. 2043 - r. 20 - To replace: “such as hydro-meteorological and morphological constraints” by: “such as hydro-meteorological inputs and morphological characteristics”. 25. P. 2044 - r. 26 - “The limits of the modelled area are represented by the limits established for the groundwater body GWSI03”, while in the title of the paragraph 4.3 the model Modcou / Newsam was applied “to the groundwater bodies”. To modify the paragraph title accordingly. 26. P. 2044- r. 28 - to introduce “is” after “which” 27. P. 2045 - r. 11 - to use: “potential evapotranspiration” instead of “evapotranspiration potential”. 28. P. 2045 - r. 17-20: It would be useful to stress that the calibration was done in un-steady state (even if it is mentioned that the calibration period is 1994-2003). 29. P. 2045 - r. 11-14 - Suggestion: to move the last two sentences (“Costs related to the improvement is an environmental one) immediately after the first sentence of the paragraph 4.4 (ending with “Wateco, 2002”). 30. P. 2045 - r. 11 - to explain what means “pollution rights”. 31. P. 2047 - r. 16 - “a rapport between cost and efficiency raport is calculated” - to reformulate 32. P. 2047 - r. 20-23 - the first phrase of the paragraph is too long. I suggest to delete “in front of the groundwater body GWSI03”, and to modify the last part as it follows: “situated in the upstream and middle part of the basin, which was divided into ” 33. P. 2053 - r. 3: To replace “geological” by “hydro-geological”, or if “geological” is kept to add also “hydro-geological” in the enumeration.

34. P. 2058 - Table 2 - in all the correlations Investment - Inhabitant equivalent, the left

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term should be written Inv (instead of ).

35. P. 2060- Fig. 2 - To indicate the main cities in the basin: Bacau, Piatra Neamt and Vatra Dornei, or at least Bacau. 36. P. 2061 - Fig. 3 - Instead of “GIS info-layers for the Bistrita Basin” to modify it into: “Bistrita River basin”.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 4, 2035, 2007.

**HESSD**

4, S740–S744, 2007

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