

## ***Interactive comment on “Assessment of open thermodynamic system concepts for fluviokarst temperature calculations – an example, the Cent-Fonts resurgence (Hérault, France)” by P. Machetel and D. A. Yuen***

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Received and published: 28 February 2014

The paper is presented as an application of temperature calculation to the Cent-Fonts karst system. Being not a specialist of thermal modeling, I won't comment the theoretical approach but I will focus on its application as I well know this case study (Maréchal et al. 2008, Reimann et al. 2014). Besides from the fact that there are unrealistic assumptions regarding the application of this model to the Cent-Font karst system as explained by the comment of M. Bakalowicz, it is difficult to apprehend the interest of

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such application to a specific case study. Such a site-specific application would be sound and justified if there was a comparison between model results and field measurements. Here, it is not the case and consequently the application to a case study strongly lack of interest and should not be recommended for publication in its present state. The paper would greatly gain in universal interest for the whole scientific community (and especially for karst hydrogeology community) if the paper had a wider range of application. Therefore, if the theoretical approach is sound and is judged novel (see anonymous reviewer comment), I recommend to the authors to deeply reorganize the paper in order to apply the model to various karst system configurations. It could allow sensitivity analysis to (i) geometrical and hydrogeological characteristics of the Conduit System (CS) (ii) thermal characteristics of Porous Fracture Matrix (PFM) and (iii) temperature boundary conditions. The latest analysis would allow the comparison of winter with summer conditions for example, when the system shifts from a heating to a cooling effect of the PFM. Therefore, the Appendix A (Cent-Fonts description) is not necessary and the reference to Cent-Fonts karst system should be removed from the title and the whole paper. References: Maréchal, J.C., Ladouche, B., Dörfliger, N. Lachassagne, P. (2008) - Interpretation of pumping tests in a mixed flow karst system, *Water Resources Research*, 44, W05401, doi:10.1029/2007WR006288, 2008. Reimann, T., Giese, M., Geyer, T., Liedl, R., Maréchal, J.C., Shoemaker, W.B. (2014) Representation of water abstraction from a karst conduit with numerical discrete-continuum models, *Hydrol. Earth Syst. Sci.*, 18, 227–241, doi:10.5194/hess-18-227-2014

Interactive comment on *Hydrol. Earth Syst. Sci. Discuss.*, 11, 169, 2014.

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