

Interactive comment on “Integrating field and numerical modeling methods for applied urban karst hydrogeology” by J. Epting et al.

Anonymous Referee #2

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The paper demonstrates how hydrogeologic modelling and karst evolution modelling can be favourably combined to investigate groundwater flow, gypsum dissolution, and corresponding feedback mechanisms. This is shown for an urban environment where subsidence is observed near a river dam and a highway. The combined modelling approach is novel to the best of my knowledge and supports the analysis of the actual situation as well as the assessment of potential countermeasures. The topic is relevant, suitable for HESSD and certainly of high interest for the international karst research community. The submitted paper is properly organised and generally well written. All figures and tables are informative and an extensive list of references is provided to cover site-specific features, general karst hydro(geo)logy and methodological aspects of karst modelling. Summing up, I am recommending minor revision of the submitted paper according to the specific suggestions / questions given below.

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1) p. 3580, l. 20: Which appendix is referred? 2) p. 3580, l. 24 ff.: Please check numbering. 3) p. 3581, l. 25: cross-checked 4) Fig. 2: It was rather difficult for me to identify the location of OW3. Furthermore, “Fig. 2” and “Fig. 3” are referenced to indicate the views for the photos but I think this should read “Fig. 3” and “Fig. 4”, resp. 5) p. 3585, l. 5: Average river discharge should be given for comparison. 6) p. 3590, l. 18: How was the flow boundary condition specified in Modflow (recharge, well)? 7) P. 3592, l. 2 ff.: Please indicate more clearly that matrix blocks, which are represented by a continuum approach in the HGM, are represented by a fracture network in the KEM. I feel that this conceptual difference between the two modelling packages needs to be a bit better elucidated. 8) p. 3593, l. 5/6: Terms “uniform” and “non-uniform” appear to be more appropriate here than “homogeneous” and “heterogeneous”, resp. 9) p. 3593, l. 17/18: Please include references for items (2) and (3). 10) Tab. 1: Please correct header of 2nd column. 11) p. 3596, l. 17: simulations 12) Tab. 2: Why are water budgets for zones 1 and 2 not balanced? 13) p. 3600, l. 11: statistically 14) p. 3601, l. 12-14: It is not clear to me what you would like to express by saying that “the amount of gypsum ... can inhibit karstification”. 15) p. 3606, l. 22: “ ... which varied by orders of magnitude.” 16) p. 3608, l. 5: derived 17) p. 3609, l. 9: Skip “an”. 18) p. 3612, l. 1: To my mind, lower Δh should lead to an increase in calculated drain diameters according to eq. (B3) if the same discharge is considered.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 3577, 2009.

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