

HABILITATION THESIS REVIEWER'S REPORT

Masaryk University

Applicant

Mgr. Tomáš Kuchovský, Ph.D.

Habilitation thesis

Anthropogenic impact on the groundwaters between Bohemian Massif and Western Carpathians

Reviewer

doc. Ing. Jan Šembera, Ph.D.

**Reviewer's home unit,
institution**

Technical University of Liberec

Tomáš Kuchovský's habilitation thesis, "Anthropogenic Impact on the Groundwaters between the Bohemian Massif and the Western Carpathians," consists of eight articles published between 2007 and 2025 in high-level journals and proceedings, whose co-author was Tomáš Kuchovský and whose common topic directly corresponds to the thesis's title, supplemented by a 55-page explanatory commentary. The explanatory commentary is divided into three chapters, supplemented by an introduction, conclusion, and bibliography. The individual chapters address specific issues related to anthropogenic impacts on groundwater, specifically the impact of mining, groundwater contamination, and Thermal water extraction. The bibliography includes more than 120 items in addition to the author's eight papers.

The first two articles concerning open-pit mining influence on groundwater balance in Mohelnice and Ceperka sites show the usability of a 3D calibrated model for water balance and water loss evaluation that may differ from general estimations.

Further three articles concern the numerical modelling of groundwater regime around former deep mines, esp. in the Rosice-Oslavany black coal mining district and the Uranium mining district of Rožná. The author shows that numerical modelling can be an integrative tool, and calibrated heterogeneous models can reconcile stream-loss segments, fractured-mass storage, and discharge points during and after dewatering.

The topic of water resource contamination is presented on only the author's paper, dealing with a comparison of natural attenuation on three different sites contaminated by chlorinated solvents, and a literature search concentrated on one specific decontamination method – monitored natural attenuation. Even though the topic is not as general as the chapter heading (Groundwater contamination), the author clearly shows that calibrated models can help in this case with the prediction of the success and, therefore usability of the method in specific sites. The last topic – influence of thermal water extraction on water resources – is being presented on two studies concentrated on the same transboundary aquifer on the Czech-Austrian border. The authors use hydrogeological modelling not only for the description of the site but for the quantification of recoverable heat and water, resolution of deep heat-flux and water flow.

Overall, this habilitation thesis demonstrates the practical utility of understanding groundwater flow and its influence by human activity, as well as the usefulness of 3D hydrogeological modelling for acquiring and refining this understanding. A calibrated model of groundwater flow and the transport of substances in groundwater can significantly simplify the path to understanding the processes occurring in the rock environment. For my part, I would like to note that a key condition for realizing this potential of the models is that they must be calibrated not only using reliable data but also through a reliable procedure based on the author's expertise. In my opinion, the author of the habilitation thesis has confirmed this expertise through the presented results.

The language of the thesis is clear and easy to understand.

Tomáš Kuchovský's habilitation thesis documents the author's long-term, systematic scientific work in the field of 3D hydrogeological modelling for addressing issues related to the impact of human activities on groundwater regimes, as well as on the availability and quality of groundwater. In doing so, the author demonstrates his professional and scientific qualifications in the field of geology, as well as his ability and determination to focus on and develop one aspect of this field over the long term.

I have no additional questions for the habilitation thesis defence.

Conclusion

The habilitation thesis entitled **Anthropogenic impact on the groundwaters between Bohemian Massif and Western Carpathians** by Tomáš Kuchovský **fulfils** requirements expected of a habilitation thesis in the field of geology.

Date: April 14th, 2026

Signature: