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**Evaluation of the US DOE's conceptual model of hydrothermal activity at Yucca Mountain, Nevada**

Y. V. Dublyansky

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Received: 18 September 2012 – Published in Geosci. Model Dev. Discuss.: 23 November 2012

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**Abstract.** A unique conceptual model describing the conductive heating of rocks in the thick unsaturated zone of Yucca Mountain, Nevada by a silicic pluton emplaced several kilometers away is accepted by the US Department of Energy (DOE) as an explanation of the elevated depositional temperatures measured in fluid inclusions in secondary fluorite and calcite. Acceptance of this model allowed the DOE to keep from considering hydrothermal activity in the performance assessment of the proposed high-level nuclear waste disposal facility.

The evaluation presented in this paper shows that no computational modeling results have yet produced a satisfactory match with the empirical benchmark data, specifically with age and fluid inclusion data that indicate high temperatures (up to ca. 80 ° C) in the unsaturated zone of Yucca Mountain. Auxiliary sub-models complementing the DOE model, as well as observations at a natural analog site, have also been evaluated. Summarily, the model cannot be considered as validated. Due to the lack of validation, the reliance on this model must be discontinued and the appropriateness of decisions which rely on this model must be re-evaluated.



Citation: Dublyansky, Y. V.: Evaluation of the US DOE's conceptual model of hydrothermal activity at Yucca Mountain, Nevada, Geosci. Model Dev., 7, 1583-1607, doi:10.5194/gmd-7-1583-2014, 2014.

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