

To
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Date

26.August.2024

Ref: PhD thesis evaluation: Bc. et RNDr. Ondřej Hotový

Dear Dean's office,

I am attaching the thesis evaluation report of Bc. et RNDr. Ondřej Hotový.

With best wishes

Assoc. Prof. Juraj Parajka

Evaluation Report of PhD Thesis: Changes in snowmelt and rain-on-snow runoff in mountainous catchments (Bc. et RNDr. Ondřej Hotový)

General comments

Rain-on-snow (RoS) and associated snowmelt is a runoff generation mechanism, that can produce extreme flooding, especially in the mountain areas. Recent and expected changes in precipitation regime and air temperature warming pose a question, of whether this runoff generation process will change (and how) in the near future. It is still not well understood whether and where we can expect changes in the snowmelt and rain-on-snow runoff and whether the frequency and magnitude of such events will change in the mountains.

This thesis investigates different aspects and scales of snowmelt runoff generation processes in the mountains. It consists of four papers, which propose and evaluate new and original methods for analyzing snowmelt and RoS processes across different scales. The specific research questions address:

- 1) Analysis of the main snowmelt drivers and their contribution to runoff,
- 2) Evaluation of the frequency and extremity of RoS events, their spatial and temporal changes and hydrological implications,
- 3) Assessment of the role of warming climate and landscape changes on snowmelt processes, runoff, and RoS events.

Final evaluation

The PhD thesis presents a very interesting hydrological topic, which is very timely and presents original solutions. It consists of four scientific papers published (3) or submitted (1) to high-ranked hydrological journals. The PhD candidate is the first author (main contributor) in three papers, in one paper he has an important contribution related to snowmelt modeling. The thesis has a clear structure and the parts presenting the scope and context of the research papers are precisely written. The configuration of the thesis is easy to follow and logically presented. I like a very comprehensive synthesis of existing literature (including many national studies), a summary of available approaches, and an

evaluation of RoS principles and expected changes due to climate change. The synthesis of the main results is linked and discussed with previous research, including a discussion of the result's implications, associated uncertainties, challenges and limitations. The presentation, interpretation and synthesis of results clearly demonstrate that the candidate fully masters the subject matter. The research objectives and findings of the thesis provide an important contribution to the existing literature and the results have a very strong scientific and societal relevance at the national and international levels.

Overall the thesis has a very good quality and a high content of innovative and original work. I have no hesitation in recommending the thesis for the defense.

Yours sincerely

Assoc. Prof. Juraj Parajka

