

## ***Interactive comment on “A modified tank model including snowmelt and infiltration time lags for deep-seated landslides in Alpine Environments (Aggenalm, Germany)” by W. Nie et al.***

**Anonymous Referee #1**

Received and published: 27 February 2016

Dear Editor,

Thank you for the opportunity to peer review the paper with title “A modified tank model including snowmelt and infiltration time lags for deep-seated landslides in Alpine Environments (Aggenalm, Germany)”.

In this paper the authors have demonstrated using a simplistic modified tank model to calculate groundwater levels for the deep seated landslide in Bavaria. The modified tank model has been applied to measure change in groundwater level where snowmelt and infiltration play an important role. On the basis on equations they illustrated differences between original tank model and modified tank model. To define water pore pressure a temperature index for snow melting has been adopted and estimation of

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change of PWP with different time lags and monitored data was depicted by graphs. Authors have attempted to reduce the time lag effects an important parameter for the groundwater level. From the content as a whole it can be seen that described method and procedure can have completely practical effect and bring benefits to wider society, especially to civil protection.

General referee comment The objectives defined by the authors are quite clear and paper is good structured and the reader can distinguish between material and methods, results and discussion. The main drawback in this manuscript is lack of information about frozen soils and reasons why authors not include it to the research, as well critical evaluation of using methods in the paragraph of discussion. According to the above mentioned facts the present paper will be ready for publication after minor revisions.

Here are listed specific comments that I would recommend the authors makes. Paragraph 2 (Site description) - I would advise the authors of this paper to describe climate condition in the region of investigation and rainfall patterns for the observed period that influence on the landslide initiation. Data of climate and rainfall are important for understanding results of tank model.

- In the Figure 1b the font of text is not clear enough. I suggest using different font.

Paragraph 3 (Data and methods) - According to the monitored data from winter season the presence of frozen soil greatly affects the amount of runoff produced from snowmelt. From the site description one is unable to find information about frozen soils. If there is significant relationship between frozen soils, infiltration and PWP then you include effect of frozen soils to the tank models. Frozen soils have impact also on snow melting. Note this fact at the equation for snow melting or alternatively introduce new formula.

Paragraph 3.1 (Monitoring data) - Line 9: you did not explain why your data of PWP, temperature and humidity averaged over a 24-hour period, why you use this time frame? - Line 15: how you performed validation of tank model?

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Paragraph 5 (Discussion) - Authors have produced an interesting dataset but more needs to be done in the “Highlights of the modified model” before publication where major drawbacks and critical overview of the using methods must be included.

Linguistic alterations In general the manuscript is written in acceptable English, but some paragraphs have to be rewritten (Discussions and Conclusions). Many sentences in these paragraphs are somehow "clumsy" but not completely incorrect. Some sentences are written in the first person, please avoid the first person pronouns and explain results more formal and impersonal. Nonetheless, the entire document should be revised by a native speaker.

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., doi:10.5194/nhess-2015-341, 2016.

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