

## Review of paper

### 'A review of the (Revised) Universal Soil Loss Equation (R/USLE): with a view to increasing its global applicability and improving soil loss estimates'

By R. Benavidez et. al.

#### 1. Scope

The paper provides a thorough introduction into the USLE model family, a group of empirical long term soil erosion models. This paper is of interest to the HESSD community, as the various USLE variants described in this paper are among the most used erosion models overall.

#### 2. Summary

The paper gives an introduction into the motivation and method of using USLE models and describes the conceptual background for all individual factors needed to calculate the annual soil loss amounts with USLE models. This is being done by referring to different case studies as well as widely cited papers of variations of USLE models developed to adapt the model to other regions of the world and improve the model family. The calculation formulas of the USLE factors from those papers are provided in tabular form as well, giving a quick overview of these different approaches. The paper also discusses the limitations of USLE models and points at needed future improvements.

#### 3. General evaluation

##### Scientific significance

The paper provides a good overview of the topic and goes in depth into the history and motivation of the various USLE models and the possible application use cases of them. This is especially helpful for someone just starting with soil erosion modelling.

##### Scientific quality

The paper is providing a useful overview over the widely used USLE models and their respective equations as well as discussing the limitations of the application of those models. It goes in depth on the problem of validation of modelled results while providing an explicit range of reported under- and over-prediction by the various studies. It mentions the connection of erosion to surface runoff and sediment transport into the rivers and lakes, and the point that this is where the USLE models are lacking and could be improved on.

##### Presentation quality

The paper is structured well, but is lacking in visual descriptions of concepts and equations. Especially a visualization of the equations could make the mathematical concepts behind them more understandable.

#### 4. Specific comments

p. 2, l. 5-6: "Understanding and mitigating erosion and associated ..." instead of "Managing erosion"

p. 2, l. 28-30: I think this would be a good place to add a mention to the timescale, too, even though it is mentioned a few lines later.

p. 4, l. 25: Sentence seems a bit out of place in this chapter, rather as part of chapter 1?

p.15, l.31: "stream delivery ratio", should be "sediment delivery ratio".

p. 18, l. 12-22: this whole paragraph seems a bit too general for this seasonality section (and a bit redundant). It would be better to move it to the summary and conclusion chapter.

p. 18, l. 23-24: This sentence needs rephrasing in my opinion. Modelling at sub-annual time scale is important **because** of the temporal and spatial variations that are there and if we don't account for them somehow, the model results will be wrong or at least very bad. The understanding of those temporal variations is a prerequisite and not knowledge derived from the application of the USLE model.

p. 19, l. 28: typo: some key ~~few~~ future ...

p. 19, summary chapter: Missing a few points that get mentioned during the paper (see remark for p.18, l.12-22).

## **5. Additional comments**

I personally think the SDR part is still a little too short, but it would probably be out of scope of the paper to go into more detail.