

**COST Action TU1202****Impact of climate change on engineered slopes for infrastructure****WG3 Meeting – Advances on SOTA papers and plans for final dissemination event in 2016.**

Venue: ETH Zurich, HG Building, Room E 42

24th April 2015, 11h10 to 13h00



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**Attending:** Anh Minh Tang (AMT), Manuel Oliveira (MO), Daisy Lucas (DL), Stanislav Lenart (SL), Eugeniusz Koda (EK), Piotr Osinski (PO), Mihael Brencic (MB), Giovana Grossi (GG), Beata Gajewska (BG), Emma Keszeyné Say (EKS), Fotini Kehagia (FK), J. Javier Diez (JJD) - 12 persons

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**Meeting notes/minutes**

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**Agenda**

1. SOTA paper (Advance from the last WG workshop in Lisbon, Comments from the Editorial Board)
2. Final dissemination event in 2016
3. Future activities

**1. SOTA paper*****Advances from the last WG workshop in Lisbon***

AMT presented the general structure of the SOTA paper. Four points remain to be clarified (signalized in bold, italics and underlined in the following index) and these were presented and discussed:

1. Introduction
2. Soil/atmosphere interactions: ***Infiltration***, Evaporation, Transpiration, Freeze/thaw cycles
3. Impact of soil water pressure: small-scale aspect, ***Retention and transport properties of soil water***, shear strength, rainfall-induced slope instability
4. Mechanical impact of vegetation: Effect of roots on soil mechanical properties, role of vegetation on slope stability
5. Surface and internal erosion: Mechanisms, ***Slope instability***, Effects of internal erosion on slopes
6. Desiccation cracks: Development of cracks, Effect of soil tensile strength on cracks, Modelling desiccation cracking
7. ***Climate change***
8. Conclusion

**Infiltration:** MB explained that the paper would be more consistent with experimental results for infiltration. It was decided to split the actual infiltration section into two parts in order to give relevance to infiltration process and show experimental results. The two

parts are **Infiltration** and **Soil water movement and deep infiltration**. MB to add a secondary axis in the figure with rate of infiltration (vs time).

**Retention and transport properties of soil water:** EKS presented the text and figures of this section (prepared also by Tibor Firgi), stressing the difficulty of measuring water retention curve. AMT expected also to have results of the effect of suction on permeability in an unsaturated soil. PO suggested that Amin Askarinejad (former researcher at ETH Zurich) or Sarah Springman (ETH Zurich) could be contacted to provide this information. Minh suggested to keep the figures of the soil water retention curve but to drop the model results part from the actual text EKS has provided. There was also some discussion about the title that could be changed to “Water retention and transport properties”.

Concerning chapter 3, section **rainfall-induced slope instability**, JJD will discuss with Sarah Springman about weathering processes and provide feedback later.

**Slope instability:** BG explained the new text and figure, stressing that intensity of precipitation is more important than quantity, and the protection provided by different covers. BG to update the graph with the period of analysis and with the characteristics of the geotextiles. JJD commented that erosion increases dramatically with weathering.

**Climate change:** GG presented the text, referring that one-two paragraphs could be moved to the Introduction chapter. It was discussed if the figures could be transformed into a table considering different “homogeneous” regions of Europe and showing the impacts of the various emission scenarios of the 5<sup>th</sup> assessment report of the IPCC. Mention other parameters besides Temperature and Precipitation. Mention the relation between the change in parameters and the impact on the slope stability.

### ***Comments from the Editorial Board***

The editorial board presented general and specific comments. Concerning general comments, it was concluded that during the revision of the paper a better structure/narration will be achieved. Concerning specific comments:

**Comment 1:** A first version prepared by Ross Stirling of a diagram for the Introduction chapter to highlight the components that are going to be described afterwards in the paper was shown. It should also be represented in the diagram a layer to mention the freeze/thaw process, and an arrow to represent deep infiltration (just across the root maximum depth but above the groundwater level line). The “Macro-bioturbation” process, that is not considered should be removed [despite after the meeting a talk in the corridor with Sarah Springman has led to the possibility of leaving this process, just mentioning it in the introduction]. Due to the similarities it was decided to make a reference like “After Vardon (2014)”.

**Comment 2:** Whenever possible, each section in the text will be reviewed/rewritten to consider two perspectives: the asset manager’s/stakeholder’s needs/sensitivities and the climate change possible impact.

**Comment 3:** Characterisation of the parameters is the main output of WG3 to WG1 (Modelling). The parameters needed for modelling will be referred and their importance emphasised. In the end (Conclusions?) a table with the relevant parameters and

referring the corresponding sections in the paper will be attempted. This would allow the Modelling paper to cross-reference this paper.

**Comment 4:** In the sequence of the previous meetings, the paper is expected to focus on atmosphere-vegetation-soil interactions. This will have the necessary relations to climate, but not to climate change, and may underline differences in climate observed in different parts of Europe (rainfall volume and intensity, air temperature, soil temperature, permafrost...). The climate change section before the conclusions, will discuss potential effects on geotechnical infrastructures. Concerning the suggested discussion from the Editorial Board “on management options – perhaps a table of approaches in different countries?” despite its relevance, seems to be already beyond the scope of this state of the art paper. However some works can be done by considering the same different “homogeneous” regions of Europe.

**Comment 5:** Thanks to Tom Dijkstra and Paul Hughes!

## 2. Final dissemination event in 2016

The final dissemination meeting will be immediately before or after the 3<sup>rd</sup> European Conference on Unsaturated Soils that will take place in Paris, 12-14 September 2016 (<http://eunsat2016.sciencesconf.org>).

The possibility of postponing some submission deadlines of this Conference was raised so that people of the Action that has STSM close to the deadlines could still present their result in this Conference. This is something that the organisers of the Conference should decide.

## 3. Future Activities

What to do in next workshop in Ljubljana?

Separate in different groups to discuss different things.

Prepare final output of the WG3.