

SMuCPhy

Slope Mass-wasting under Climate change. Physical mechanisms, predictive modelling and possible mitigation strategies.

Kick-off meeting

11 April 2016

Room 212, D2 building, Campus Nord UPC

Participants:

Clàudia Abàncó (Worldsensing)

José Anibal Baéz (UPC)

Felipe Buill (UPC)

Marta Gonzalez (ICGC)

Marcel Hürlimann (UPC)

Antoni Lloret (UPC)

Joan Martínez (Geomar)

Jordi Marturià (ICGC)

José Moya (UPC)

Maria Amparo Nuñez (UPC)

Pere Oller (GeoNeuRisk)

Raül Oorthis (UPC)

Jordi Pinyol (ICGC)

Carol Puig (UPC)

Jatnna Sánchez (UPC)

Jean Vaunat (UPC)

10h00-10h10: Welcome address.

10h10-10h30: Introduction to SMucPhy project. *Marcel Hürlimann & Jean Vaunat*

General presentation of the project by M. Hürlimann:

18 participants and 6 agencies/companies. 6 workpackages. Initial budget cut by 33%.

Communication tools include:

Web site: <http://smucphy.upc.edu>

Cloud for external data exchange: <https://drive.caminstech.upc.edu/>

Protected area on the server of the division of Geotechnical Engineering and Geosciences:

T:\Project SMuCPhy

Email distribution list: smucphy@mylist.upc.edu

10h30-11h00: Presentation of Workpackage 1 - Analysis of historic events (*WP leaders Marta Gonzalez & Jordi Pinyol*)

Presentations by M. González & J. Pinyol:

Description of the SIRG (Geological Risk Information system), which integrates the previous LLISCAT database and allows for detailed mapping information of landslides. Public database in update (published but not in “visor”). Recent update of susceptibility map with about 50 shallow landslides in Vall d’Aran.

Results of discussion:

- Number of shallow landslides not accessible for the moment but will be once done, when the full integration of all the data is performed (J. Pinyol)
- Geotechnical information exists in cities at scale 1/5000 with access to pdf files of soil column. Numerical data should be requested to ICGC (M. Sánchez & J. Marturià).
- SIRG will be the tool used to define the typical slope cases of Workpackage 5 (M. Hürlimann)

11h00-11h30: Presentation of Workpackage 2 - Monitoring of slope mass-wasting at catchment scale (*WP leaders Jose Moya & Marcel Hürlimann*).

Presentation by J. Moya and A. Nuñez:

Current data recording in instrumented cases: Rebaixader (monitoring since 2009), Erill (event in 2010), Cercs (since 2012), possibility to include Barranco de Portainé (monitoring since 2015).

Available information about mass wasting, cumulative frequency, relationship between rain and change in hydraulic conditions.

Results of discussion:

- Study the possibility to build a 3D model for Rebaixader (UPC) and to apply it for the 70 last years (J. Vaunat)
- Contemplate possibility of a drone flight at the beginning and the end of the project (F. Buill)

11h30-12h00: Presentation of Workpackage 3 - Full-scale experiment soil/plant/atmosphere interactions (*WP leaders Antonio Lloret & Enrique Romero*).

Presentation by A. Lloret:

Large scale in situ experiment uses surrounding material at conditions close to that of mountain slope and autochthonous vegetation. Size is 3 m height, 12 m large (bottom), 2 m large (top). Instrumentation: meteorological station, photographic cameras for displacements, collection of water run-off at the bottom of the slope, TDRs for water content, temperature and electric conductivity (3), WP6a and tensiometers for suction (2), soil temperature in the 10 first cms.

Results of discussion:

- Study the possibility to include more granular material in one part of the embankment (J. Moya)
- For vegetation, contemplate camera with a range between infrared and red (C. Puig)
- For vegetation selection, contact company specialized in slope artificial vegetation (J. Martínez)

12h00-12h30: Presentation of Workpackage 4 & 5 - Development of advanced numerical model (*WP leader Jean Vaunat*). Numerical analysis of slope response (*WP leaders Jean Vaunat & Marcel Hürlimann*).

Presentation by J. Vaunat

Use existing THM model with climatic boundary in a first step of the project. Develop new model for vegetation with biomass evolution in a second step. Model will be validated and then exploited to interpret and predict slope response of the full-scale experiment, site, basin and regional through the definition of typical slope cases.

Results of discussion:

- Workpackage 5 includes validation, interpretation and prediction for periods between 1970 and the end of the project (2019). Workpackage 6 includes predictions under climate change (J. Vaunat).

12h30-13h00: Presentation of Workpackage 6 - Scenarios analysis (*WP leaders Marcel Hürlimann & Carol Puig*).

Presentation by C. Puig:

WP6 is a multi-disciplinary synthesis workpackage. Scenarios are for the moment investigated by use of satellite images for rain, vegetation and soil humidity. Control period is from 1970 to 2020. Projection period is from 2021 to 2050. Current data indicate an increase of vegetation, increase of days with extreme temperature and extreme rain event, increase of snow cover for the area studied in the project.

Results of discussion:

- Look at regional models defined by Catalonia Meteorological Survey. Reference person Carme Llasat (UB).

13h00-14h00: General discussion on project objectives and development including issues related to workpackage 7 (Proposal of some specific mitigation strategies). *All participants*

Results of discussion:

- Importance to delimit the term “mass wasting” to facilitate request to regional database (M. Gonzalez)
- Acknowledgment of the multi-disciplinary and challenging character of the project. Traditional research lines in engineering geology and géotechnique are now crossed with new geomatics, bioengineering and climatic issues (M. Hurlimann)
- Importance of publishing the results obtained (M. Hürlimann)

14h00: Lunch. *All participants*

15h00-17h00: specific splitter meetings

- WP2: Monitoring of slope mass-wasting at catchment scale
- WP3: Full-scale experiment
- WP6: Scenario analysis

Barcelona, 18/4/2016

SMuCPhy – IPs:

M. Hürlimann

J. Vaunat