Landslide triggering-thickness susceptibility, a simple proxy for landslide hazard? A test in the Mili catchment (North-Eastern Sicily, Italy).

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UNIVERSITÀ DEGLI STUDI DI TORINO

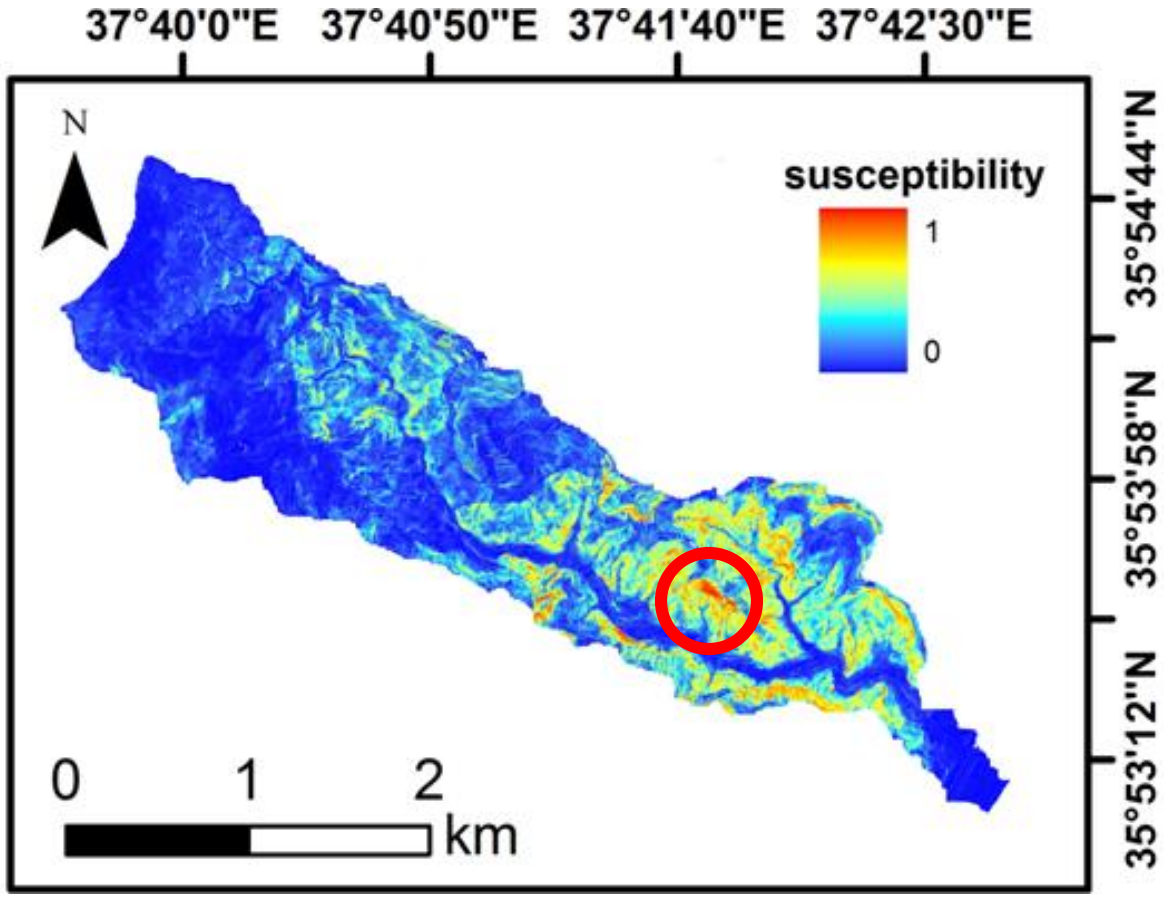
جامعة الملك عبدالله للعلوم والتقنية
King Abdullah University of Science and Technology

COMPUTATIONAL EARTHQUAKE SEISMOLOGY

ROMA TRE UNIVERSITÀ DEGLI STUDI

Motivation

Combining traditional susceptibility approaches to simulations of landslide propagation.



Motivation

Combining traditional susceptibility approaches to simulations of landslide propagation.

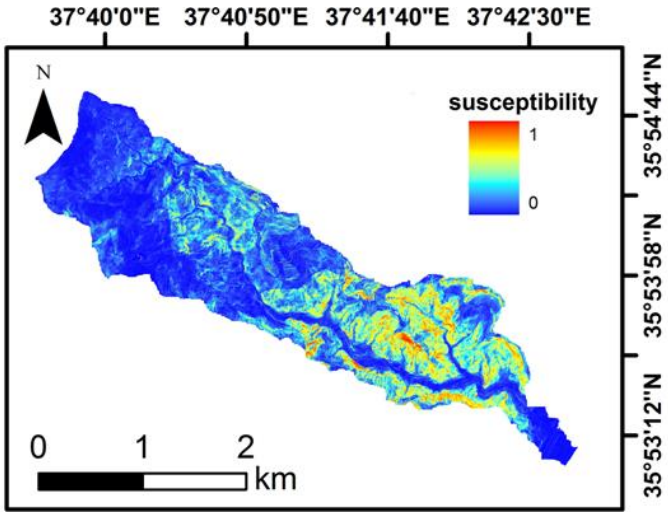
Mobilised Thickness (m)

0

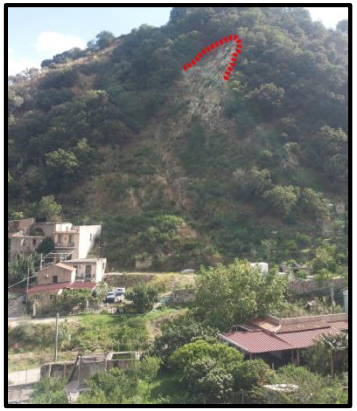
2

Motivations

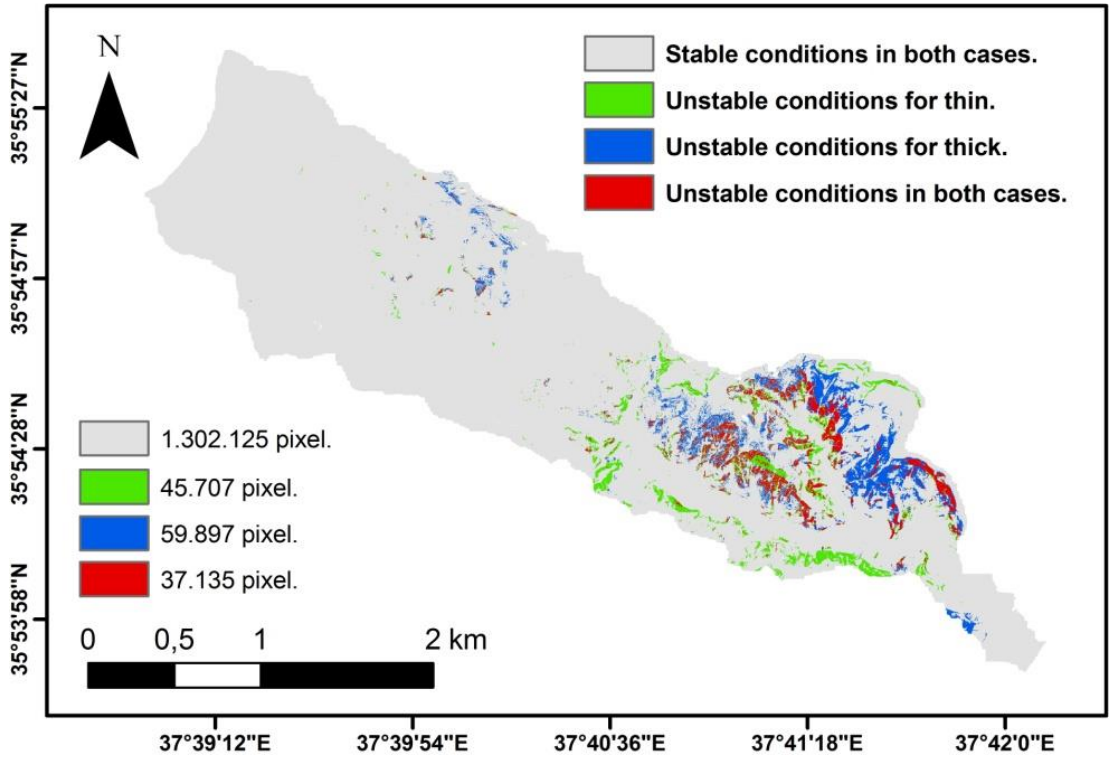
Requirements for propagation simulations



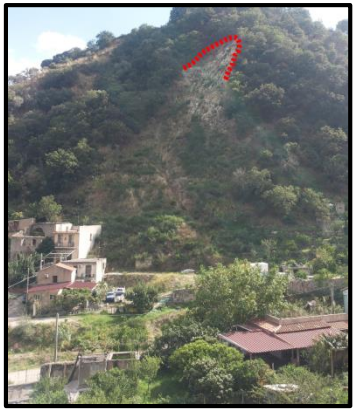
Solution



Measuring crown thickness onsite and use it as dependent variable to be predicted

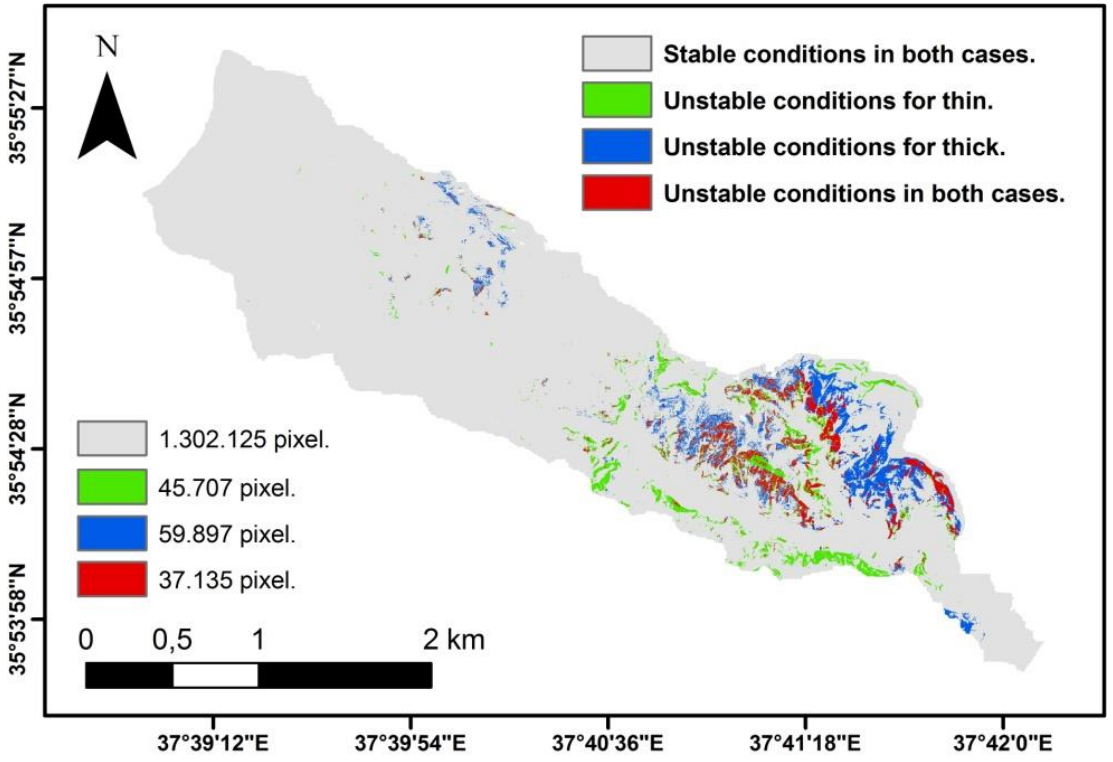


Solution



HOW?

Come to the next PICO



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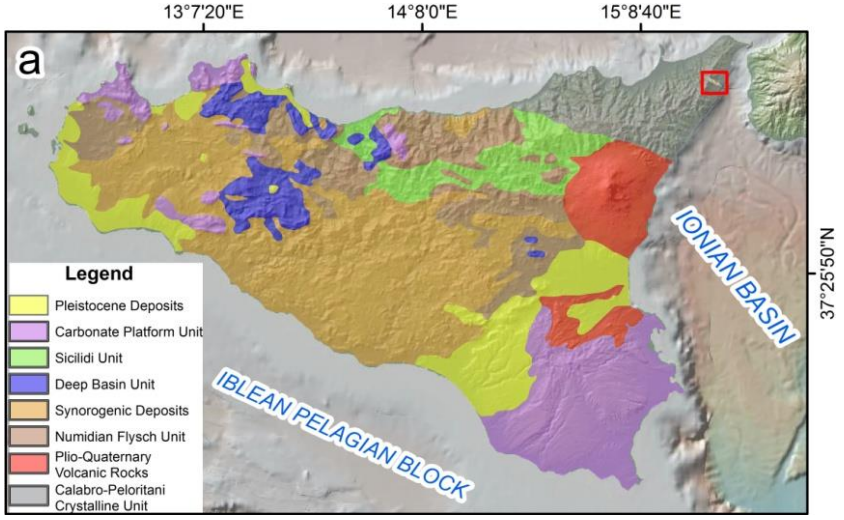
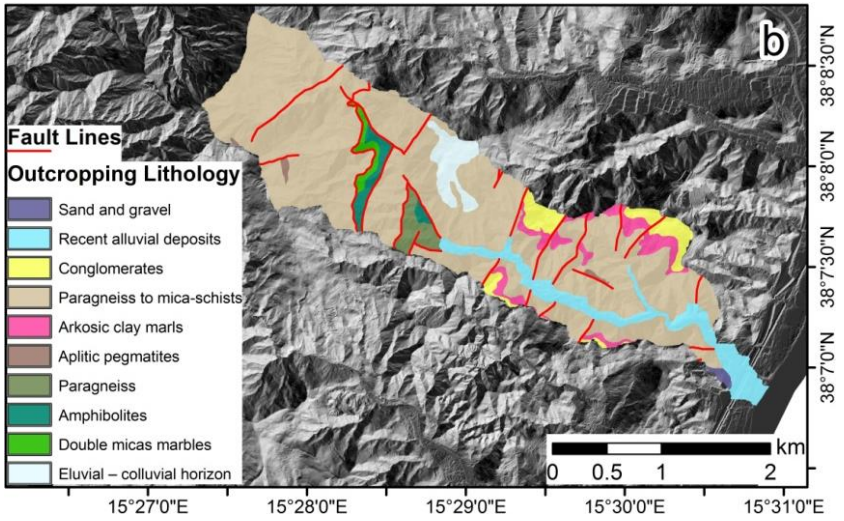
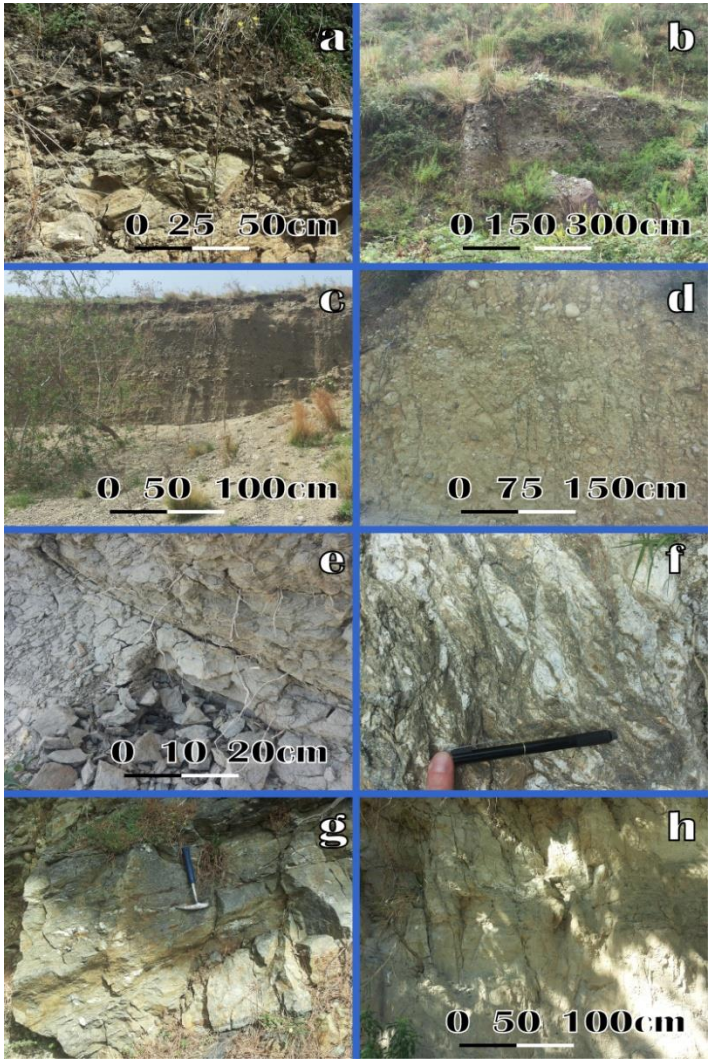
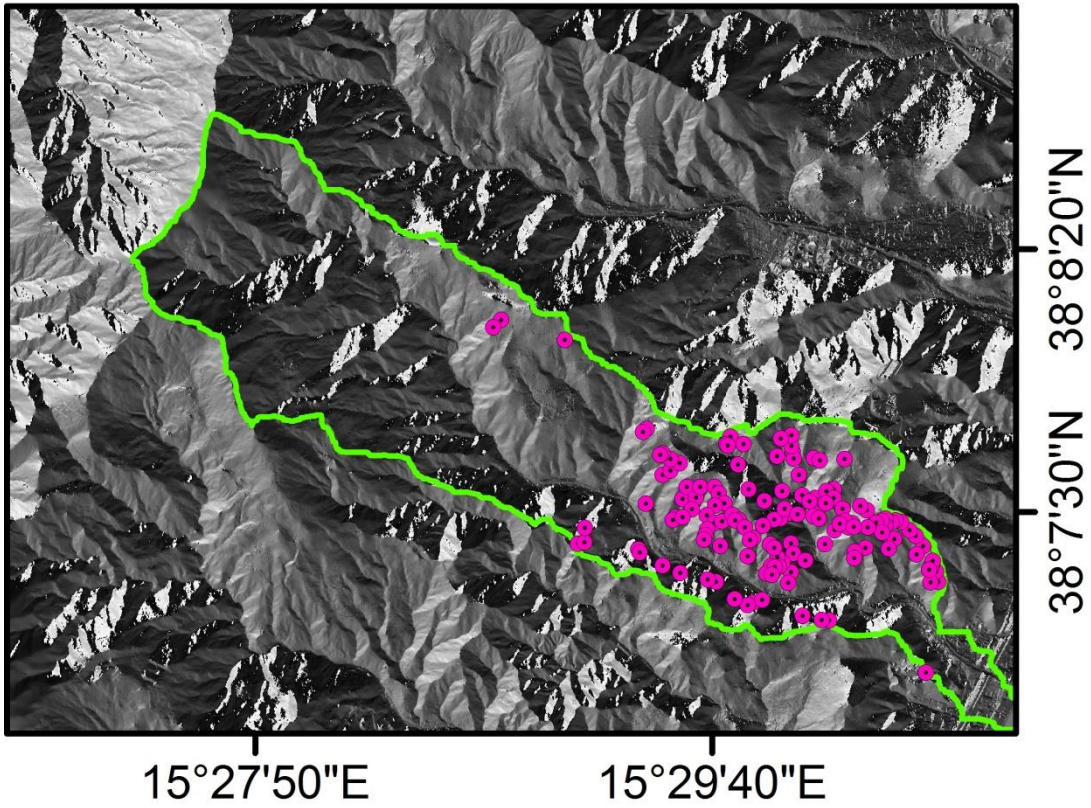
Settings

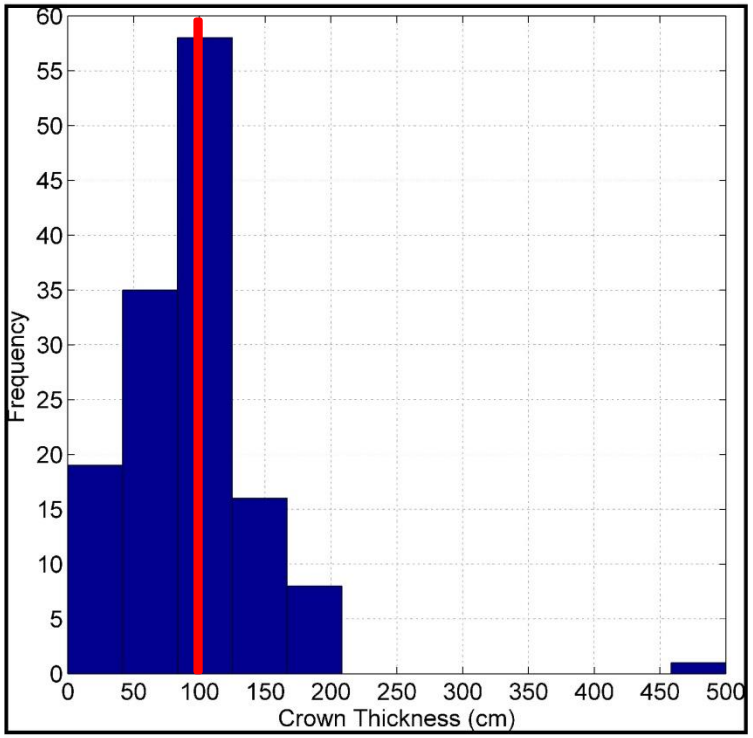




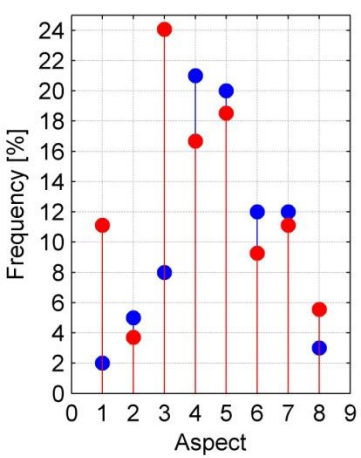


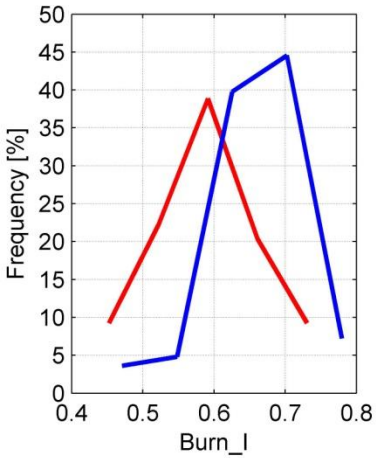
Landslide inventory

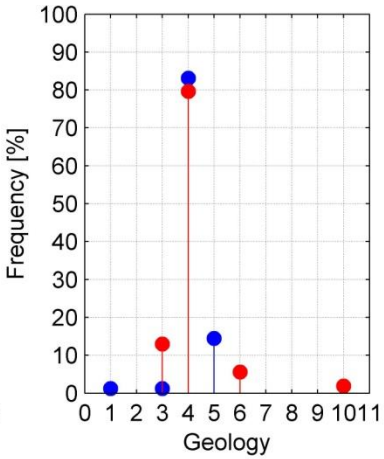


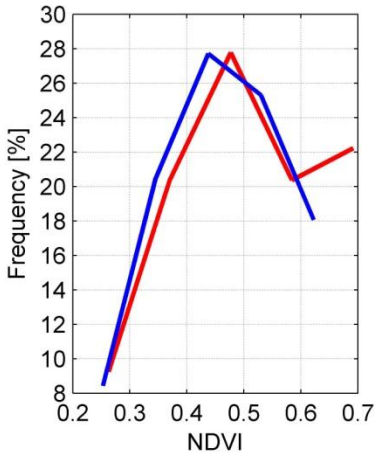


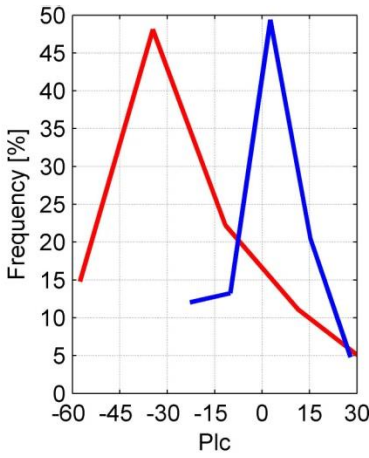
Distributions

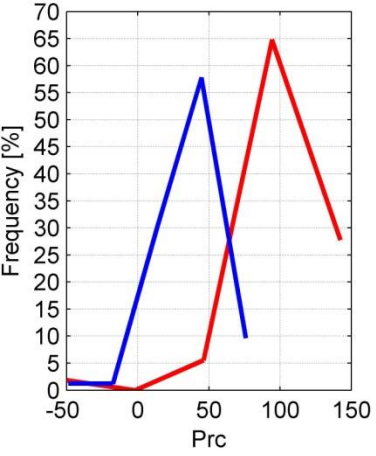


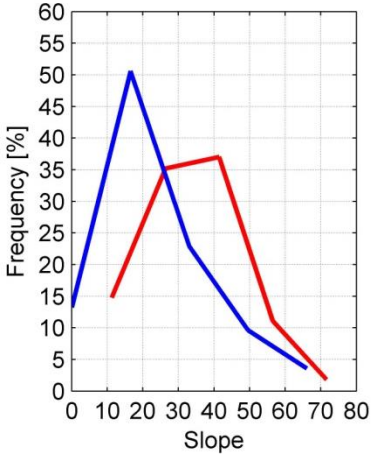


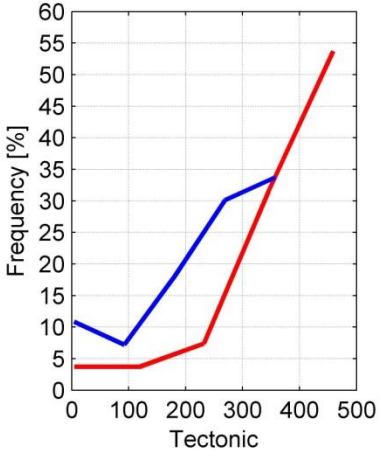


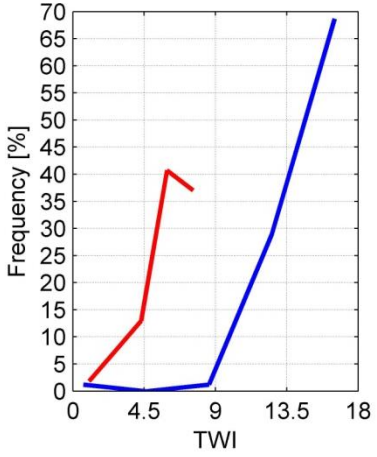


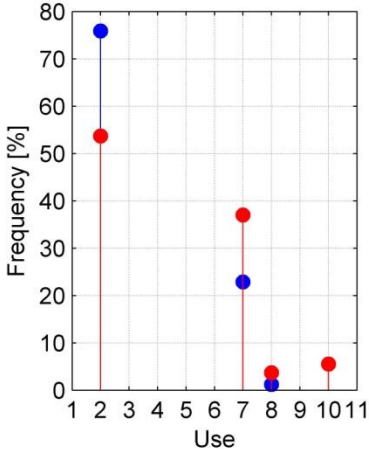












Thick & **Thin**

Susceptibility Modeling

375 Thin
537 Thick

} Landslide Identification Points (LIP)
Lombardo et al., 2014

+

5 Morphometric
2 Remotely-sensed
3 Thematic

} 10 predictors

+

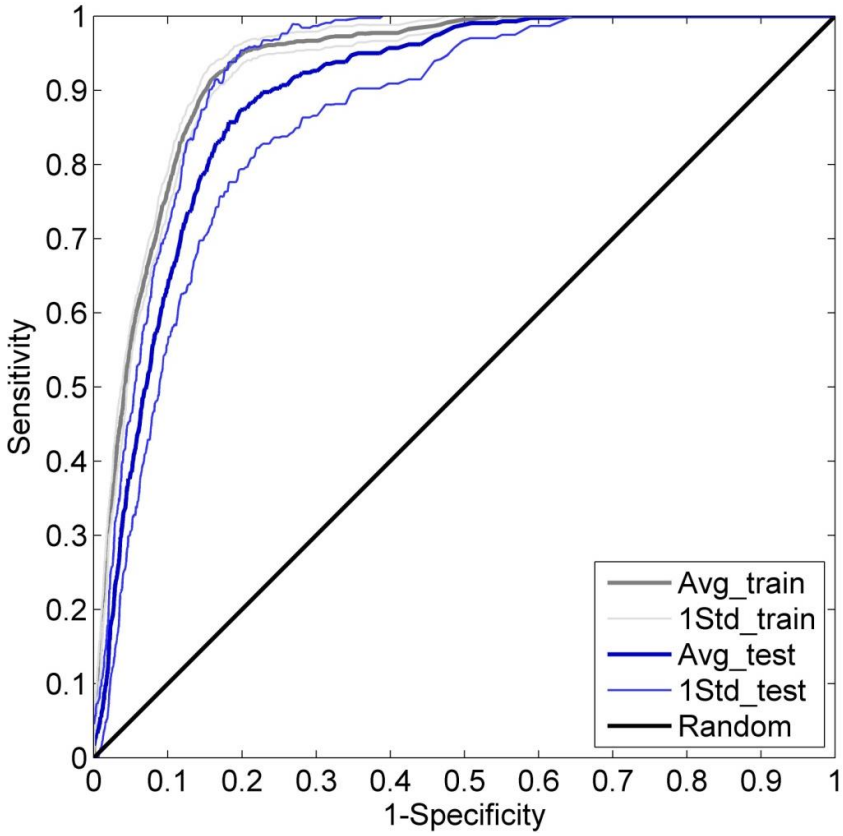
Maximum Entropy
Phillips et al., 2006

+ 50 randomly extracted replicates +

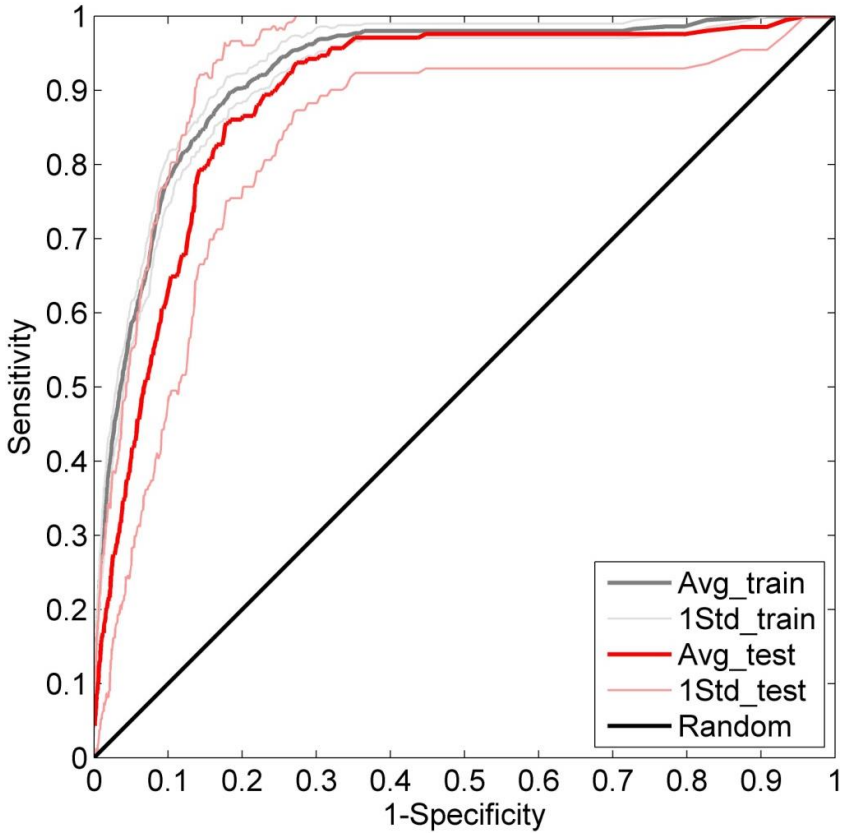
Model reliability assessment

Predictive performances

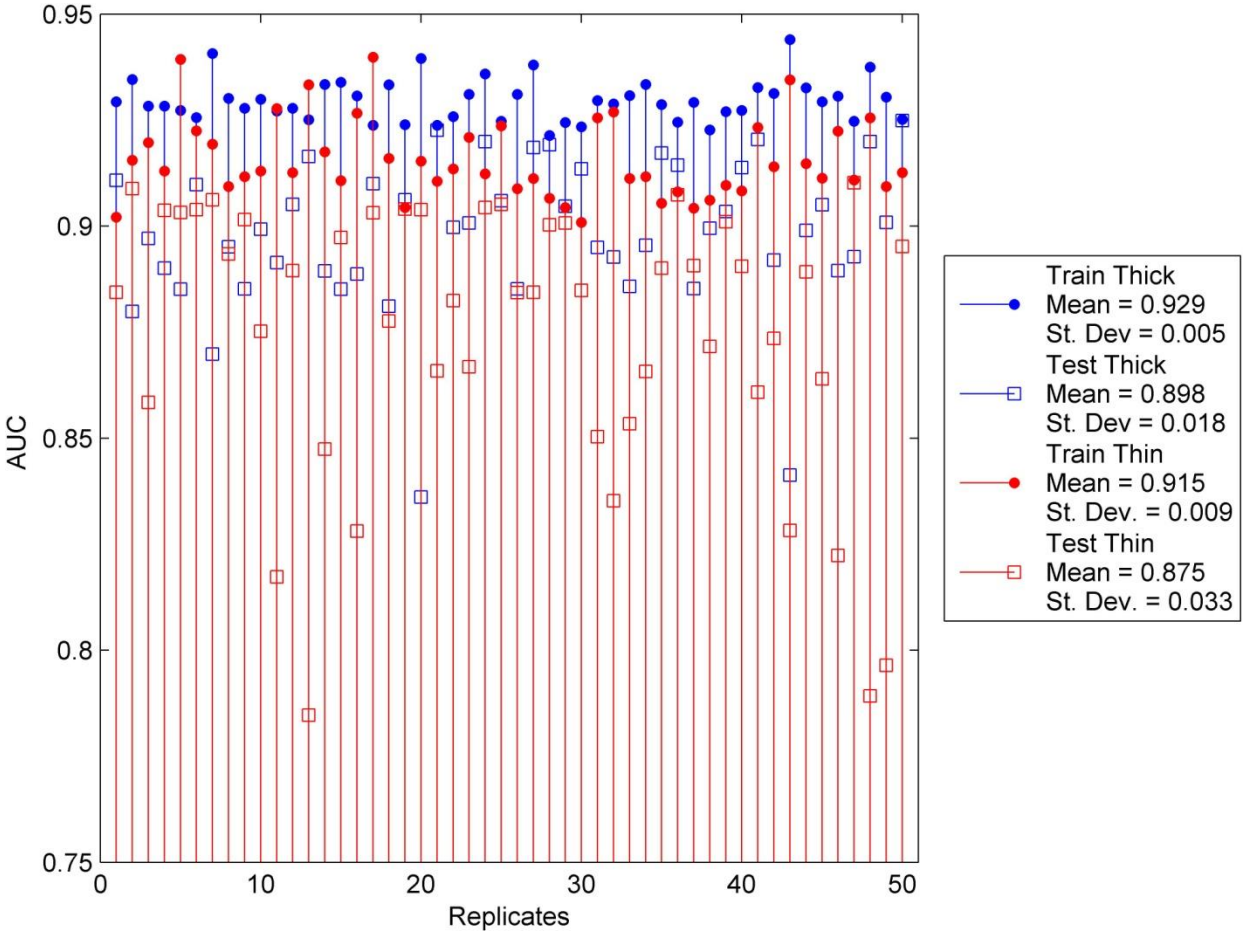
Thick



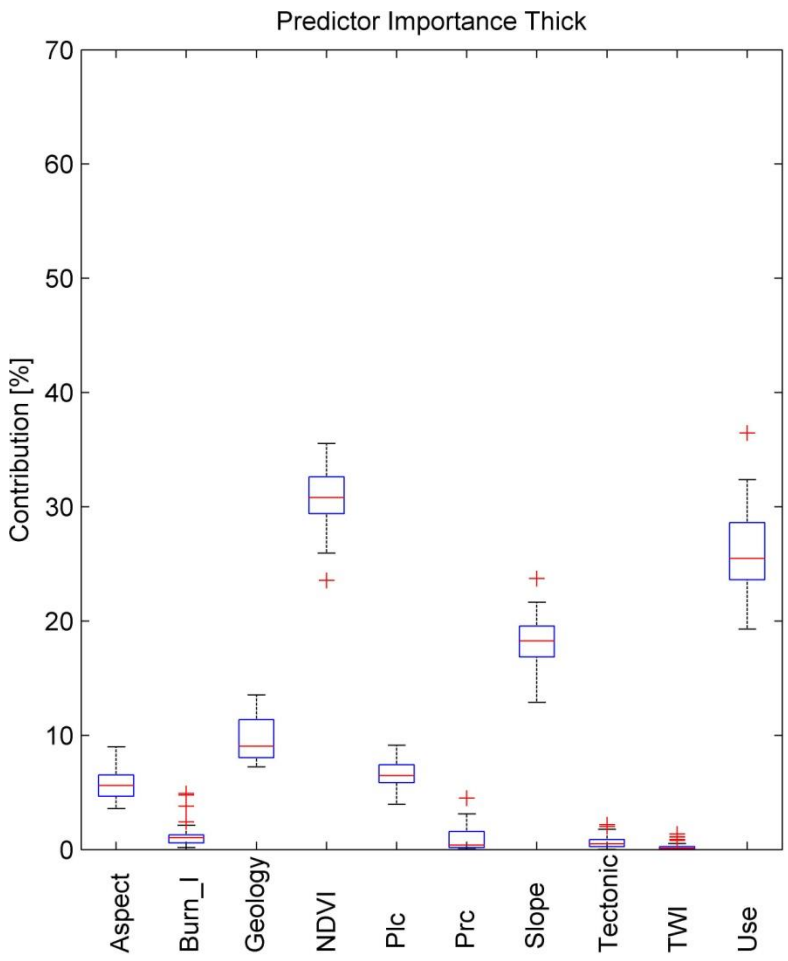
Thin

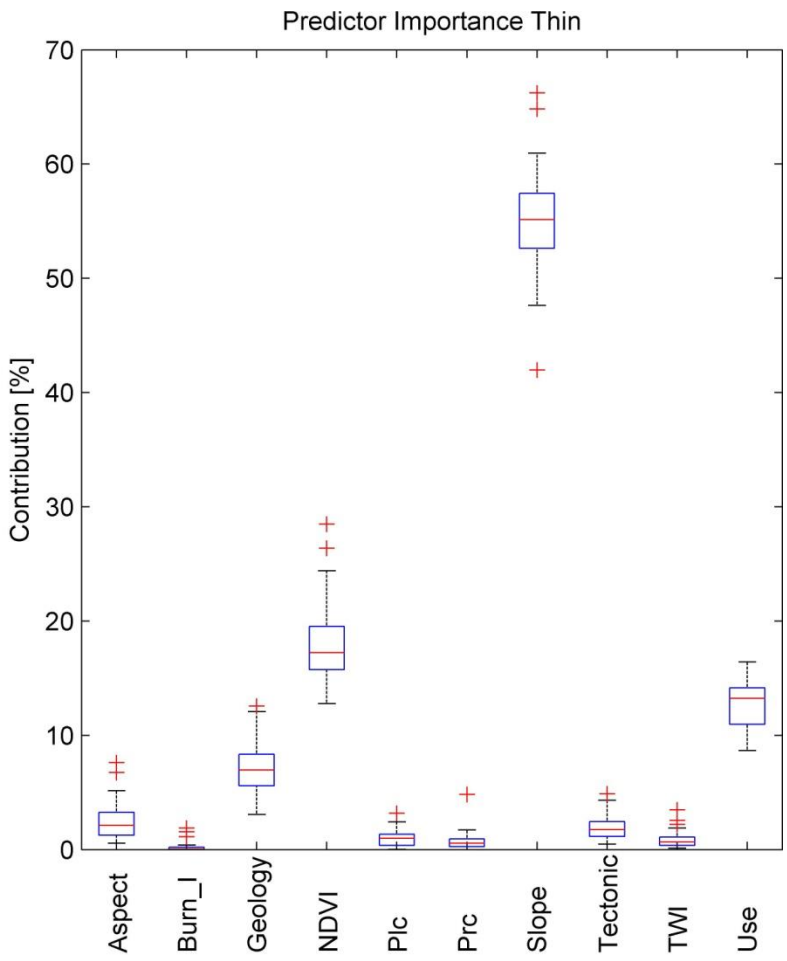


Predictive performances

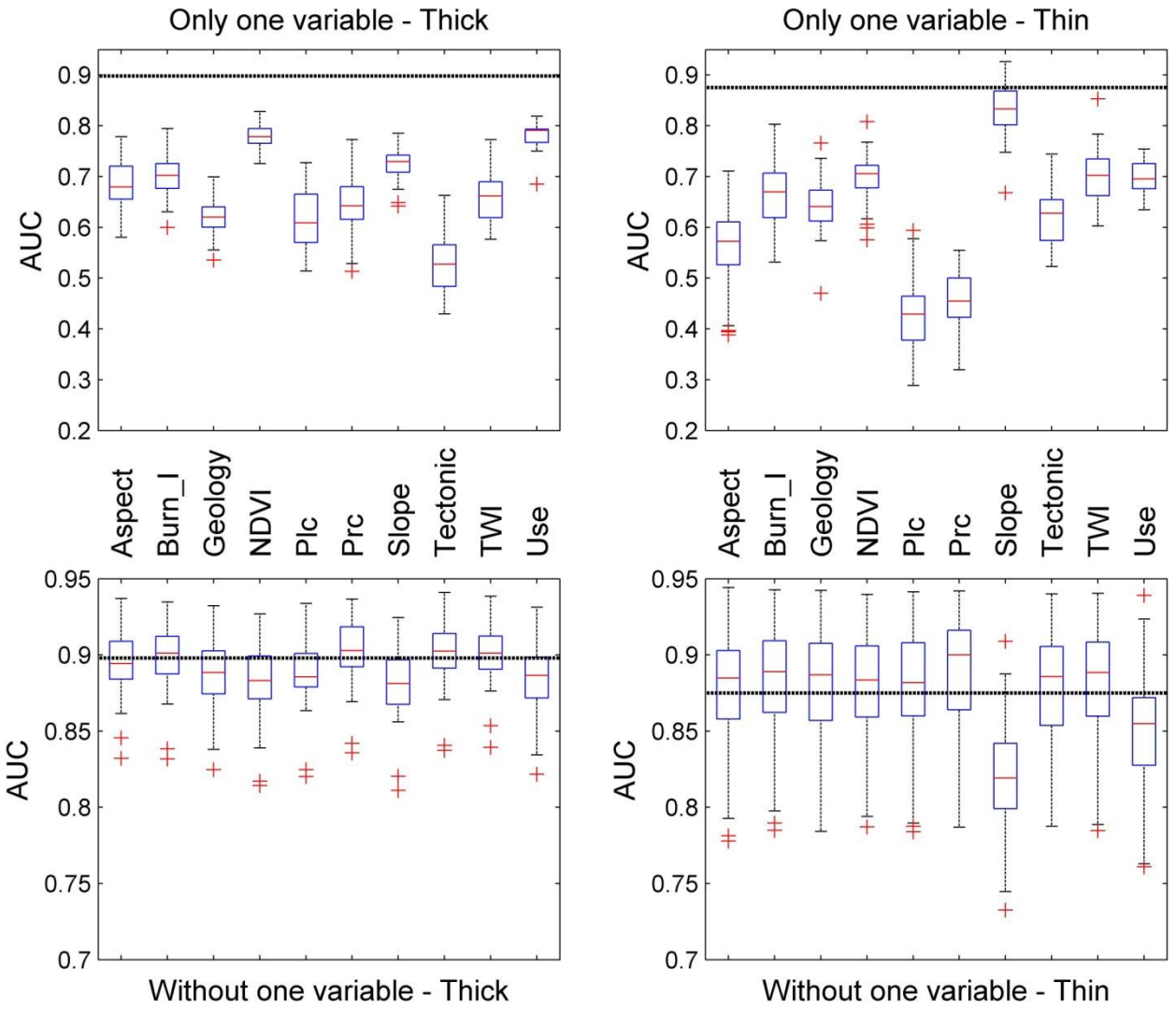


Predictor Importance

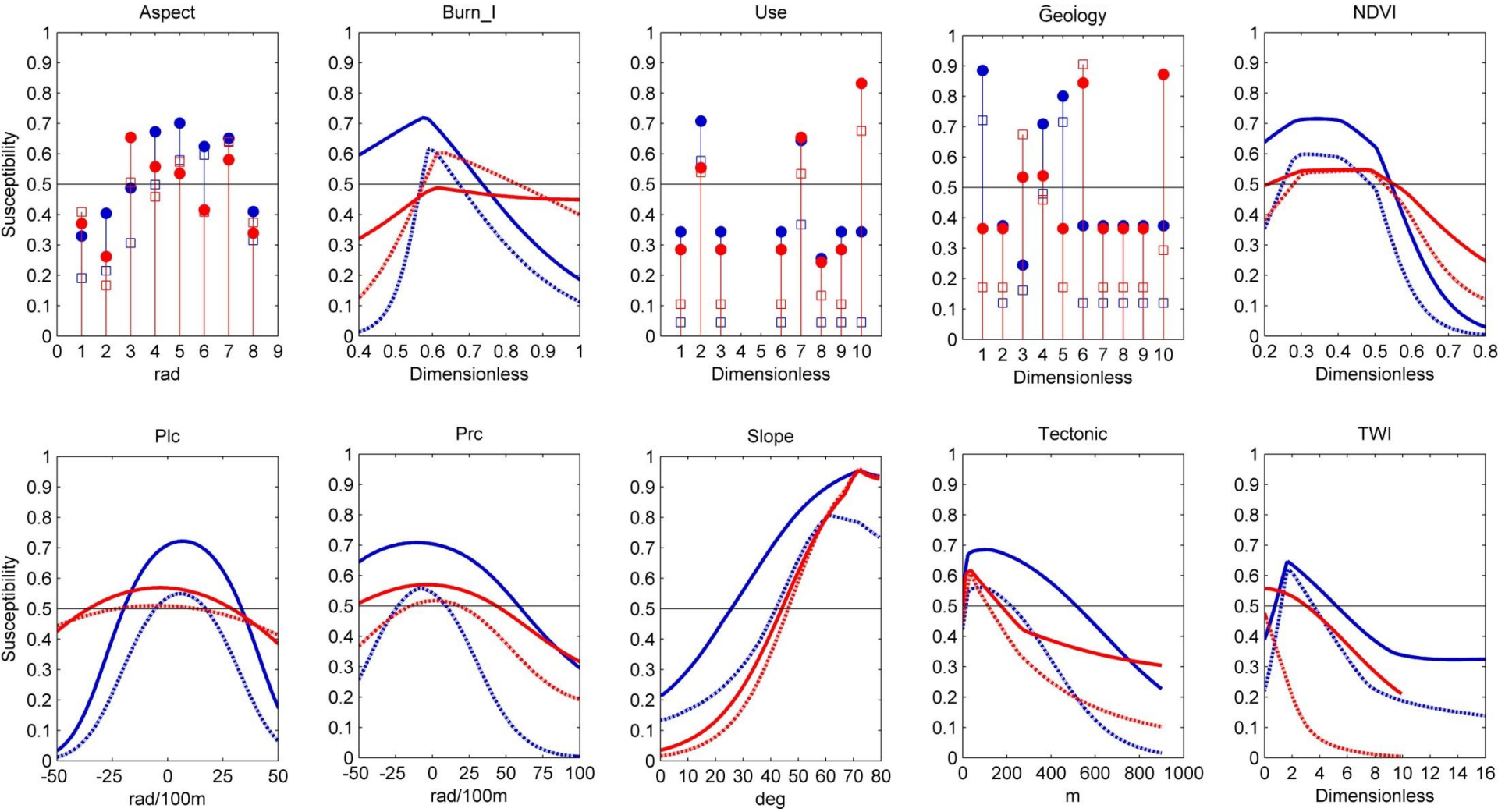




Jack-knife Tests

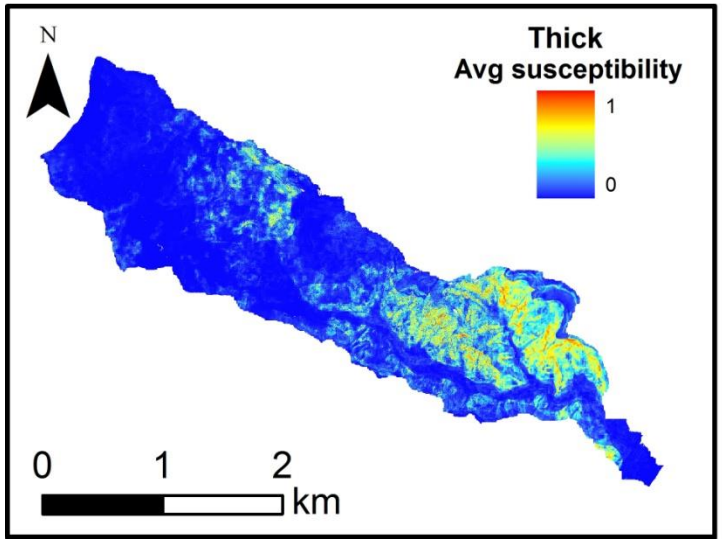


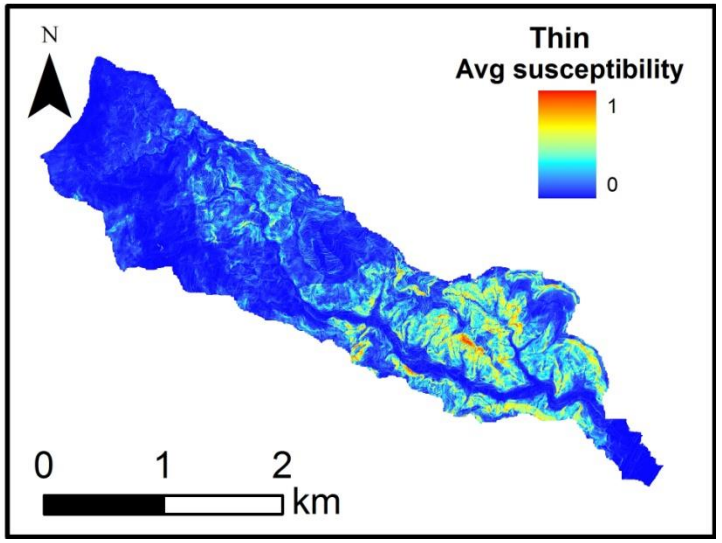
Response Curves

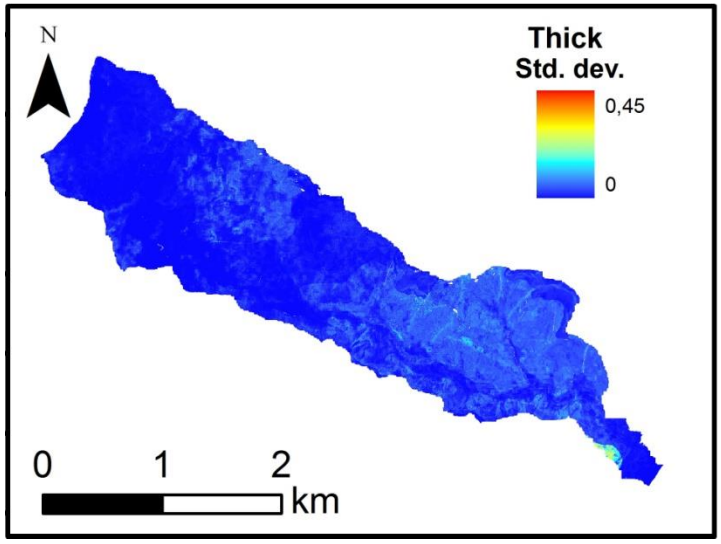


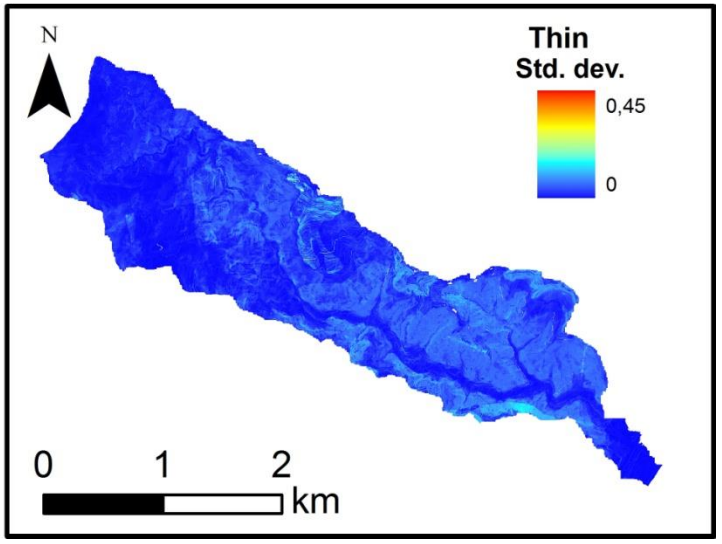
Thick & **Thin**

Susceptibility



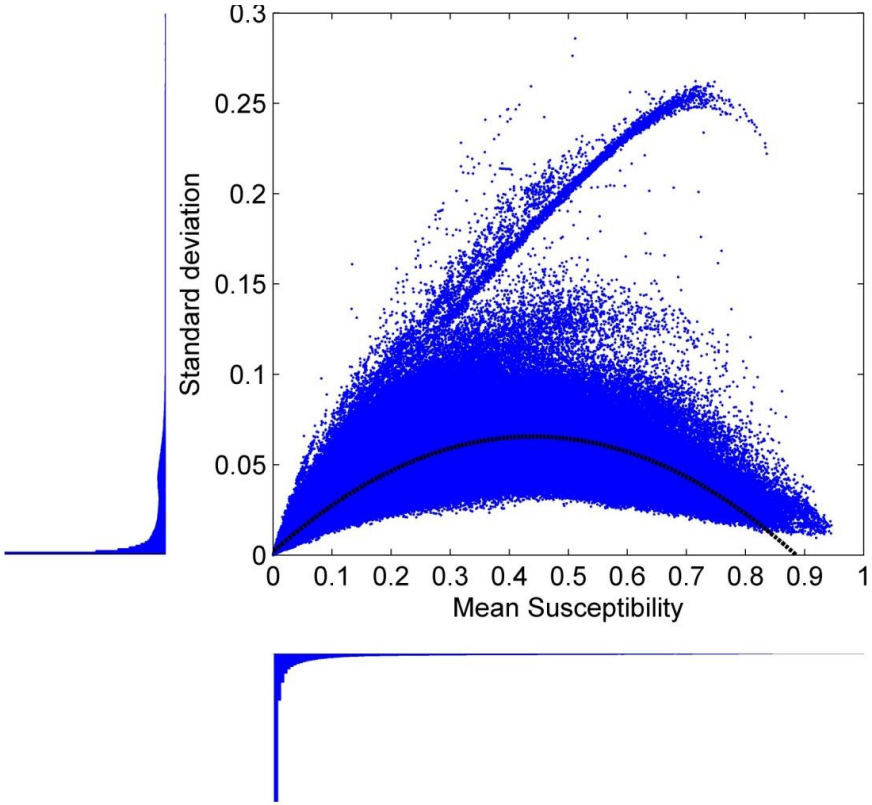




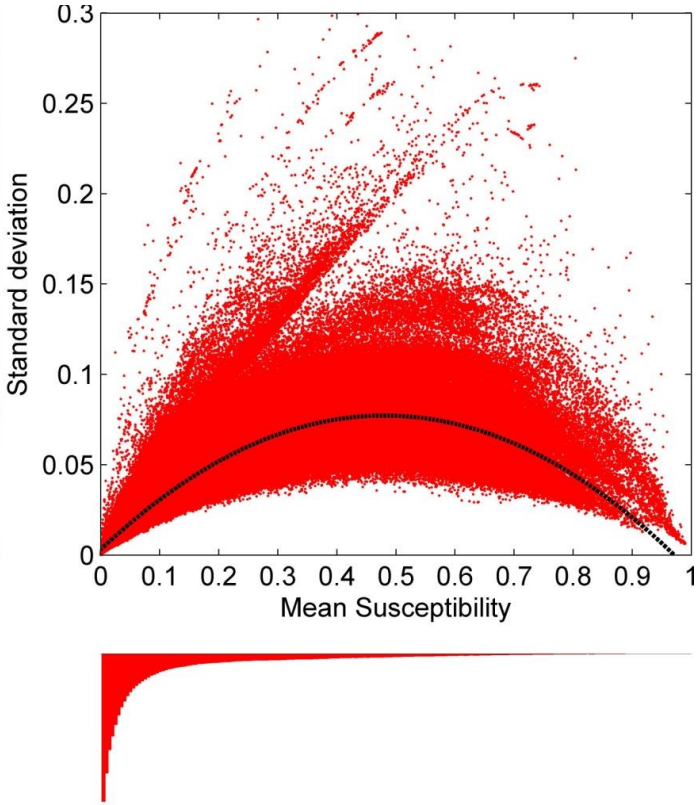


Reliability

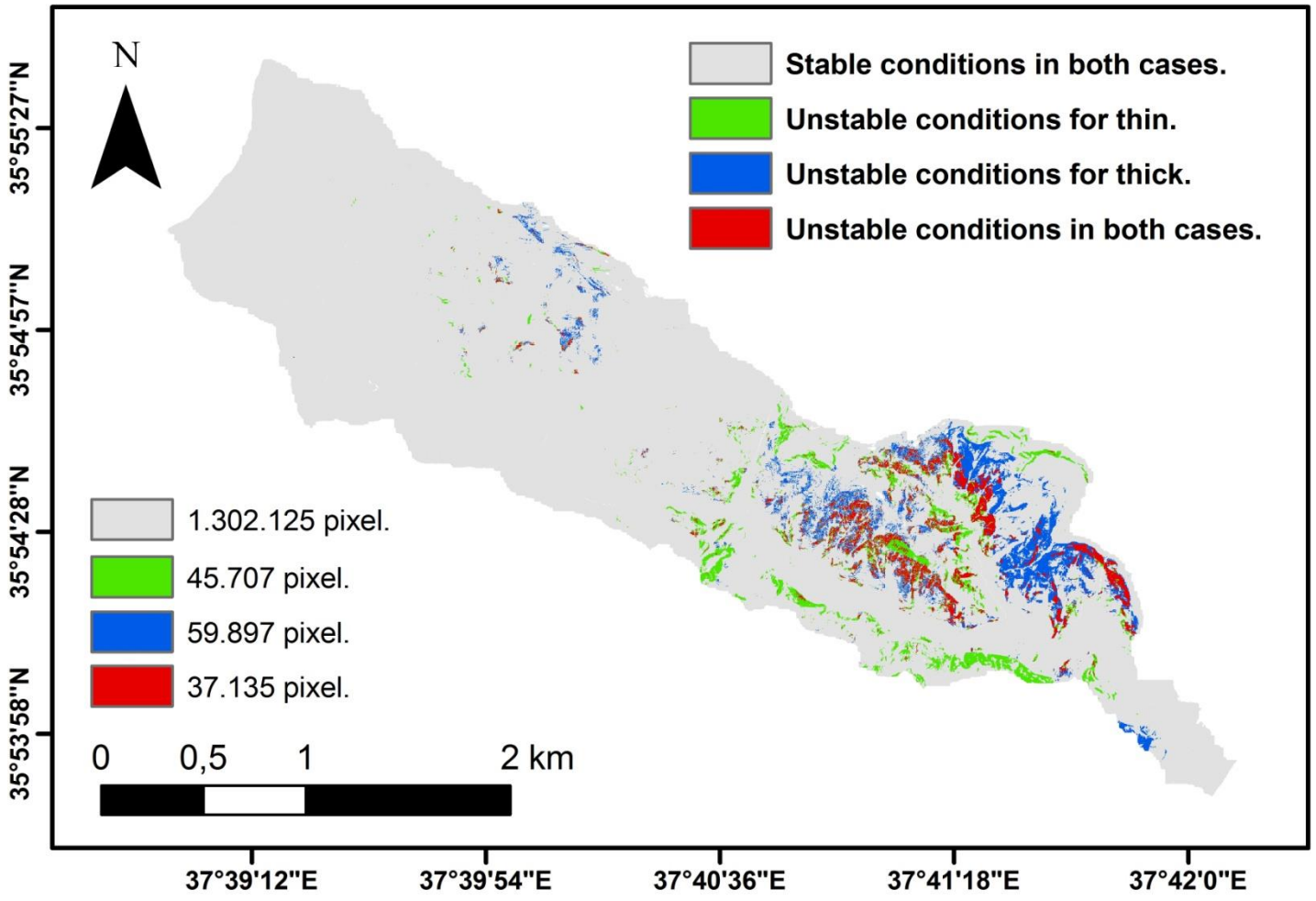
Thick



Thin



Triggering-thickness susceptibility



Conclusions

-We started this work as a side-project for landslide propagation studies, and yet it became an interesting topic on its own:

1) Triggering-thicknesses can be predicted.
2) Maximum Entropy is a performing approach.
3) Reliability assessment should include Predictor Importance, Jack-knife Tests, and Response Curves.
4) Combined susceptibility maps provide a better information and support physically based simulation of landslide propagation.

THANK YOU