Oral Presentation at the Lunar and Planetary Science Conference 2018, The Woodlands, Texas: "Origin of Longitudinal Ridges and Furrows associated with Long Runout Landslides: The Case Study of a Martian Landslide."

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The project.

The formation mechanism of long runout landslides remains matter of discussion. Several hypotheses have been proposed to explain their ability to travel up to tens of kilometres moving on nearly flat surfaces with very high velocity. The purpose of this study is to clarify the relationship between the occurrence of longitudinal ridges and the long runout landslides they are associated with, in the attempt to link the morphologies with the mechanisms involved during the emplacement of such catastrophic events. Mars offers beautiful examples of long runout landslides with well-preserved longitudinal ridges. We made use of the latest high resolution imagery (CTX and HiRISE camera, aboard MRO) to make DEMs using SOCET SET software and conduct morphometric analysis of the deposit of a landslide in Valles Marineris. We found that the wavelength of the longitudinal ridges scales with the thickness of the deposit ($h \sim 2-3\ \lambda$). We also observed the appearance of new smaller ridges between diverging ridges. Our results represent the first field evidence of laboratory experiments conducted on rapid granular flows. We conclude that the occurrence of longitudinal ridges in long runout landslides should not be considered as evidence of the presence of ice at the time landslides took place. We also presented preliminary images of our recent field work in North Chile, where we used drones to map a cluster of rock avalanches. We aim to extend the number of case studies to verify whether the same scaling relationship between the wavelength of ridges and thickness of the deposit recurs.

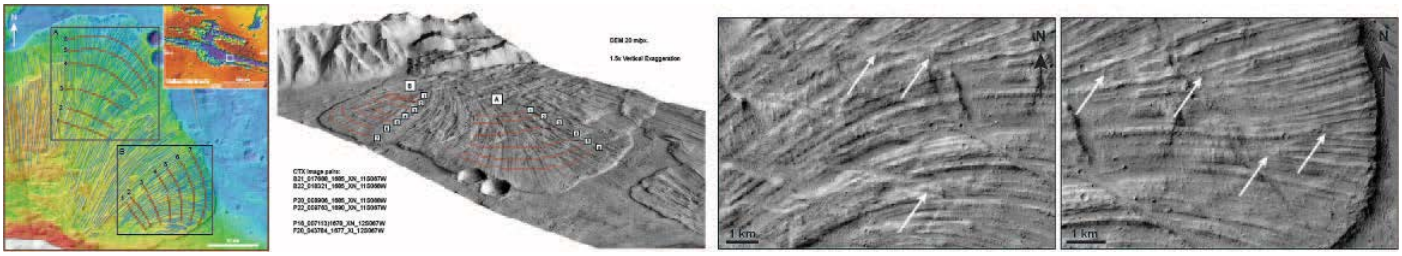

Figure 1. DEM and oblique view of the martian landslide subject of this study. Close-ups of the landslide's deposit showing the appearance of new smaller ridges between diverging ridges.

Comments.

Figure 2. The first slide of my talk at the 49th LPSC.

Being able to attend and present this work at the 49th LPSC was a fruitful experience. This work has received attention from several experienced researchers involved in lunar landslides, impact crater ejecta, and granular flows experiments and modelling. In particular, two of them wanted to meet and discuss further my work and they suggested future collaboration for studies on lunar landslides and granular flow experiments. I hope that the wide interest that this work received will help to attract more attention to the project I am carrying out for my PhD and more funding from other bodies in support for future field work and conference attendance.

Social media statement.

The occurrence of longitudinal ridges in long runout landslides should not be considered as evidence for the presence of ice at the time landslides took place.