

## Morphology of martian long run-out landslide along Valles Marineris

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Valles Marineris on Mars is known as a site of huge valley systems including many large scale landslides. The average drop height of these landslides is about 6.5km and the average run-out length is about 40km[1]. The apparent coefficient of friction given by drop height over run-out length shows 0.16 which is quite smaller than the value of frictional flow of dry rocks; 0.6. To drastically reduce the coefficient of friction, we have to think some extraordinary effect such as internal fluid or mechanical fluidization[2,3]. If the flow style of martian landslide needs water as an internal fluid, examining of martian landslide could be linked to the detection of subsurface water. Several studies are already done to decide whether the martian landslide is wet or dry [1,2,4,5,6], but we don't still have a consensus.

In this study, we focus on the surface small scale characteristics; the levees and the longitudinal lineation which are both common feature in martian long run-out landslides and are not well examined in previous studies. The thickness and the shape of Levee are quite sensitive to the fluid property and the stream condition such as yield strength, basal plane inclination and grain size distribution[7]. On the other hand, the origin of the longitudinal lineation is not still well clarified and uncommon in the terrestrial landslides. We examine these small scale characteristics recognized on the martian landslides, and the relationship between these particular features and the apparent coefficient of friction. Then we discuss whether martian landslide was wet or dry.

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