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## The effect of weathering on rock wall erosion and rockfall generation at La Cornalle, Switzerland

Li Fei, Marc-Henri Derron, Tiggi Choanji, Michel Jaboyedoff, and Chunwei Sun

Institute of Earth Sciences, University of Lausanne, Lausanne, Switzerland (li.fei@unil.ch)

The weathering posing a significant influence on the rock wall retreat has been widely recognized. In this paper, multi-methods monitoring is designed to detect the erosion and rockfall activity on a rockslide cliff composed of marl-sandstone (maybe mixed with limestone) in Western Switzerland. The monitoring program includes weekly SfM and monthly LiDAR scanning measurements of rock cliff surface, hourly time-lapse imaging of the rock cliff, manual measurement of rock surface moisture, automated recordings of rock temperature and influencing meteorological factors (air temperature, humidity, wind, and precipitation) collected by a weather station. Sequential 3D Points Clouds acquired by LiDAR and SfM from December 2019 are used to visually identify the location of erosion and rockfall at monthly resolution. According to the rock wall structural analysis, the rock mass consists of a network of discontinuities mainly oriented nearly parallel and perpendicular to the direction of the layers. Some fractures are filled with calcite which might lead to a zone of weakness in the rock mass. During the field survey, we saw some calcite crystals covering on the rock block surface in the deposit area and exposed on rock cliff outcrop. We suppose that some rockfalls are generated along those discontinuities filled with calcite where the chemical reaction is active when there is constant water infiltrating during rainfall season. According to the preliminary panoramic thermal image of the cliff surface shot by DJI Mavic 2 Enterprise on 19 December 2019, some weathered and fresh surface areas show different temperatures in the same rock layers which suggest the thermal imaging monitoring may help us to identify the weathering spatial characteristics. In this study, we try first to reveal the effect of temperature variations (thermal stress) on crack deformation from rock temperature values extracted from thermal images and the deformation measured by the crack meter during 24h in winter and summer. Secondly, we explore the role of freeze-thaw cycle playing in the rock fall initiation and rock face erosion. Thirdly, we make clear the link between surface weathering spatial distribution and location of erosion, rockfalls. This provides a model of weathering and rockfall estimation.

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