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## **Relationships of interaction between ice/snow and volcanic products in lahar generation in the eruption of Villarica Volcano on March 3rd 2015**

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A sudden increase of seismic activity was registered during the early morning of March 3rd 2015 in Villarica Volcano, along with a strong eruptive pulse of 25 minutes that decreased completely after 55 minutes. This was marked by the development of a lava source that reached ~1.5-km height with an ejection of abundant incandescent pyroclastic material that covered the ice/snow layer in the volcanic structure and generated great magnitude lahars. The presence of ice/snow during the whole year in the volcano turns into a latent hazard, bearing in mind that it is one of the most active volcanoes of South America and having important touristic cities within its close radius, such as Pucón and Villarica. In this study it will be performed the first drone-generated high resolution orthomosaic mapping of proximal deposits, evaluating the interaction between this material and ice/snow, and its relevance in lahar generation. With this in mind, it is acknowledged that the main lahar triggers are mixed avalanches that are developed in the paroxysmal stage of the eruption, which are composed of snow avalanches and hybrid pyroclastic flows that get great mobility by being in contact with ice/snow. In addition, the thermal transference from volcanic products is mainly produced by heat conduction, this being very effective due to direct interaction of these with layers of ice and snow. Accordingly, it was possible to link the lahar origin with web cameras photos and geophysical surveys in the main valleys where they were based, which highlights the significance of mixed avalanches generated in the most critical stage of the eruption in lahar generation.