

Detailed Geomorphological survey in a recently deglaciated area by Terrestrial Laser Scanner

Marcio Rocha Francelino (1), Adriano Luis Schünemann (2), Carlos Ernesto Gonçalves Reynaud Schaefer (1), Elpidio Inacio Fernandes Filho (1), Pedro Henrique Araujo Almeida (1), and Andre Thomazini (1)

(1) Departamento de Solos, Universidade Federal de Viçosa, Viçosa-MG, Brazil (marcio.francelino@ufv.br), (2) Universidade Federal do Pampa, São Gabriel-RS, Brazil (als.unipsmps.edu.br)

High resolution topographic surveys are important tools to model landscapes, especially in zones subjected to strong environmental changes, such as Antarctica, where landforms are highly influenced by glacial retreat and permafrost melting. The aim of this work was to map geomorphological features in Keller Peninsula, King George Island, Maritime Antarctica, by using Terrestrial Laser Scanner. The survey was performed in 2014/2015 and 2015/2016 during the austral summer, by means of a Terrestrial Laser Scanner (TLS) model VZ-1000 of Rigel. In order to cover the entire Peninsula, the TLS equipment was installed in 81 different points. After processing, a cloud with more than 5 million points was generated, spatially well distributed, enabling the generalization process to obtain surface models with high performance. Hence, ultra-details of the different landscape features on the peninsula were studied. Results obtained were compared with a geomorphological map previously produced from the analysis of aerial photographs in the same area. Different limits were observed between the two techniques, mostly regarding sizes, allowing the identification of new landscape features. Depositional features are the most common landforms in Keller Peninsula, encompassing scree slopes, protalus, morainas and talus. Rock outcrops are common, forming prominent scarps, feeding talus and protalus. Small patterned-ground soil areas were distinguished by the TLS. The use of TLS allowed the mapping of landforms with high resolution needed for environmental monitoring.