



Charaterization of the sedimentary dynamics in proglacial domain using ground-penetrating radar. Example of the Bossons Glacier (Chamonix, France)

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Glacial fluctuations can be an indicator of the global climatic variations. These fluctuations have an incidence on the sedimentary filling of the proglacial zone. Proglacial sediments so represent an archives of the various glacial advances and retreats, their study allows to explain the paleodynamics of a glacier. To understand their deposit modes, a geophysics and topographic study was led on the proglacial domain of the Bossons Glacier (Chamonix, France).

An investigation with a ground-penetrating radar (monostatic mode, antennas of 200 MHz and 400 MHz) was realized on a surface of approximately 1 ha. A grid of 5 longitudinal profiles (parallel to the flow of proglacial meltwater torrents) and 18 transverse profiles (perpendicular to the first ones) allowed to obtain an image of the internal geometries of the proglacial sediments. By revealing of the limit bedrock/sediments, an estimation of the depth of the sedimentary filling was determined. The first analysis of the radar profiles showed the presence of erosional surfaces, characteristic geometries (progradational stratification, channel forms) and buried blocks. A more detailed study of this profiles will allow to associate this characteristics to glacial paleodynamics.

To facilitate this interpretation and propose a reconstruction of the glacial and proglacial paleodynamics, an analysis of the current glaciofluvial system was realized in surface. A topographic model, established on a leveling survey of approximately 900 points mesured with a differential GPS, allowed to represent the distribution of the proglacial channels as well as the surface lithofacies, coded from the sedimentologic classification of Heinz and al. (2003), derived of the code of Miall (1978). This

model so informs us about the current dynamics and the modes of deposits within the glaciofluvial system. Hypotheses concerning the processes of sediments transport/deposit and formation of the structures revealed by ground-penetrating radar can be made.

Keywords : ground-penetrating radar, proglacial dynamics, Bossons Glacier

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