

Fiche analytique – Mémoire de Master MUSE

A rendre au secrétariat lors de l'inscription à la soutenance du mémoire

* champs obligatoires

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TITRE MEMOIRE*	How can dendrogeomorphology associated to drone imagery contribute to GLOF hazard assessment in remote areas ? Case study in Chilean Patagonia			
NUMERO MEMOIRE	420			
DATE SOUTENANCE	10.11.2020	Salle: par zoom		Heure: 14h
THEMATIQUE* (AFFILIATION)	Climate Impacts			
VOLEE MUSE*	2018			
TITRE ACADEMIQUE* (par ex.: licencié en biologie)	Bachelor of arts in geography			
DIRECTION* / EVALUATION	Directeur de mémoire* Markus Stoffel	Co-directeur de mémoire* Jérôme Lopez-Saez	Nom(s) du ou des juré(s)* - Alberto Munoz Torrero Manchado - -	
STAGE (éventuel)	Organisme d'accueil		Maître de stage	
Projet de l'ISE (éventuel) auquel le mémoire est rattaché				
Bourse (éventuelle) reçue par l'étudiant				
COLLATION*	Nb de pages* 66	Nb de figures* 38	Nb de tableaux* 6	
TERRAIN D'ETUDE OU D'APPLICATION				
MOTS-CLES* (entre 5 et 10)	Dendrogeomorphology, photogrammetry, hazard assessment, glacial lake outburst, object based image analysis			
RESUME* (max 1500 car)				
SUMMARY* (en anglais)	With a consequent glacier mass reduction projected by the end of the century, the formation of periglacial lakes due to glaciers retreat is to be expected. Even though these changes often occur in remote areas, they can nevertheless have catastrophic impacts on populations and infrastructures through processes such as glacial lake outburst and flood. These events are results of complex geomorphological changes and subject to various timescales, thus urging the need for a multidimensional approach. The present study associates two methods in order to analyze natural hazards in a secluded national park situated in Chile. The <i>Grosse</i> glacier outlet was chosen after interpreting satellite imagery and historical pictures putting forward the purge of a lateral lake, which was also supported by local testimonies. Dendrogeomorphology was primarily used with an automatic detection approach to identify possible dates of occurrences for glacial lake outbursts at the <i>Grosse</i> outlet. A total of 105 disturbed <i>Nothofagus</i> were sampled, highlighting 6 years as potential events as well as confirming this tree specie to be challenging but still suitable for such an analysis. The second method aimed to complete the above finding with the help of acquired aerial imagery on the field by mapping of geomorphological evidence related to GLOFs. Boulders and deposits are one of the recognized signs of a lake outburst and were thus used so as to differentiate simple floods from high magnitude events. More precisely, throughout an object-based strategy we could map deposits density and extrapolate a theoretical flow. Where the first			

	<p>method allowed us to select dates of potential events, the second helped us identify and map the spatial extent of evidence from a high-energy event. We could confirm that these two approaches have added value when put together in the context of complex natural hazards such as GLOFs. This master thesis identified several years/decades as possibly active from a natural hazard perspective and confirmed a significant frequency in the studied region. Such findings are believed to make a valuable contribution to historical records and help for future assessments of natural hazard in <i>Grosse's</i> area. Finally, by using a two-dimensional approach this study has opened discussions about the need for various sources of information in order to capture most of the temporal and spatial dimensions of GLOFs.</p>
REMARQUES	