

Submitted Abstract

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Abstract

Continuous monitoring of glacial lakes, their parent glaciers and their surroundings is crucial because potential outbursts flood of these lakes can seriously affect downstream Alpine areas. The retreat of the glaciers is strictly related with the ongoing climate change: this process facilitates the formation and the expansion of glacial lakes. In the study area of Aosta Valley Region (Italy), Fondazione Montagna sicura manages the Glacial Risk Monitoring Plan of the entire Region, that includes also the glacial lakes formation. In this frame, over time different sites have been focused and studied: in particular the Lys proglacial lake (Gressoney La Trinité, Italy), the Miage proglacial lake (Courmayeur, Italy) and the Grand Croux proglacial lake (Cogne, Italy), with a Glacial Lake Outburst Flood (GLOF) event occurred in August 2016 along the Valnontey stream. Fondazione Montagna sicura (FMS) has set up a process to study and monitor these phenomena through the development of a semi-automatic glacial lake recognition methods that allow continuous monitoring of these lakes using the ESA Sentinel-2 imagery. This remotely sensed procedure is performed by using the NDWI (Normalized Difference Water Index), a method that has been developed to delineate open water features and enhance their presence in remotely-sensed digital imagery. The NDWI makes use of reflected near-infrared radiation and visible green light to enhance the presence of such features while eliminating the presence of soil and terrestrial vegetation features. In the context of the Glacial Risk Monitoring Plan of the Aosta Valley Region (Italy), the final goal is to create a semi-automatic procedure: during the summer season an operator will analyze any ESA Sentinel-2 image at each satellite pass in the AOI, in order to identify the glacial and periglacial lakes and define their evolution in terms of presence, area and characteristics. This study has been conducted and financed in the framework of the WP3 of the project Interreg Alcotra 2014-2020 (IT-FR) RISK-ACT-PITEM RISK.