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Glacier Change in the Ortler-Cevedale Group, Autonomous Province of Bozen, Italy - Airborne Laserscanning and direct surface mass balance measurements

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The Ortler-Cevedale group is the most glaciated region in the Autonomous Province of Bozen, South-Tyrol (Italy). The mountain range contains numerous glaciers of various sizes in different elevations and expositions. During the melt season, the runoff of these glaciers feeds the Etsch-river which is the main water source for the extensive fruit production in the Vinschgau, an inner alpine dry valley with exceptionally low precipitation rates.
Nevertheless, relatively little is still known about the current state of the glaciers in this area, except for Weißbrunnferner which can be considered to be of limited representativity for the region due to several reasons and for Langenferner, which is subject to detailed observations since the hydrological year 2003/04.
For this study, two sets of airborne laser scanning (ALS) data are used to calculate the recent changes in glacier area and volume for the glaciers in the Suldental and Martelltal. Data from 2004/2005 is available from the Autonomous Province of Bozen, while another data acquisition campaign was conducted in context of the project MALS (Multitemporal Airborne Laserscanning South-Tyrol) in autumn 2011. Based on the 2011 ALS data, the current outlines of the investigated glaciers have been delineated. In order to examine changes in area and their altitudinal distribution, the results were compared to the existing glacier inventories of 2006 and 1997. The two ALS data-sets were also used to calculate the volume change of the studied glaciers in the time between the two ALS-campaigns.
Furthermore, the derived volume changes were used to cross-check the direct mass balance observations on Langenferner and to evaluate the representativity of these measurements for other glaciers in the region.