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Use of remote imagery to analyse spatial impacts of the Chaitén volcano eruption (Chile) in fluvial systems

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The processes associated with the 2008 eruption of the Chaitén Volcano (south of Chile) generated morphological, ecological, and social disturbances. These disturbances were changes in the channel widths, vegetated islands and riparian forests. Changes in the river systems continued to occur years after the eruption due to hydrological processes induced indirectly by the volcanic eruption. This study analyzes the morphological changes in a river segment of three basins (Blanco, El Amarillo and Rayas) located near the Chaiten volcano, through an analysis of a sequence of remote images. The three watersheds were subjected to different disturbance intensities, depending on the type of dominant volcanic processes. In addition, changes were analysed by comparing two study periods, the first associated to the effusive and explosive period of the eruption, and the second after this period. In the first period mean channel widths increased by 91% (38 m/year), 6% (7 m/year) and 3% (11 m/year) for the Blanco, El Amarillo and Rayas rivers, respectively. In the second period, the variations of the mean channel widths were 19% (4 m/year), 2% (2 m/year) and 4% (5 m/year) for same rivers. On the other hand, the number of islands decreased annually by 15 and 16% on the Blanco River, 4 and 3%, in the El Amarillo River and 9 and 12% in the Rayas, in the first and second periods, respectively. The magnitude of active channel changes reflects the scale of the dominant volcanic processes in each watershed. While in the second study period strong changes continue to occur mainly at the level of the islands. This research is being developed within the framework of Project FONDECYT 1141064.