



## Occurrence and impacts of heat waves events in a glacierized basin in the subtropical Andes

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Subtropical Andean glaciers are losing mass in response to the long-term atmospheric warming and precipitation decrease. Extreme events as heat waves, however, seems to potentially play a key role in the sustained ice loss detected in the last decades. Increased frequency of heat wave events have been detected in the central valley of Chile, however, the occurrence and impact of these events on the Andean cryosphere remain unknown. The main reason is associated with the lack of meteorological observations at higher elevations in the Andes.

In filling this gap, we present an assessment of the occurrence of heat waves in the glacierized Río Olivares basin (33°S), which comprise an elevation range between ~1500 and ~6000 m a.s.l. and where a strong ice loss has been detected during the last decades. The main aim is to analyse the correspondence of heat waves events occurred with those in the nearby city of Santiago located in the central valley of Chile and to assess the potential impacts of these events on the glaciers located in this basin. Using meteorological observations in Río Olivares basin and in Santiago between the years 2013 and 2020, heat wave events were determined. We estimated the heat wave events using the monthly 90th percentile and the adjustment of a harmonic function. An additional adjustment relative to the climate period 1981-2010 was also introduced. The results determined 66 events in the Río Olivares basin while in Santiago were 53 events. These results reveal high spatial variability in the occurrences of heat waves as only 49% of the events in Santiago were detected in the Río Olivares basin. Ongoing work is focused on analysing the impacts of these events over the glaciers of the basin. Here, through the use of the computed basin-scale 0°C isotherm, the relation between glacier area under melt (i.e. glacier area located below the 0°C isotherm) and the heat wave events will be shown. The findings of this works reinforce the need for more observational efforts over high elevations in the Andes in order to robustly assess and at a basin scale, the impact of extreme events on the Andean cryosphere.