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## Drastic glacier retreat at Pico de Orizaba (19° N, Mexico) since the Little Ice Age

Jesús Alcalá Reygosa<sup>1</sup>, Néstor Campos<sup>2</sup>, Melaine Le Roy<sup>3</sup>, Bijesh Kozhikkodan Veettil<sup>4</sup>, and Adam Emmer<sup>5,6</sup>

<sup>1</sup>Facultad de Filosofía y Letras, Universidad Nacional Autónoma de México, Ciudad de México, Mexico (jalcalar@ucm.es)

<sup>2</sup>Faculty of Natural and Exact Sciences, University of Playa Ancha, Chile (nestorcampos@gmail.com)

<sup>3</sup>Université Grenoble Alpes, Université Savoie Mont Blanc, CNRS, EDYTEM, 73000 Chambéry, France (melaine.le-roy@univ-smb.fr)

<sup>4</sup>Institute of Research and Development, Duy Tan University, Da Nang 550000, Vietnam (bijeeshkozhikkodanveettil@duytan.edu.vn)

<sup>5</sup>The Czech Academy of Sciences, Global Change Research Institute; 603 00 Brno, Czechia (aemmer@seznam.cz)

<sup>6</sup>Charles University, Faculty of Science; 128 43 Prague, Czechia (aemmer@seznam.cz)

The Little Ice Age (LIA) occurred between CE 1250 and 1850 and is considered a period of moderate cold conditions, especially recorded in the northern hemisphere. Numerous recent studies provide robust evidence of glacier advances worldwide during the LIA and a dramatic retreat since then. These studies combined investigation of moraine records, paintings, topographical and glaciological measurements as well as multitemporal aerial and terrestrial photographs and satellite images. For instance, post-LIA glaciers retreat amounts ~60 % in the Alps (Paul et al., 2020), ~88 % in the Pyrenees (Rico et al., 2016) and 89 % in the Bolivian Andes (Ramírez et al., 2001). However, there is scarce knowledge in Mexico about the glacier changes since the LIA. The reconstructions are limited to the Iztaccíhuatl volcano where Schneider et al. (2008) established a glacier retreat of 95 %.

Here, we reconstruct the glacier evolution since the LIA to CE 2015 of the Mexican highest ice-capped volcano: Pico de Orizaba (19° 01' N, 97° 16' W, 5,675 m a.s.l.). Due to Pico de Orizaba is in the outer Tropic, the most plausible scenario is a glacier evolution similar to the Bolivian Andes and especially to the Iztaccíhuatl volcano. To carry out this research, we mapped the glacier area during the LIA, based on moraine record, and the area during 1945, 1958, 1971, 1988, 1994, 2003 and 2015 using a previous map elaborated by Palacios and Vázquez-Selem (1996), aerial orthophotographs and satellite images. The geographical mapping and the calculus of area, minimum altitude and volume of the glacier were generated with the software ArcGIS 10.2.2. The results show that glacier area retreated 92% between the LIA (8.8 km<sup>2</sup>) and 2015 (0.67 km<sup>2</sup>), being a drastic glacier loss in agreement with the Bolivian Andes and Iztaccíhuatl. Therefore, Mexican glaciers have experienced the major shrink since LIA that implies a highly sensitive reaction to global warming.

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