



Widespread expansion of glacier moraine-dammed lakes in the Chinese Himalaya

Shiyin Liu (1), Felix Ng (2), Xin Wang (1,3), Wanqin Guo (1), Xiaojun Yao (4,1), Pengchun Yu (1), Junli Xu (1), and Yongjian Ding (1)

(1) State Key Laboratory of Cryospheric Sciences, Cold & Arid Regions Environmental & Engineering Research Institute, Chinese Academy of Sciences, Lanzhou, China, (2) Department of Geography, University of Sheffield, Sheffield, United Kingdom (f.ng@sheffield.ac.uk), (3) Department of Geography, Hunan University of Science & Technology, Xiangtan, China, (4) College of Geography and Environment Science, Northwest Normal University, Lanzhou, China

More moraine-dammed lakes in the Himalaya may form and enlarge due to glacier retreat and increased meltwater availability under the climatic warming that has been recorded across this mountain range over the last few decades. Because of this, and because such lakes have caused major GLOF (glacial lake outburst flood) events before, international organisations have been developing lake inventories to evaluate flood risks in the Himalaya, mainly in the south. Here we present the first complete inventory of moraine-dammed lakes on the Chinese side, which shows expansion and formation dominate their behaviour from the 1970s to the 2000s. We found that while their number has remained at ≈ 1200 , their combined area has drastically increased, and glacier retreat also helped focus this overall growth in a narrow elevation range where many large new lakes have appeared. Our discovery of a glacier-recession signal in the lakes' variation underlines the need to study the climatological and glaciological factors behind lake evolution.