Paleoglaciation of Shaluli Shan, Southeastern Tibetan Plateau

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Reconstructing paleoglaciation of the Tibetan Plateau is critical to understanding linkages between regional climate changes and global climate changes, and here we focus on the glacial history of the Shaluli Shan, an area of the southeastern Tibetan Plateau that receives much of its precipitation from monsoon flow. Based on field investigation, geomorphological mapping and ^{10}Be exposure dating of moraines, we identify glacial deposits from the Late Glacial, with minimum ages at 13.0 ± 1.2 ka to 17.1 ± 1.6, global Last Glacial Maximum (LGM) at 21.6 ± 2.0 ka, and pre-global LGM at 102.3 ± 10.0 to 183.6 ± 17.0 ka. These ages are consistent with and significantly extend the known range from most prior chronological work using terrestrial cosmogenic nuclides in this area, and include a set of dates for the Kuzhaori moraine that raise questions about prior chronologies based on the electron spin resonance technique. Ice caps about 4000 km^2 in size covered the Haizishan Plateau and the Xinlong Plateau during the global LGM, with large glaciers extending far down outlet valleys. The presence of ice cap glaciation, here, contrasts strongly to glaciation elsewhere in the Shaluli Shan and more central regions of the Tibetan Plateau where ice expansion remained constricted to valleys. This work provides important insights into the paleoclimate pattern and monsoon evolution of the Tibetan Plateau over past glacial cycles and indicates that the Shaluli Shan has a glacial chronology more consistent with the Northern Hemisphere paleo-ice sheets than other areas of the Tibetan Plateau.