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Fundamental questions on tree ring-glacier fluctuation study in the High Central Asia

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The southern half of the Tibet Plateau is the world's most concentrated glacier in the middle and low latitudes, providing water resources for the surrounding areas. In the context of climate warming, glaciers in the area show a strong retreating and thinning. However, due to its remoteness, the observations of glaciers in this area are not only scarce but also very short. The purpose of this study was to investigate whether pioneer trees could serve as proxy observer on glacial fluctuations. If so, to what kind of resolution? Based on historical photos and records of glaciers from Pakistan, Nepal and China, we found pioneer tree species could colonize the glacier deposits in about 10 years. The traditional method of using increment cores to infer tree ages could get a dating resolution of about 30 years. This study provides a methodological reference for assessing the uncertainty of previous tree-ring glaciological research results and further improving the accuracy of data.