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Cooling History of a Crustal Section in Eastern Tibet (Well HC1) Constrained by Thermochronology

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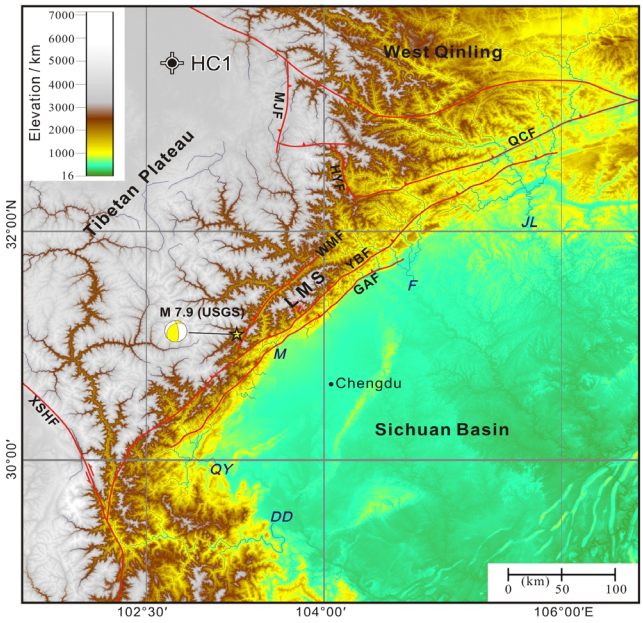
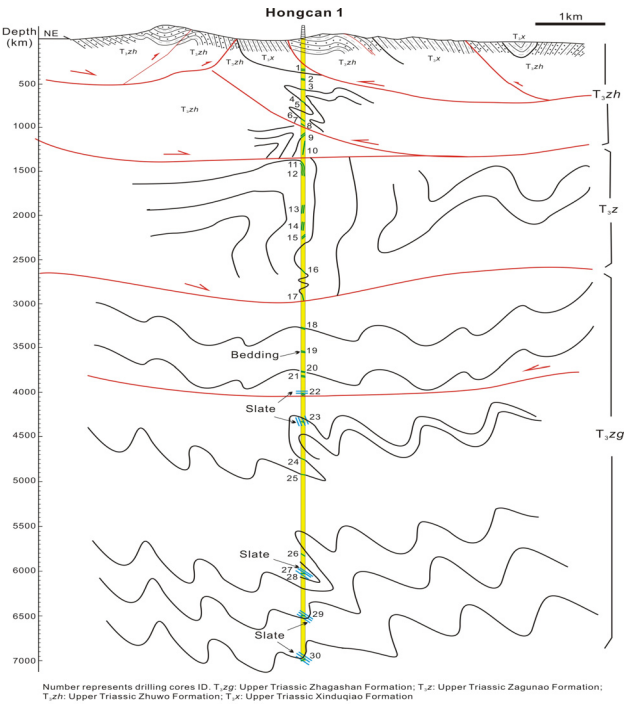
Information about the timing and magnitude of exhumation of different parts of the Tibetan Plateau has been constrained from numerous thermochronological studies. Interior high-elevation parts of the plateau have experienced rock uplift and some exhumation during the Cenozoic, although the magnitude and timing of this uplift and exhumation become unconstrained the less erosion there has been. Conversely, the plateau margins are rich in data about the timing and magnitude of exhumation, but it is unclear the extent to which the marked exhumation and rock uplift at these margins relate to the timing and amount of rock uplift of the interior. Through access to a suite of samples from a deep (7 km) exploration drill-hole (Well HC1) sited on the north-east interior part of the plateau (Fig. 1), for the first time, we can evaluate the amount of erosion that accompanied the rock uplift of the crustal section. This drill-hole is spudded into the eastern part of the Songpan-Ganzi Belt, having an elevation of ~3500 m above sea level (Fig. 1). We have applied apatite fission track analysis (AFT) to 12 samples between the surface and ~7,000 m depth in the hole (Fig. 2) and helium thermochronometry on apatite and zircon is in progress. All samples are sandstone with stratigraphic ages of Late Triassic in the upper section and Middle Triassic in the lower section of the hole (Fig.2). AFT ages range between Late Cretaceous and 0 Ma down the hole; all measured ages are much younger than the stratigraphic age of the host rocks and the data define part of a Late Cretaceous reset zone and a modern partial annealing zone. These data identify a Late Cretaceous phase of regional uplift and erosion, followed by Cenozoic uplift that built the plateau accompanied by some erosion at the drill site and its



LMS: Longmen Shan thrust belt; XSHF: Xianshuihe Fault; WMF: Wenchuan-Maoxian Fault; YBF: Yingxiu-Beichuan Fault; GAF: Guanxian-anxian Fualt; QCF: Qingchuang Fualt; HYF: Huya Fault; MJF: Minjiang Fault; JL: Jialing Jiang(Jiang=River); F: Fu Jiang; M: Min Jiang; QY: Qingyi Jiang River; DD: Dadu River; HC1: Well Hongcan1



Number represents drilling cores ID. T₃zg: Upper Triassic Zhagashan Formation; T₃z: Upper Triassic Zagunao Formation; T₃zh: Upper Triassic Zhuwo Formation; T₃x: Upper Triassic Xinduqiao Formation

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environs. The apatite fission track data do not identify the timing of plateau uplift in the northeast, but it is more probably later rather than earlier during the Cenozoic.

Key words: eastern Tibetan Plateau, plateau uplift, exhumation, thermochronology

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