Evidence for Repeated Megafloods Down the Tsangpo River Gorge, Southeastern Tibet

Field work in 2002 and subsequent GIS analyses constrained the extent of two of the lakes, a younger 240-m-deep lake and an older, 680-m-deep lake. Radiocarbon dating of wood and charcoal yielded ages of 8860$\pm$40 and 9870$\pm$50 $^{14}$C yr B.P. for the higher set of lake terraces, and 1220$\pm$40 and 1660$\pm$40 $^{14}$C yr B.P. for sediments from the lower terraces. Field work in 2004 revealed evidence for both a younger
shallow lake and an older deeper lake. The 680-m-deep paleolake
discovered in 2002 covered almost 2850 km$^2$ and contained an
estimated 835 km$^3$ of water; the 240-m-deep paleolake
contained an estimated 81 km$^3$ of water. These two dated
paleolakes correlate with the timing of glacial advances due to monsoon
strengthening indicated by glacial advances at Chomolongma (Mount
Everest). In addition, preliminary $^{10}$Be dating of ridge-crest
boulders from a sequence of moraines about 50 km NE of the Tsangpo
gorge indicates a series of at least three glacial advances, the youngest
of which appears to be the same age as the 680-m-deep paleolake. Two
earlier Pleistocene glacial advances were larger and may correlate with
the deeper lake discovered in 2004. Catastrophic failure of the glacial
dams that impounded the two dated paleolakes would have released
outburst floods down the gorge of the Tsangpo River with estimated
peak discharges of up to 1 to 5 x10$^6$ m$^3$ s$^{-1}$. The erosive
potential represented by the unit stream power calculated for the head
of the gorge during such a catastrophic lake breakout indicates that
post-glacial megafloods down the Tsangpo River were likely among the
most erosive events in recent Earth history. Our evidence for previously
unrecognized glacially dammed lakes at Namche Barwa show that
monsoon-driven valley glacier advances dammed even the largest
Himalayan rivers, and repeatedly created unstable glacier-dammed
lakes that generated floods likely unparalleled in the recent history of
the Himalaya. Hence, such immense outburst floods may well have
played an important role not only in carving the deepest valley on
Earth, but also, more generally, in the development of the spectacular
topography across the Himalaya and other high, glaciated ranges.

**DE**: 1815 Erosion and sedimentation
**DE**: 1824 Geomorphology (1625)
**DE**: 1827 Glaciology (1863)
**SC**: Tectonophysics [T]
**MN**: 2004 AGU Fall Meeting

---

New Search

![AGU](http://www.agu.org/cgi-bin/SFgate/SFgate?language=English&verbose...620%2034347594%202fdata2%2fpubs%2fwais%2fdata%2ffm04%2ffm04.txt)