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№ 7816

RIVER INCISION HISTORY IN THE WINOOSKI DRAINAGE BASIN, VERMONT

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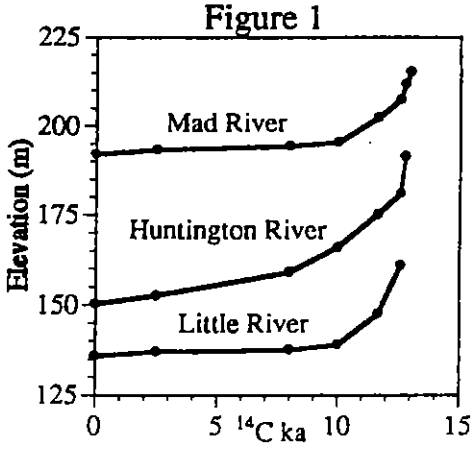
Flights of fluvial terraces in three valleys of the Winooski Drainage Basin of north-central Vermont have been surveyed and dated to determine the timing and amount of incision since deglaciation. Terrace ages are defined by correlations with previously dated baselevels (Connally and Sirkin, 1973; Parent and Occhietti, 1988), basal ages of overlying alluvial fans (Church and Bierman, 1995; Zehfuss and Bierman, 1996), and direct dating of terrace deposits. Following deglaciation, shoaling pro-glacial lakes produced a prominent fill terrace in each valley studied. Based on correlations to previously dated baselevels, the age of this terrace varies from >12.8 ^{14}C ka to 12.6 ^{14}C ka, depending on position in the basin. As many as 7 separate incision events, triggered by previously documented baselevel (Chapman, 1937) and environmental changes (Lin, 1995) during the past 13.0 ^{14}C ka, have subsequently formed distinct flights of paired strath terraces, now preserved as discontinuous remnants, in the Huntington, Little, and Mad River valleys.

At any location in the valleys, the amount of incision decreases exponentially during the Holocene, which reflects 1) changes in the distance to the baselevel drop and 2) a switch to climatic rather than baselevel forcing. For all three valleys, the first incision event followed the deposition of the glacio-lacustrine fill terrace; in each case, it was caused by different, but similar magnitude (~50 m), drops. As the pro-glacial lakes and the Champlain Sea retreated down valley, baselevel changes led to decreasing amounts of incision (Figure 1) until knickpoints were encountered. The climate changes of the Middle to Late Holocene resulted in continued incision, but the amount of incision was less than that caused by the baselevel changes.

These results point to dramatic and episodic valley bottom degradation since deglaciation in Vermont. River incision, controlled first by baselevel changes and later by climate changes, has lowered valley floors by as much as 40 m. The significant geomorphic work accomplished by the rivers in the Winooski Drainage Basin during the Holocene is similar to that previously documented by Brakenridge et al. (1988) along the Missisquoi River in northwestern Vermont.

Figure 1



fluvial terraces, incision history, landscape evolution, Holocene climate changes, Vermont

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