Geophysical Research Abstracts
Vol. 13, EGU2011-7993, 2011
EGU General Assembly 2011


# Estimating incision rates in small bedrock channels using in situ cosmogenic 10Be: Assessing channel adjustment to landscape transience driven by base-level fall

Miguel Castillo (1), Paul Bishop (1), Derek Fabel (1), John Jansen (1,2)

(1) School of Geographical & Earth Sciences. University of Glasgow, United Kingdom (Miguel.Castillo@ges.gla.ac.uk), (2) Department of Physical Geography and Quaternary Geology. Stockholm University, Sweden

Knickpoints triggered by base-level fall are key transient features in the bedrock rivers of a landscape that is adjusting to the base-level fall. Whether the reach downstream of a knickpoint re-establishes its former profile and incision rate after the passage of a knickpoint, as the power law rule predicts, has not been fully assessed, especially for the case of small bedrock rivers. Here we use the concentrations of 10Be in the actively eroding riverbed in two small bedrock rivers to estimate incision rates upstream and downstream of a base-level fall knickpoint. We used the Isle of Jura (western Scotland) as a natural laboratory for this study because Jura rivers are incising into a homogeneous quartzite unit in response to the base-level fall generated by a glacio-isostatic rebound. The rock uplift in response to this rebound is confirmed by c.13.6 ka beaches now c.35 m above sea level. The 10Be data indicate that bedrock channel incision rates are higher downstream of the knickpoints, reflecting both an incomplete accommodation of the base-level fall by knickpoint retreat and ongoing glacio-isostatic uplift.