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Vertical versus lateral erosional dynamics along the Rangitikei River (North Island, New Zealand) since the Last Glacial Maximum: Geomorphic and tectonic implications

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The Rangitikei river flows in the southeastern part of the North Island, New Zealand, within the Wanganui Basin, located in a back-arc position with respect to the Hikurangi subduction between the Australian and Pacific plates. The erosional dynamics of the Rangitikei is set by a flight of climatic aggradation terraces that defines a long-term incision rate of ˜ 1.2 mm/yr since ˜100 ka. The Last Glacial Maximum (LGM) terrace (Ohakea terrace), corresponded to a wide ($>$ 1 km) aggradational braided river whose longitudinal slope was steeper than the present-day river one. River entrenchment, that leads to abandonment of the Ohakea terrace took place since the LGM at a mean rate of ˜ 3.6 mm/yr. Post-LGM entrenchment is recorded through up to 20 post-Ohakea autocyclic terraces uncorralated to climatic variations. The geometry of this last fligth of terraces suggest that incision rate has decreased continuously since the LGM. A first implication is that the long-term incision rate does not correctly capture the incisional dynamics between climatic aggradational periods. As a second implication, the incision rate calculated using elevation of the sole LGM terrace cannot be used as a measure of the uplift rate.