

## **Assessment of downstream trends in channel gradient, total and specific stream power: a GIS approach**

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### **Abstract**

Geographic Information Systems (GIS) analyses of Digital Elevation Models (DEMs) coupled with catchment area based discharge estimation techniques provide a relatively simple means of modelling contiguous downstream trends in channel gradient, total stream power, and in riverscapes conducive to regime analysis, also specific stream power. For a small, high relief, coastal catchment in SE Australia, good agreement was obtained between channel gradients derived from a 25 m cell-size DEM and field survey equivalents over distances of several kilometres, indicating that channel gradients derived from DEMs can have a reasonable degree of absolute as well as relative accuracy over multi-kilometre reach scales. Assessment of downstream rates of change in channel gradient and specific stream power across four river systems suggests that some of the river reaches most responsive to high magnitude floods occur in zones where these variables rapidly decrease downstream. Modelling of downstream trends in channel gradient, total and specific stream power from catchment-wide DEMs has potential to provide a framework with which to investigate conceptual and empirical models between channel gradient, stream power and the form and dynamics of river systems.

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