



## **Topological classification of drainage networks in the South Island of New Zealand**

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The transfer of sediment through the catchment system is often referred to as a cascade, the pattern of which is modulated by the interaction of key network characteristics such as the distribution of transport capacity and resultant zones of sediment storage. This research project aims to investigate the role that drainage network topology plays in modulating the pattern of sediment transfer from source to sink, using a numerical model of sediment production, storage and transfer and focusing on the dynamic environment of the South Island of New Zealand. It is hoped that this numerical framework can be used to address critical questions relating to the timescales associated with pulses of co-seismic sediment production following major tectonic events.

A method of identifying representative topological structures from a range of networks is presented. Stream networks were extracted from a Digital Elevation Model, and descriptive variables (e.g. slope, length) calculated across each network. A principal component analysis reduced key topological parameters to two axes describing network branching magnitude and catchment topography. An agglomerative hierarchical clustering analysis revealed five network 'types', including dendritic, herringbone and structural trellis configurations. These representative networks will inform topologically varied modelling of sediment connectivity across the South Island of New Zealand.