



## **Erosion and sedimentation models in New Zealand: spanning scales, processes and environments**

Sandy Elliott (1), Francois Oehler (1), and Ron DeRose (2)

(1) National Institute of Water and Atmospheric Research, Hamilton, New Zealand (s.elliott@niwa.co.nz), (2) Landcare Research, Palmerston North, New Zealand

Erosion and sedimentation are of keen interest in New Zealand due to pasture loss in hill areas, damage to infrastructure, loss of stream conveyance, and ecological impacts in estuarine and coastal areas. Management of these impacts requires prediction of the rates, locations, and timing of erosion and transport across a range of scales, and prediction of the response to intervention measures. A range of models has been applied in New Zealand to address these requirements, including: empirical models for the location and probability of occurrence of shallow landslides; empirical national-scale sediment load models with spatial and temporal downscaling; dynamic field-scale sheet erosion models upscaled and linked to estuarine deposition models, including assessment of climate change and effects of urbanisation; detailed (20 m) physically-based distributed dynamic catchment models applied to catchment scale; and provision of GIS-based decision support tools. Despite these advances, considerable work is required to provide the right information at the right scale. Remaining issues are linking between control measures described at the scale of implementation (part of hillslopes, reaches) to catchment-scale outcomes, which entails fine spatial resolution and large computational demands; ability to predict some key processes such as bank and head gully erosion; representation of sediment remobilisation of stores associated with response to land clearance; ability to represent episodic or catastrophic erosion processes along with relatively continuous processes such as sheet flow in a single model; and prediction of sediment concentrations and clarity under normal flow conditions. In this presentation we describe a variety of models and their application in New Zealand, summarise the models in terms of scales, complexity and uses, and outline approaches to resolving the remaining difficulties.