**Sediment source fingerprinting in New Zealand fluvial environments: an overview of recent applications**

**Simon Vale1** & Hugh Smith1

1Manaaki Whenua – Landcare Research

* **This abstract is for an Oral**
* **Methodological Advances**

# ABSTRACT

Sediment source fingerprinting is a geochemical tool for determining the proportional contributions of eroded soil from different catchment sources to sediments in downstream receiving environments. The technique involves a) selecting tracers that discriminate sources based on their biogeochemical or isotopic properties and b) applying statistical mixing models to quantitatively determine source contributions to downstream sediments. Tracers may include geochemical, fallout radionuclides, or compound specific stable isotopes (CSSIs). Tracer suitability varies depending on the characteristics of the study catchment and the soil property or erosion processes being targeted. For instance, the spatial variation in soil geochemical properties is largely determined by underlying geological and pedogenic processes, whereas CSSIs utilise δ13C isotopic properties of fatty acid biomarkers that bind to soils and vary based on plant communities associated with each land cover.

Thus, sediment fingerprinting applications vary considerably, which can make the technique challenging to understand for non-specialists. Additionally, although the basis for discriminating sediment sources is reasonably well understood, research has drawn attention to limitations and uncertainties associated with source discrimination, tracer selection, non-conservative behaviour, and mixing model performance. Here, we present an overview of selected sediment fingerprinting studies in New Zealand catchments and summarise key findings and implications for future research and application. The selected studies relate to 1) characterizing suspended sediment sources using geochemical tracers in New Zealand hill country catchments; 2) understanding temporal and spatial sediment source dynamics during rainfall events; 3) determining source contributions to overbank sediment deposits; and 4) evaluating the impact of geochemical and CSSI tracers on the accuracy of source contribution estimates.