

Glacial Suspended Particulate Matter: Characteristics, and Phosphate Adsorptive Behaviour in the Waitaki Catchment, New Zealand.

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Glaciers produce huge volumes of fine sediment that can remain suspended in downstream meltwater for long periods. The freshly abraded mineral surfaces and fine particle sizes generate large surface areas, increasing susceptibility to chemical weathering and capacity to adsorb and release dissolved nutrients such as phosphate. Glacial suspended particulate matter (SPM) can therefore exert an influence on the biogeochemistry and water quality of downstream environments. Many glacier-fed rivers in the South Island of New Zealand traverse intensely developed agricultural catchments, and the ability of glacial SPM to regulate the concentrations of dissolved phosphorus in the run-off from pastures is a consideration in the environmental management of these catchments.

This research aims to characterize the composition and adsorptive behavior of SPM in the glacier-fed Waitaki River catchment. NZ. Particular attention has been paid to particle size and mineralogy and how this evolves down catchment where five large hydroelectric lakes retain water for up to 2 years, optimizing the opportunity for active weathering.

The adsorptive capacity of glacial SPM for phosphate ranged from 0.03 – 0.33 mg P/g SPM, and adsorption edges showed a complex relationship with pH. Significant decreases in the P adsorptive capacity were observed down catchment, and are associated with an: increase in the proportion of organic carbon, diatoms and aggregates relative to primary particles; and decrease in specific surface area.