

Elemental Analysis of Suspended Sediment Transport From Glacier to Commencement Bay

The Puyallup River is formed by meltwater from glaciers on the west side of Mount Rainier. It transports and discharges glacial sediment rich water into Commencement Bay. As a result of human-induced climate change, glacial retreat can increase suspended sediment loads due to the decrease of ice cover or the increase of meltwater discharge. We used elemental analysis maps in a scanning electron microscope (SEM) to determine the mineralogy of sediment collected from three different stations – one at the terminus of Emmons Glacier and two in Commencement Bay. Samples collected from Emmons Glacier showed an average of $18\pm 7\%$ of all spot analyses containing only Fe (indicating Fe-oxides), $36\pm 1\%$ containing only Si (indicating silicate minerals), and $17\pm 5\%$ containing only Ca. Comparatively, samples collected from Commencement Bay showed an average of $22\pm 7\%$ containing Fe, $9\pm 5\%$ containing Si and $16\pm 2\%$ containing Ca. Although we originally hypothesized that iron minerals would be more abundant in glacial sediment samples than elsewhere, silicates appear to be the dominant minerals found in all of the samples. The elemental analysis of these suspended sediments can provide environmentally significant information about sediment sources in the Puyallup River system and establish a record for comparison to future changes.