

Erosion of Retrogressive Thaw Slumps, Herschel Island, YT

Jared Simpson, Department of Geography, McGill University; Montreal (Quebec) Canada, 2013, Prof. Wayne Pollard, Prof. Bernhard Lehner

Erosion rates of several retrogressive thaw slumps along the Canadian Arctic Coast are studied between 2004 and 2011. Results show a general reduction in the amount of soil eroded as the thaw slumps retreated farther from the coast and presumably stabilized. A 3Dimensional model was created in ArcScene to visualize this decrease in erosion and calculate the volumetric soil loss between each year. Expected soil loss is significant, with over 4000 cubic meters eroding into the Arctic Ocean each year, and creating a very dynamic landscape. The aims of this research are: (1) to create a 3-dimensional model of three retrogressive thaw slumps showing the erosion between 2004 and 2012; and (2) to use the resulting volumetric soil loss values to estimate soil organic carbon (SOC) flux into the Arctic Ocean. Results show a substantial amount of soil loss totaling over 160,000m³ and a subsequent SOC flux of over 13 million kg. These findings suggest that retrogressive thaw slumps have significant environmental impacts and that further research is needed to better understand these dynamic landforms.

