Longitudinal Study of Temporal and Spatial Variability of Phytoplankton from 2013-2019 in Tofino Inlet, Clayoquot Sound, B.C. Canada

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Since 2001, the University of Washington Tacoma has been collecting water property data in Clayoquot Sound, B.C. Canada to examine the long-term impacts of climate change in this region. In 2014 and 2019 the Eastern Pacific Ocean experienced marine heat waves; a relatively new phenomenon linked to climate change. Warming waters potentially impact phytoplankton at the base of the food web, thereby affecting the whole marine ecosystem. Phytoplankton samples were collected in late summer 2013-2019. Tofino Inlet consisted of five stations where three types of phytoplankton samples were collected surface, thermocline, and net. Phytoplankton were identified and enumerated to the genus level using standard microscopy techniques. The distribution of phytoplankton abundance and biodiversity were determined and compared in both space and time. General trends of total abundance and diatom ratio were not conclusive in Tofino Inlet from 2013-2019 and seemed to vary depending on the year. However, during the years impacted by marine heat wave (2014 and 2019), results indicated lower biodiversity and higher diatom to dinoflagellate ratios. Indicating that warming water temperatures cause the phytoplankton community to shift toward diatom species. These results can illustrate the variability of phytoplankton communities between years, while highlighting the effects of the pacific marine heatwave. This longitudinal data could be useful in forecasting future trends in phytoplankton abundance, diversity, and distribution as oceanic water temperatures continue to rise due to climate change.