Physical, chemical, and biological observations of ‘the Blob’ on the British Columbia central coast

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The Hakai Institute
• The Hakai Institute is a scientific research institution that advances long-term research at remote locations on the coastal margin of British Columbia
• The Hakai Institute is a not for profit organization
• Research focuses of the Hakai Institute are:
  • Oceanographic monitoring (physical, chemical, biological and ocean acidification)
  • Archaeology
  • Marine Ecology
  • Fisheries ecology and oceanography

Hakai Field Program Footprint
• The Hakai Institute has 2 field stations
  • Quadra Island (northern Strait of Georgia)
  • Calvert Island (BC central coast)
• Research focuses on regions that are accessible from those field stations
• Data are sampled year-round at daily to monthly intervals (station dependent)
• Physical data collected are:
  • Temperature, salinity, atmospheric data
• Chemical data collected are:
  • Nutrients, carbon system data, oxygen, pH
• Biological data collected are:
  • Bacteria and viruses, phytoplankton, zooplankton

Central coast core stations
• Five stations on the British Columbia central coast have been designated core stations, where biological, chemical, and physical variables are sampled year-round. All stations are sampled more frequently in summer and about every 6 weeks from October to March
• These stations are:
  • PRUTH – in Kwakshua Channel
  • HKP01 – in Hakai Pass, north of Calvert Island
  • QCS01 – NW of Calvert Island in Queen Charlotte Sound
  • FZH01 – in Fitz Hugh Sound, east of Calvert Island
  • DFO2 – in Rivers Inlet

Results - Nutrients
Figure 5: Observed phosphate (blue circles), silicate (red circles) and nitrate plus nitrite (green circles) from June 2012 – June 2015. All samples were collected by Niskin bottles at PRUTH at 5 m depth.
• Nutrient data show lower concentrations in the summer of 2014 than the previous two summers.
  • Nitrate, nitrite and silicate were lowest, suggesting nutrient limitation for phytoplankton in the summer of 2014
• All nutrients were lower in the winter of 2014-2015, suggesting reduced replenishment of nutrients to the surface waters

Results - Biology
Figure 6: Total chlorophyll-a biomass in the upper 50 m at QCS01, PRUTH, FZ001, and DFO2. All chlorophyll-a samples were collected from Niskin bottles at 0m, 1m, 5m, 10m, 30m, and 50m.
• Chlorophyll concentrations were reduced during the summer of 2015
• Zooplankton biomass was lower during the summer of 2015 than the summer of 2014 (not shown)

Summary
• The Hakai Institute collects biological, physical, and chemical data in remote regions of British Columbia’s coastal margin
• The Blob first appeared on British Columbia’s central coast during the winter of 2014-2015
• The Blob resulted in increased temperatures to about 100 m and reduced near-surface nutrients, phytoplankton, and zooplankton
• Continuous sampling during the winter of 2015-2016 will offer insight into the impact of the Blob and the El Niño on British Columbia’s central coast