

Line-P / Ocean Station Papa 1949-Present

Kyle Simpson, Marie Robert and many others

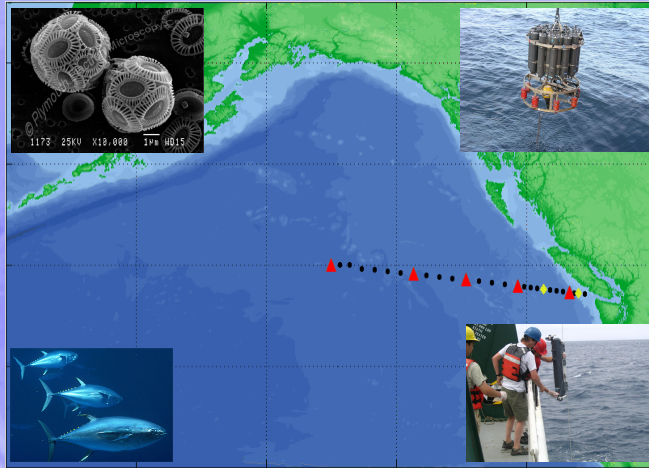
Institute of Ocean Sciences – Fisheries and Oceans Canada

<http://www.pac.dfo-mpo.gc.ca/science/oceans/data-donnees/line-p/index-eng.htm>



Introduction:

Line P and Ocean Station PAPA (50 00'N, 145 00'W, depth 4300 metres) is a long standing program which surveys a 1400 km long section 3 times annually. Data has been collected along this line since 1956 and shows the impact of climate variability and change on the ocean. It is the only Canadian time-series that allows scientists to monitor climate changes in the North Pacific Ocean.



Core Sampling

Station type: CTD (Basic - black dots on the plot) – standard sampling to 2005 dbar

- Temperature
- Conductivity
- Dissolved Oxygen
- Transmissivity
- Fluorescence

Discrete sampling at 5 dbar and Chl-Max for Nutrients, Salinity, Chl-a and Pigments (HPCL).

Station type (Full – red triangles on the plot) – Rosette/Net Hauls/Trace Metals etc.: Cast to 10m above the Sea Floor

• All CTD measurements listed above:

- **Deep cast (to 4300 dbar at OSP):**
 - Dissolved Oxygen
 - DIC, Alkalinity, and pH
 - Nutrients (Nitrate plus Nitrite, Phosphate, Silicate)
 - Salinity
- **Shallow Cast (to 200 dbar)** including PAR
 - DMS (Dimethylsulfide) – DMSD dissolved and total
 - Nutrients
 - Chl-a and pigments (HPLC)

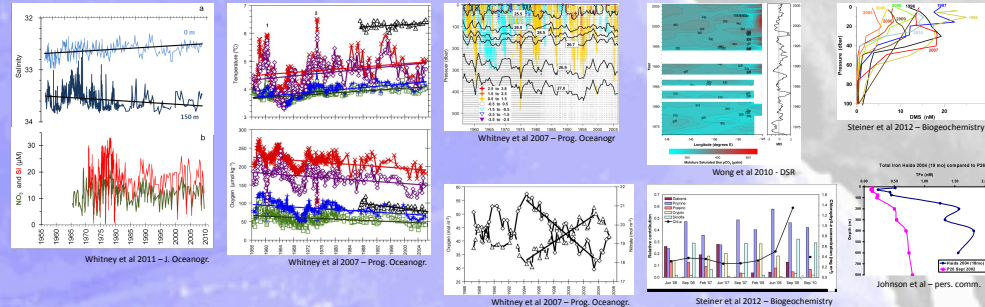
- Trace Metal Sampling (to 1200m) but capable to 4500m
- Vertical Net Haul (Bongos) to 250m with mesh size of 236 μ m

Underway Measurements

- Thermosalinograph (Temperature, Salinity, Fluorescence), pCO₂, acoustic sounder.

Standard depths / pressures for sample collection: 5, 10, 15, 20, 25, 30, 40, 50, 75, 100, 125, 150, 175, 200, 250, 300, 400, 600, 800, 1000, 1250, 1500, 2000, 2500, 3000, 3500, 4000 dbar and 10 m above the ocean floor.

Some Recent Results



HMCS St. Catharines and Stone Town



CCGS Quadra



CSS Parizeau



CCGS JP Tully

History

Operated as an ocean weather station from 19 December, 1949 through 20 June, 1981. The first oceanographic observation there, in the form of a bathythermograph cast, was made on 19 December, 1949 (Leipper et al., 1954). The oceanographic program at Station P and Line P has undergone much iteration since then as can be seen from a paired down summary (below). In view of the importance of long ocean time series, the observations at Station P and Line P were continued, although at much less frequent intervals than in the past, after the withdrawal of the weather-ships in June 1981. The observations are carried out mainly by the staff of the *Institute of Ocean Science, Fisheries and Oceans Canada*,

- 1940s Weather stations designated in N. Pacific
- 1950 - 1981 OSP taken over by Canada, Weather-ships constantly on station
- 1981 Observations continued at Station P and Line P at intervals of 3-6 times per year
- 1984 -1988 SUPER (Subarctic Pacific Ecosystem Research)
- 1991-1997 Line P /Station P sampling part of WOCE
- 1992-1997 Line P /Station P sampling part of the Canadian JGOFS program
- 2002 SERIES (Subarctic ecosystem response to iron enrichment study)
- 2012 Line P / Station PAPA – Continues 3x per year

Current Principal Participants and Collaborators

Fisheries and Oceans Canada – Institute of Ocean Sciences

- Marie Robert Program Coordinator, Physical Oceanography
- Dr. Bill Crawford Physical Oceanography
- Dr. Jim Christian Biogeochemistry
- Dr. Howard Freeland Physical Oceanography, ARGO
- Dr. Sophia Johannessen pCO₂
- Dr. Dave Mackas Zooplankton
- Dr. Lisa Miller Dissolved Inorganic Carbon, Alkalinity, pH
- Dr. Angelica Peña Phytoplankton, HPLC
- Kyle Simpson Trace metals, carbonate chemistry
- Dr. Nadja Steiner DMS, DMSP

Collaborators

- Environment Canada/Canadian Wildlife Services
- University of British Columbia
- University of Victoria
- Université Laval
- University of Washington
- NOAA
- Queens College of City University New York
- BIOS
- University of Rhode Island
- Oregon State University
- University of California - Berkeley
- University of Maryland
- University of Arizona
- California State University - San Marcos



Fisheries and Oceans Canada | Pêches et Océans Canada

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