

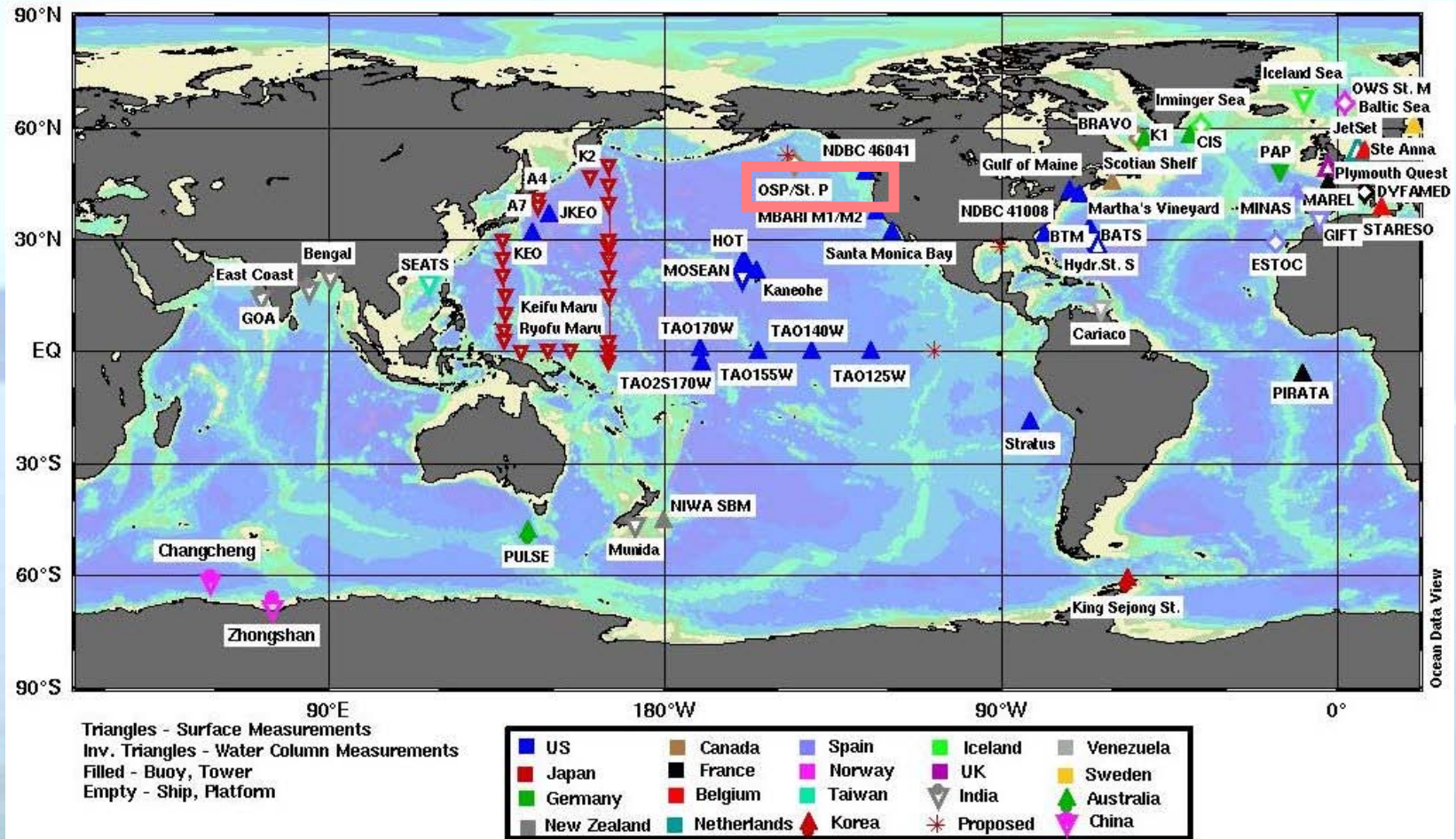


**Time-series of pCO<sub>2</sub> at Station P/Line P in the  
sub-arctic Northeast Pacific Ocean :**

**PROGRESS REPORT**

**C. S. Wong, S.-K. E. Wong, S. C. Johannessen, L. Xie and J. Page  
Fisheries and Oceans Canada, Institute of Ocean Sciences  
Canada**

# Current and proposed time series sites observing surface and water column CO<sub>2</sub>



IOCCP Map from UNESCO website

[http://ioc.unesco.org/IOCCP/Time%20series/TS\\_MAP.htm](http://ioc.unesco.org/IOCCP/Time%20series/TS_MAP.htm)



## $p\text{CO}_2$ along line P and at station Papa

“weather ship” *CCGS Vancouver*

1973 – present

weather ships and later scientific cruises (av. 3 cruises per year)

Under way measurements using equilibrator  
and different measurement systems



*CCGS John P. Tully*

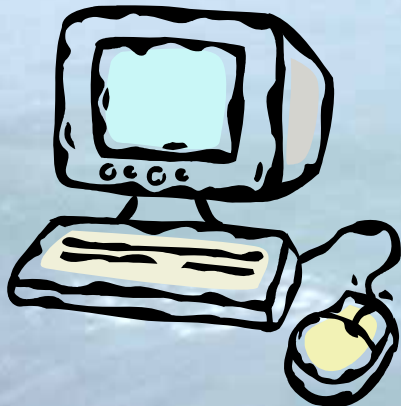
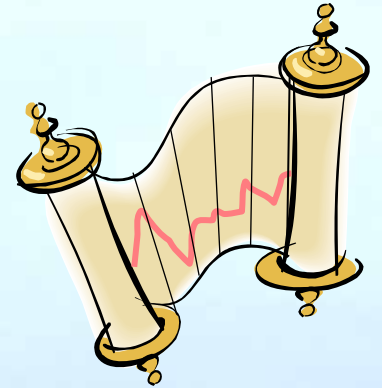
# Data mining... progress report

**82 cruises from 1973 – 2006**

Different measurement methods  
QA/QC mixed

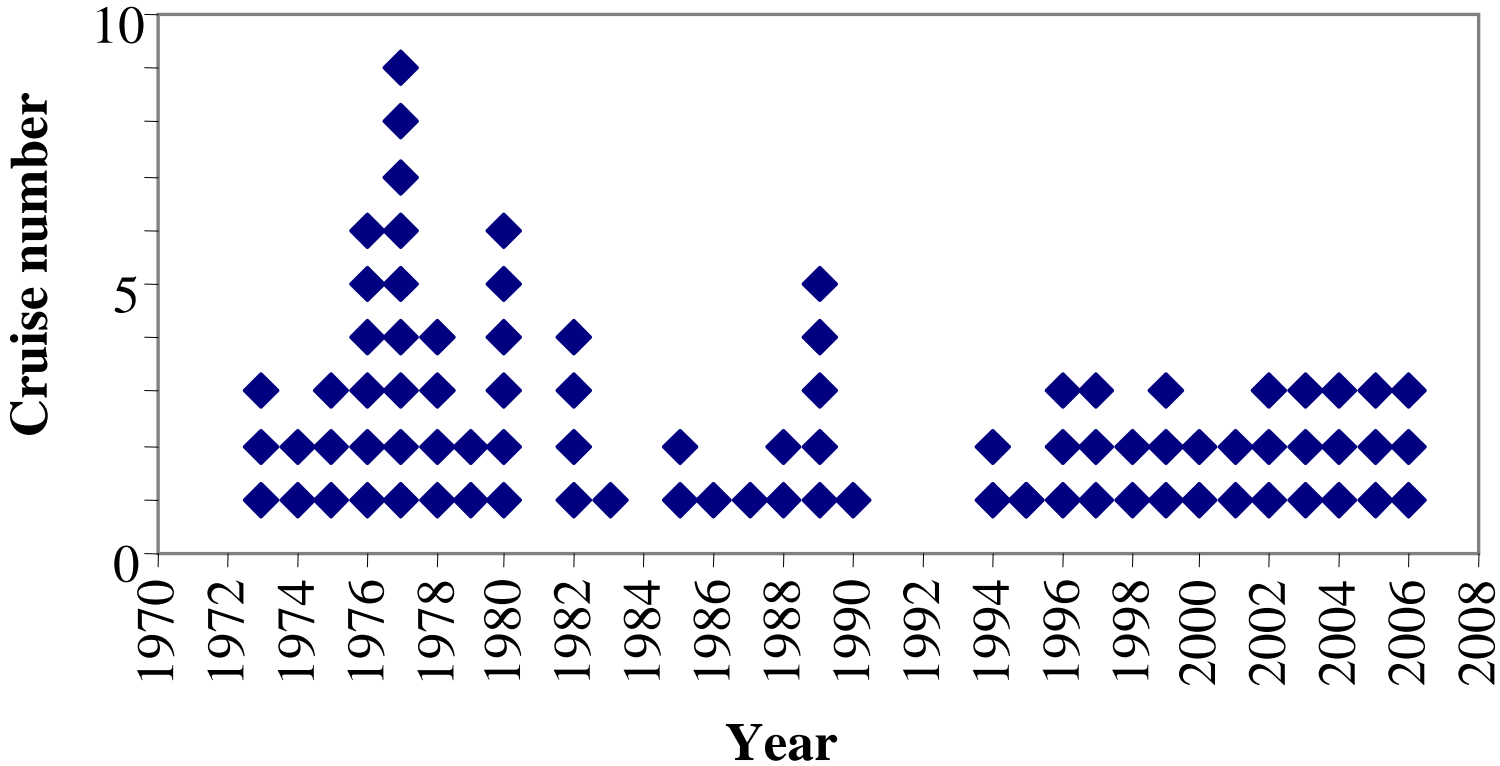
Different storage methods:

- chart paper (11 cruises)  
“digitizing” with a ruler
- various computer formats

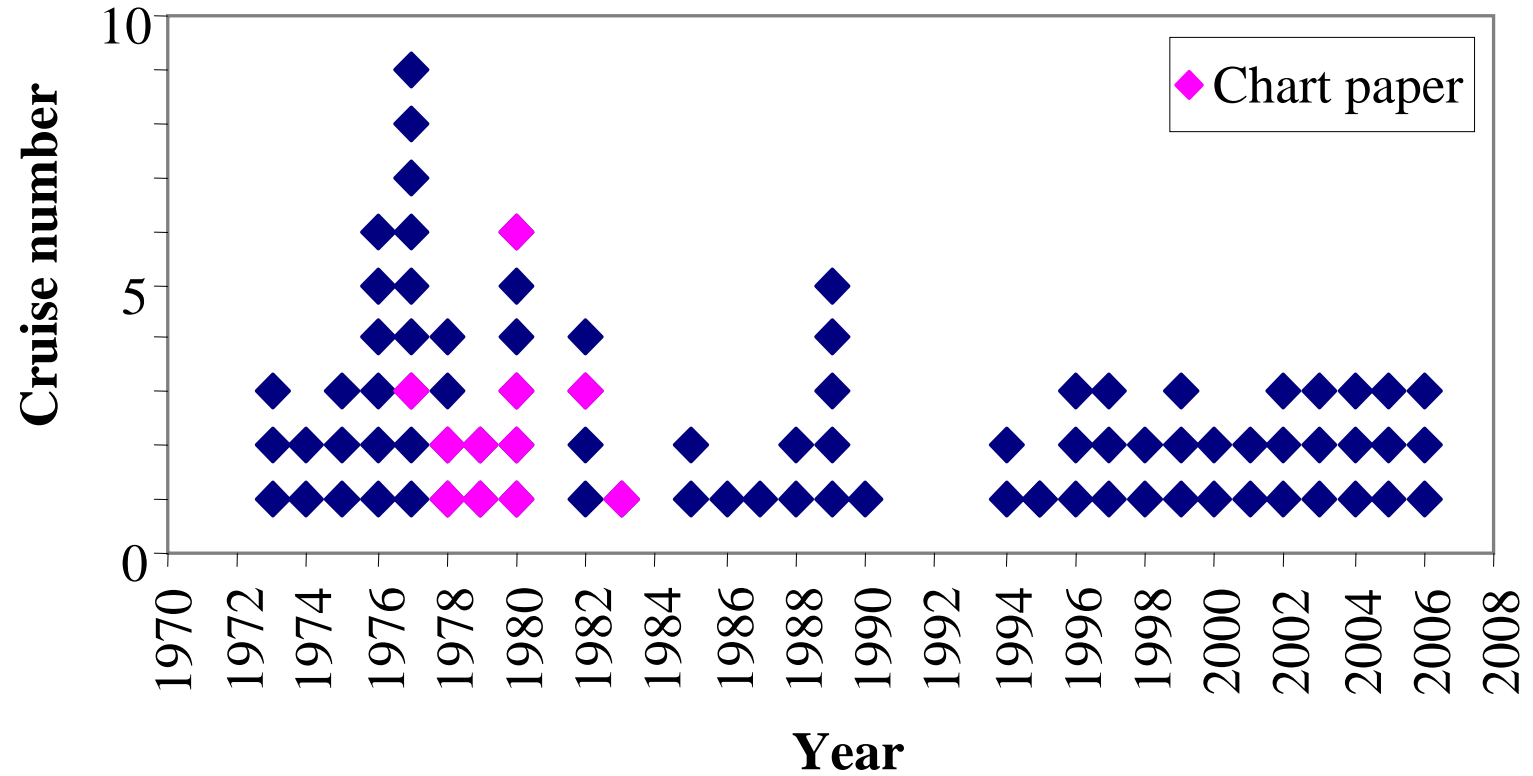


**Irreplaceable data set**  
**Interpretation just beginning**

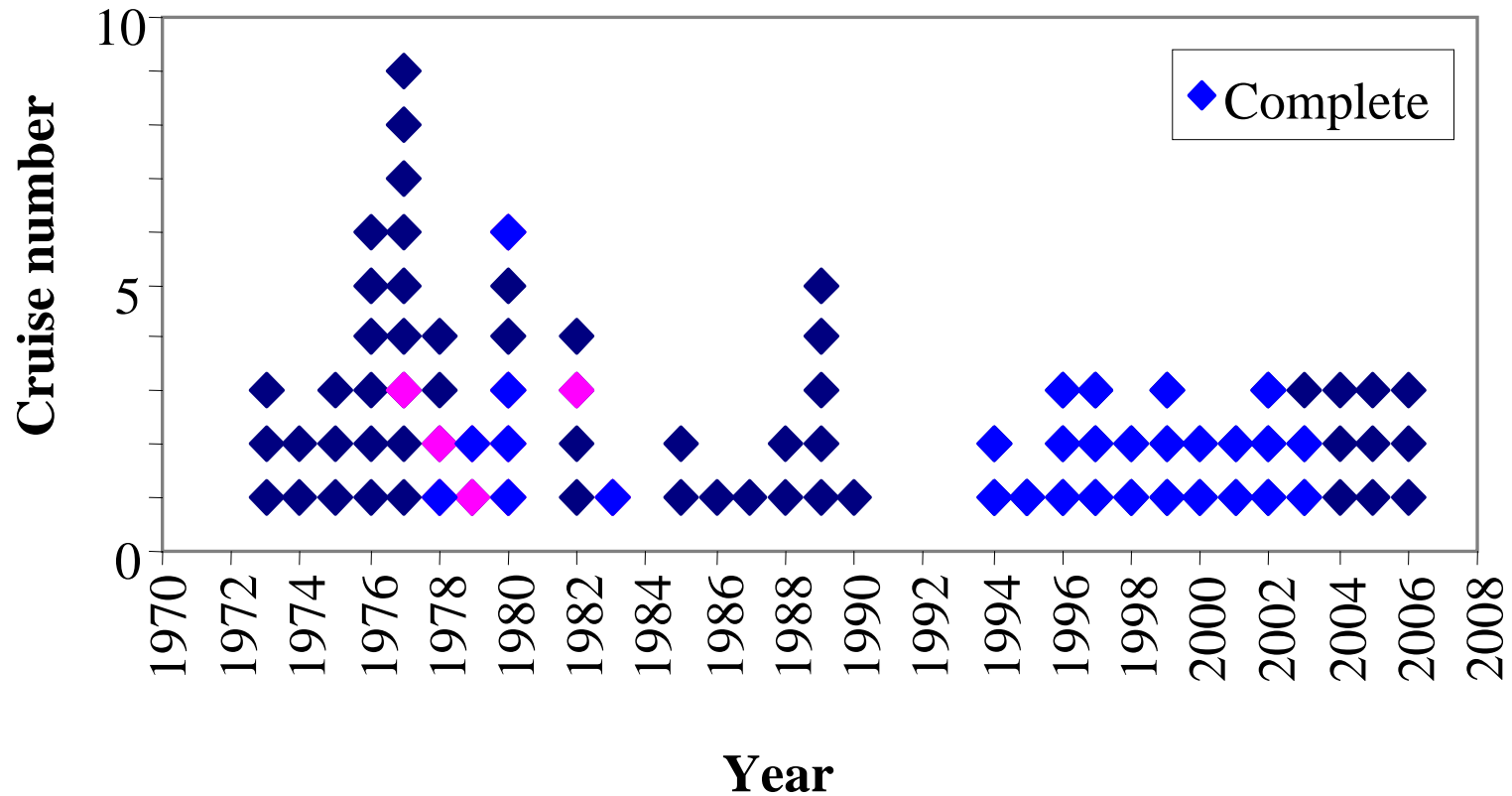
# Data Inventory



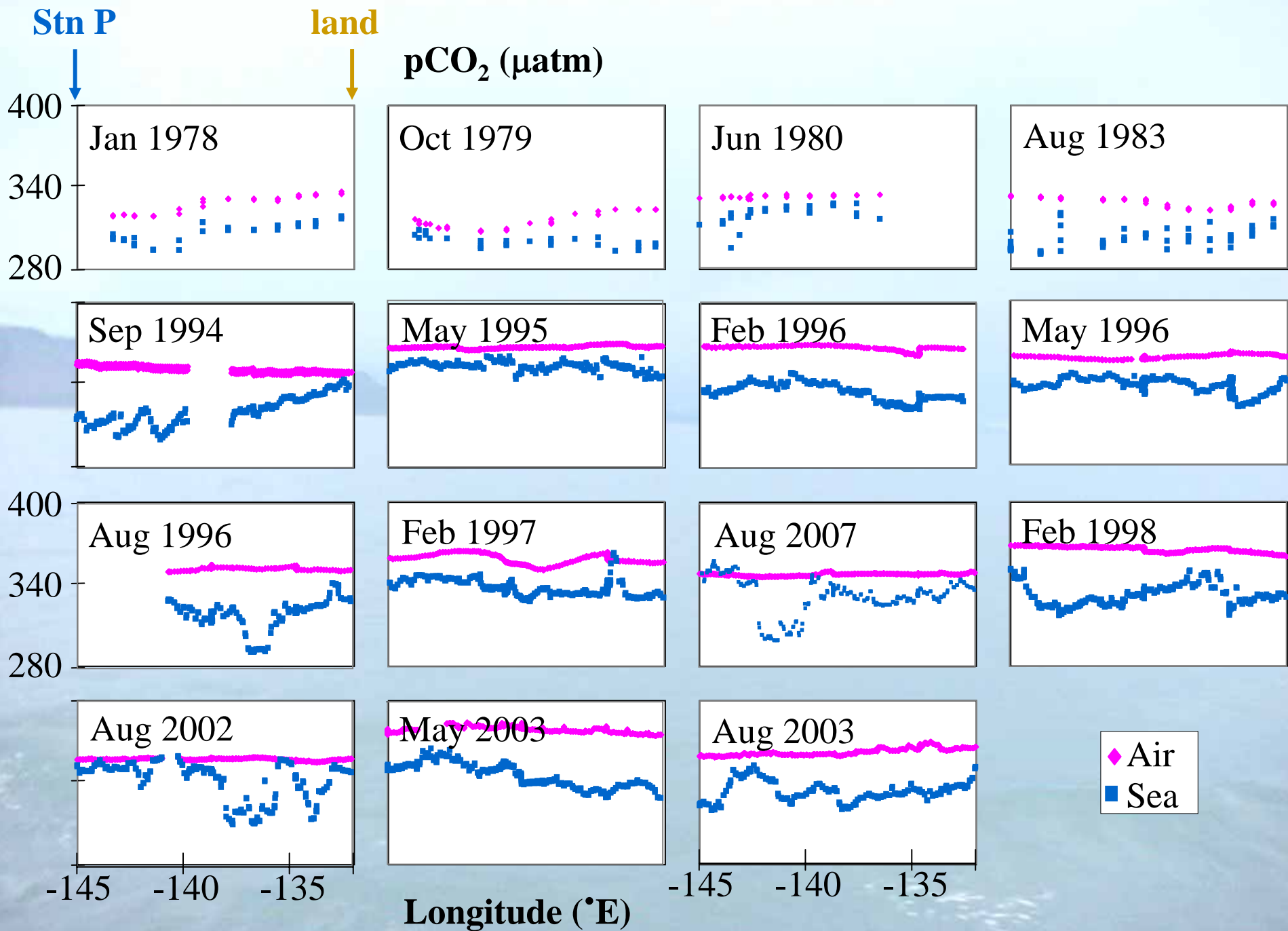
# Data Inventory



# Data Inventory

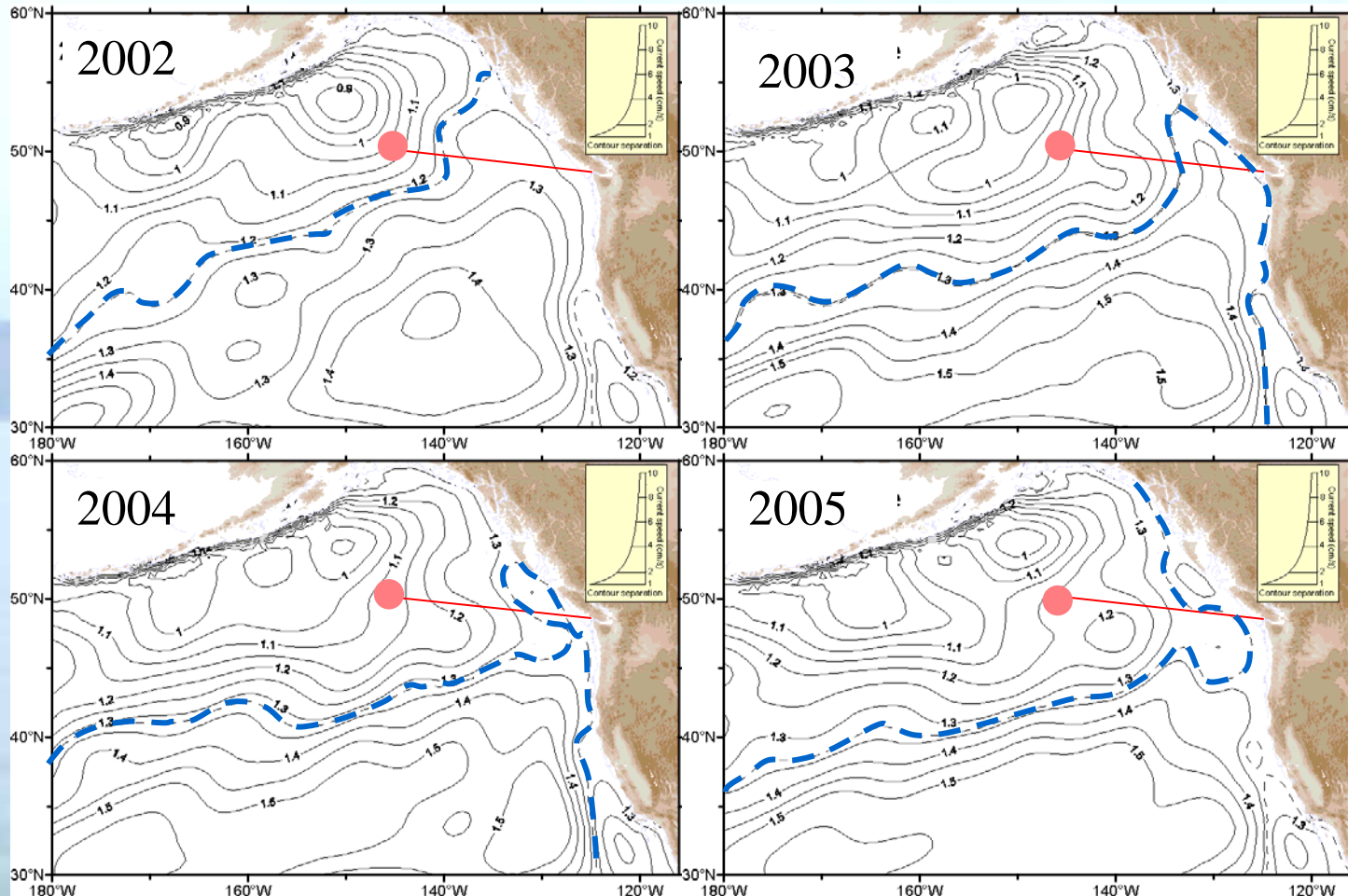


1973-1978 data published: *Wong and Chan, 1991. Tellus 43B:206-223.*





# Line P crosses 2 current systems

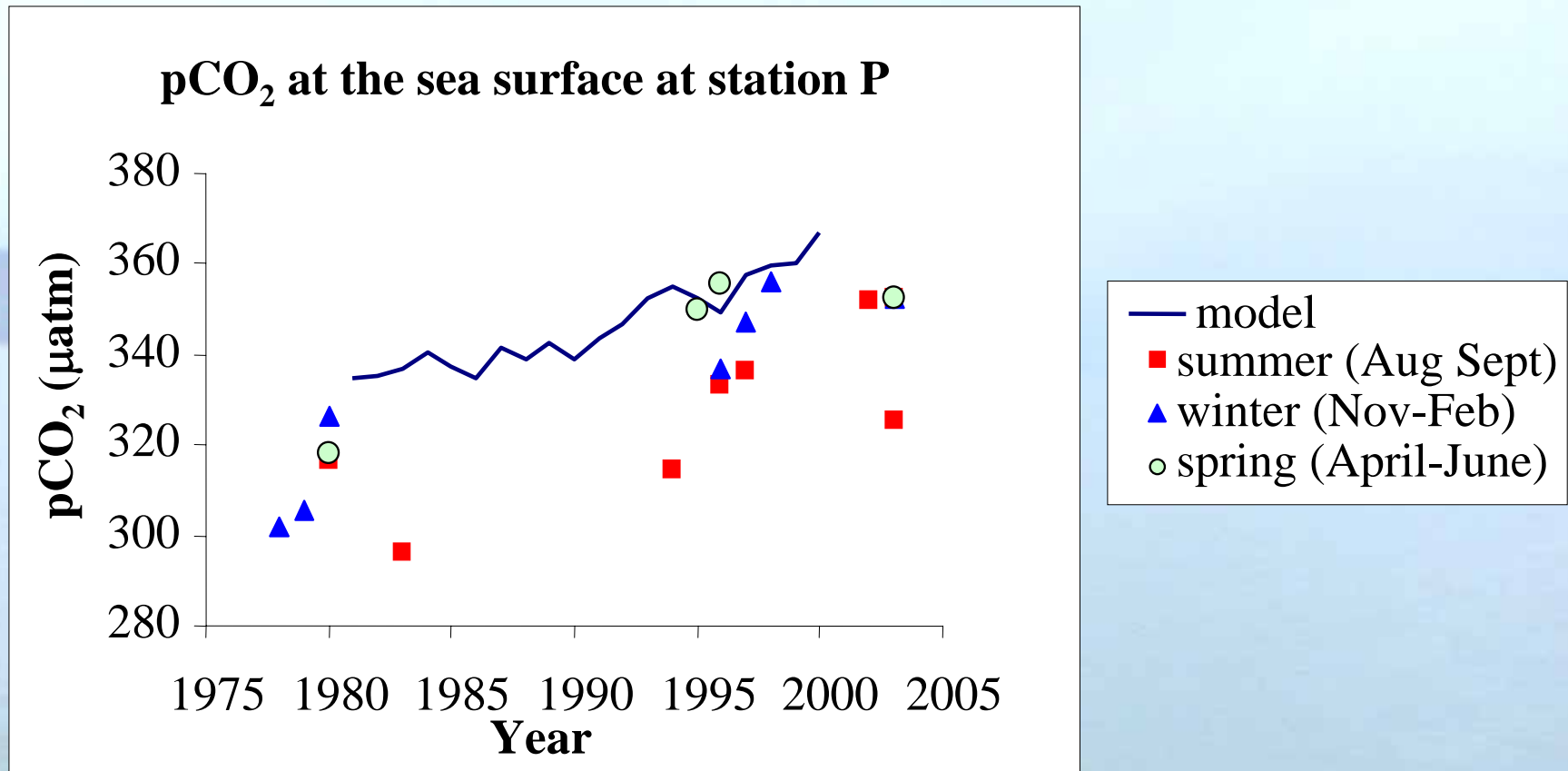


● Stn. P

Courtesy of Dr. Howard Freeland, Fisheries and Oceans Canada  
modified from Project ARGO website

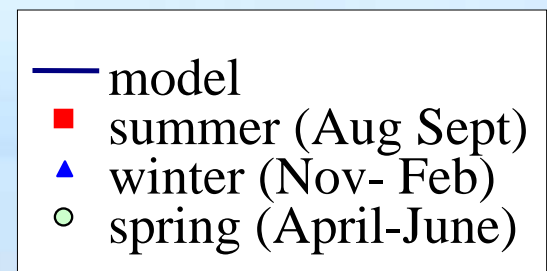
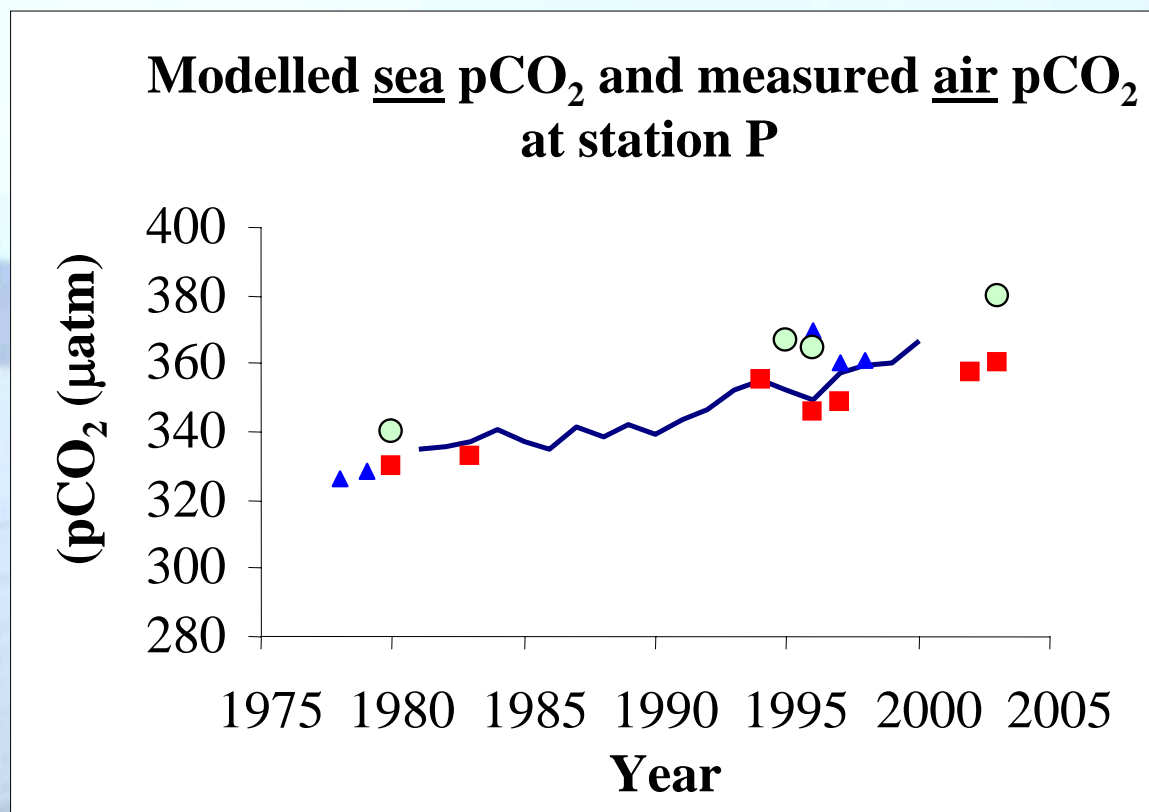
[http://www.pac.dfo-mpo.gc.ca/sci/osap/projects/argo/Dhgts\\_e.htm](http://www.pac.dfo-mpo.gc.ca/sci/osap/projects/argo/Dhgts_e.htm)

# How do the measured values compare with a model?



Coupled climate / carbon cycle model (See presentation by Christian et al. at 1600.)

# Measured air pCO<sub>2</sub> looks more like modelled sea surface



...Why?

Coupled climate / carbon cycle model (See presentation by Christian et al. at 1600.)

# Data archiving

## **All available data to be included in archive:**

- auxiliary data: T, S, wind speed, etc.
- raw voltages, where available
- standard curves
- xCO<sub>2</sub> in air and sea water
- metadata (name of ship, sampling dates, etc.)
- pCO<sub>2</sub> calculated by 2 methods and code for the calculations
- COMMENTS (bad data flagged but not excluded)

**Data will be stored in the IOS Data archive  
and eventually copied into a national  
archive (BIOCHEM)**

**Accessible on request through IOS website:**

**[http://www-sci.pac.dfo-  
mpo.gc.ca/osap/data/default\\_e.htm](http://www-sci.pac.dfo-<br/>mpo.gc.ca/osap/data/default_e.htm)**

**But be patient for at least another year...  
the data are not there yet!**

# Summary

- about 82 cruises of pCO<sub>2</sub> data collected along line P /stn P 1973-2006 (program ongoing)
- clear increase in pCO<sub>2</sub> in air and seawater
- seawater pCO<sub>2</sub> usually 10-20 μatm lower than air pCO<sub>2</sub>
- seasonal variability not strong, but sea pCO<sub>2</sub> tends to be higher in late spring / early summer
- data archiving in progress – data quality variable
- publications in prep.

# Acknowledgements

James Christian  
Lizette Beauchemin  
Valerie Forslund  
Howard Freeland  
Cynthia Wright  
Michael Arychuk  
Marty Davelaar  
Keith Johnson  
Joe Linguanti  
Lisa Miller

Funding for data archiving: DFO through  
National Science Data Management Committee