Thermosalinograph Operations

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Why ThermoSalinoGraphs (TSGs) ?

- Repeated transects (sometimes).
- Concurrent observations with other parameters.
- Allow very fine spatial resolution (SST, SSS).
- Can (will) be used to validate estimates from satellite missions.
- Data distribution under GOSUD/SAMOS standards.

Important Matters

- **Not an 'official' component of the ocean observing system.**
- **Not recommended transects as with XBTs.**
- **Currently being used to investigate MLD in tropical Pacific Ocean, El Nino studies. Need for more scientific use of data.**
- **Not being used to initialize operational models. Can we go around this problem ?**
- **Real-time transmissions: Coriolis site and GTS.**
- **Included in a Community White Paper for OceanObs09 (Shawn Smith et al, 2009).**

Important Matters

- **Unified criteria for what type of data (raw, qc) is distributed. Distribution of data with different QC procedures, or no QC at all.**

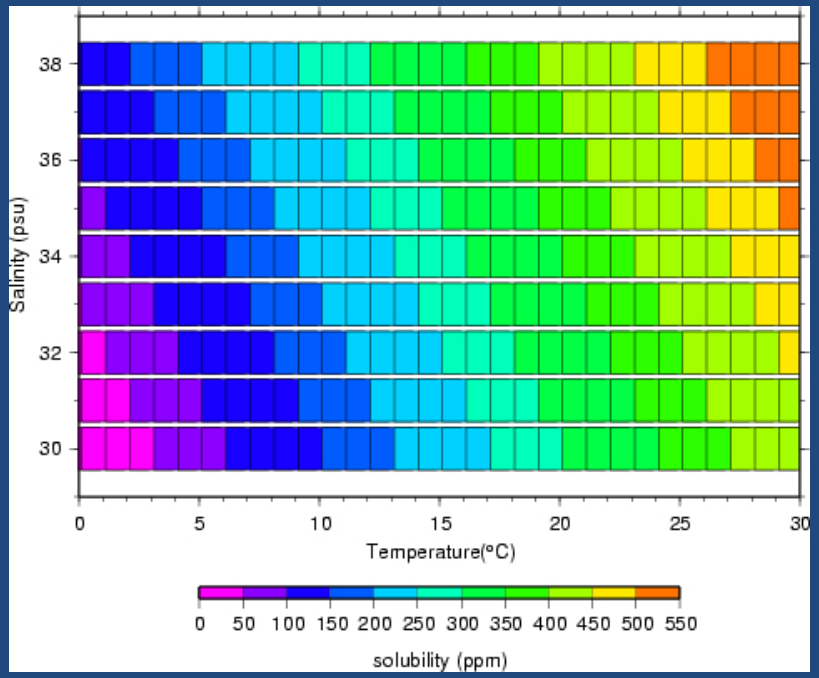
- **Real-Time data distribution:**
  Coriolis vs. GTS, or Coriolis and GTS.

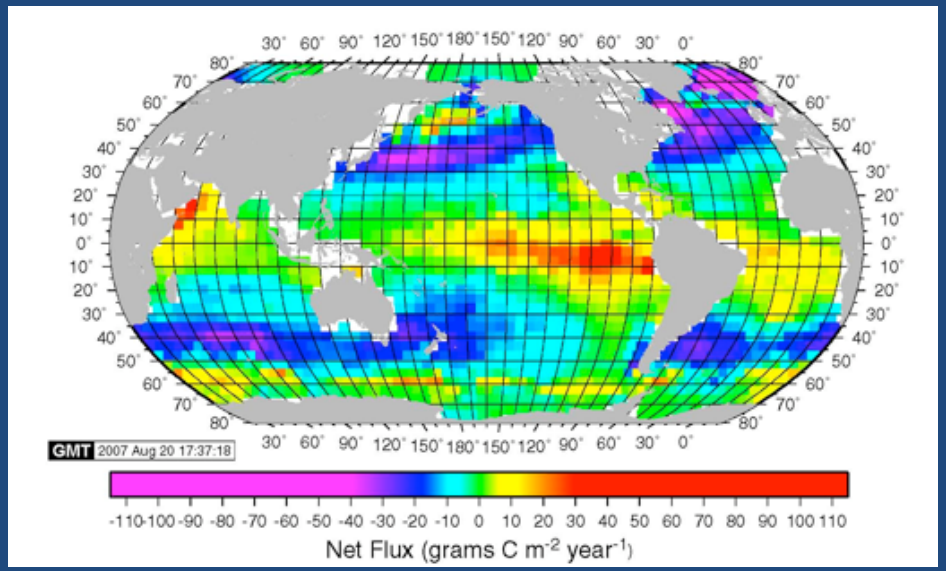
- **Make it a more useful data set: get operational centers to use TSG data.**

- **Will be used for validation of upcoming sea surface salinity missions.**

- **Real-time data transmission monitoring (GTS only).**

Sea Surface Salinity and pCO_2



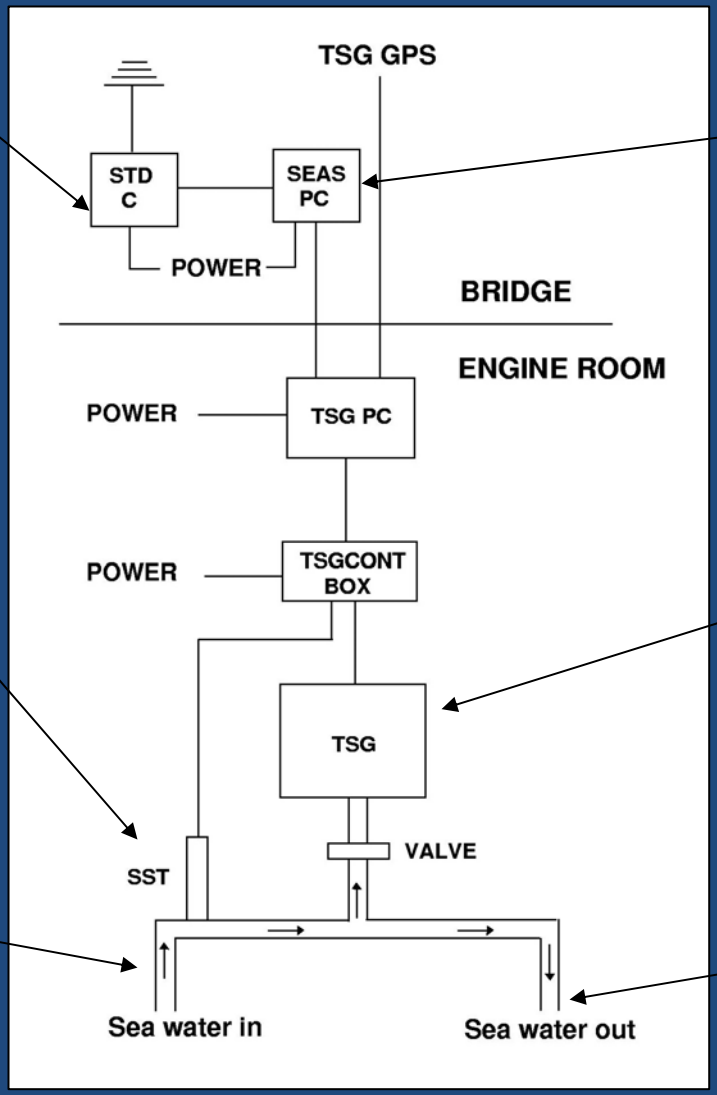


An objective of the pCO2 project is to increase the number of samples to produce seasonal maps of CO2 with initial focus on the North Atlantic and North Pacific Ocean.

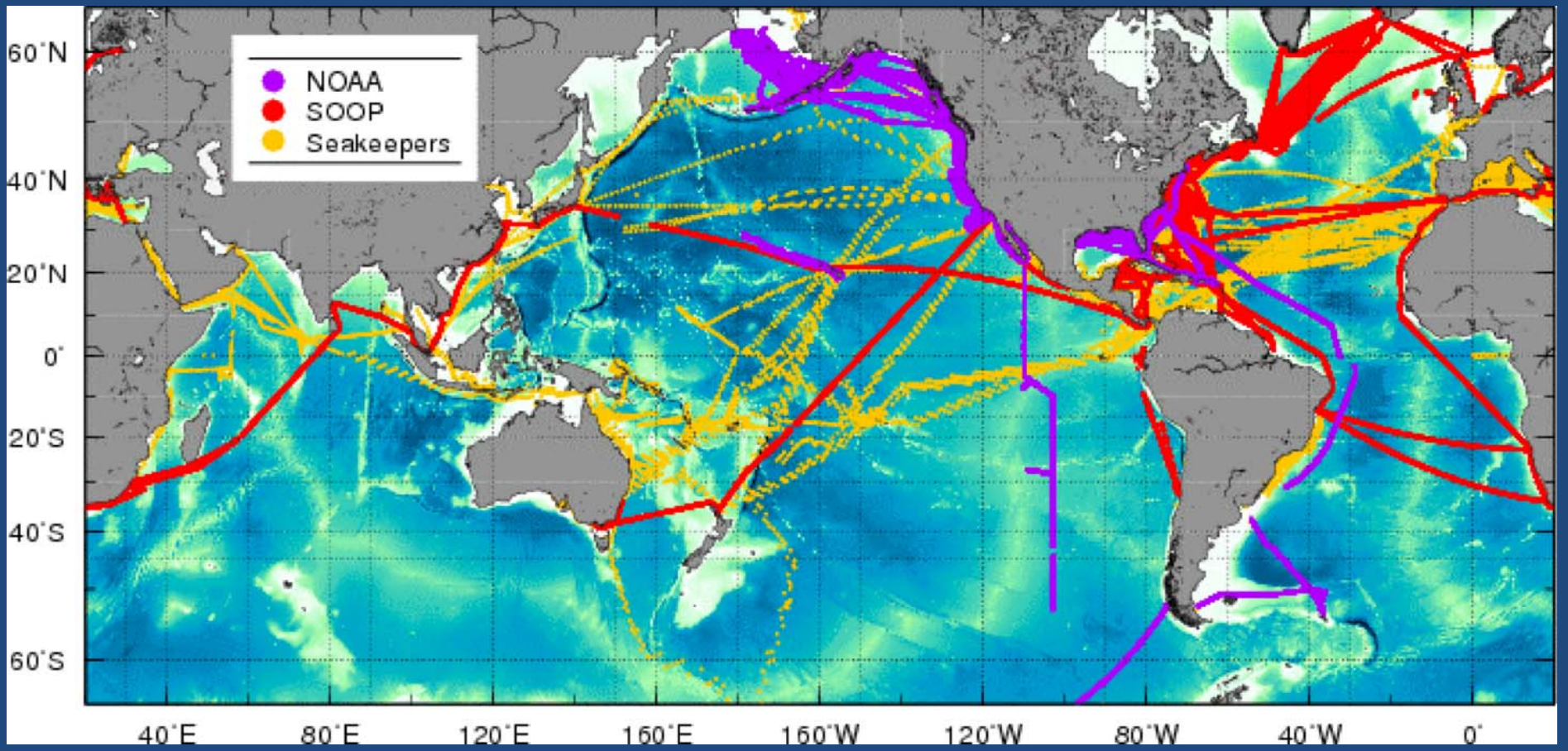
Blue=sinks

Red=sources

TSG installation set-up



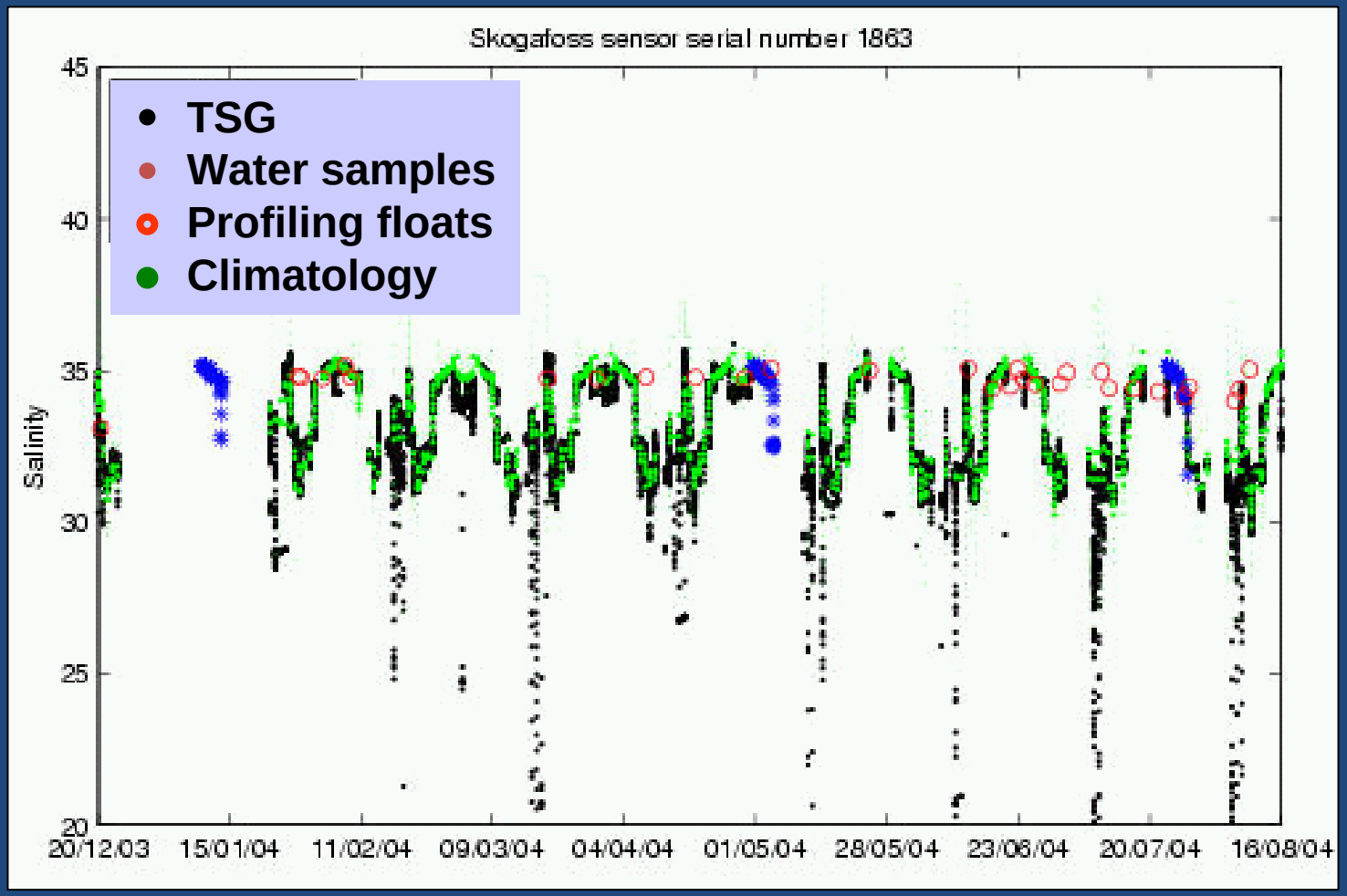
TSG observations



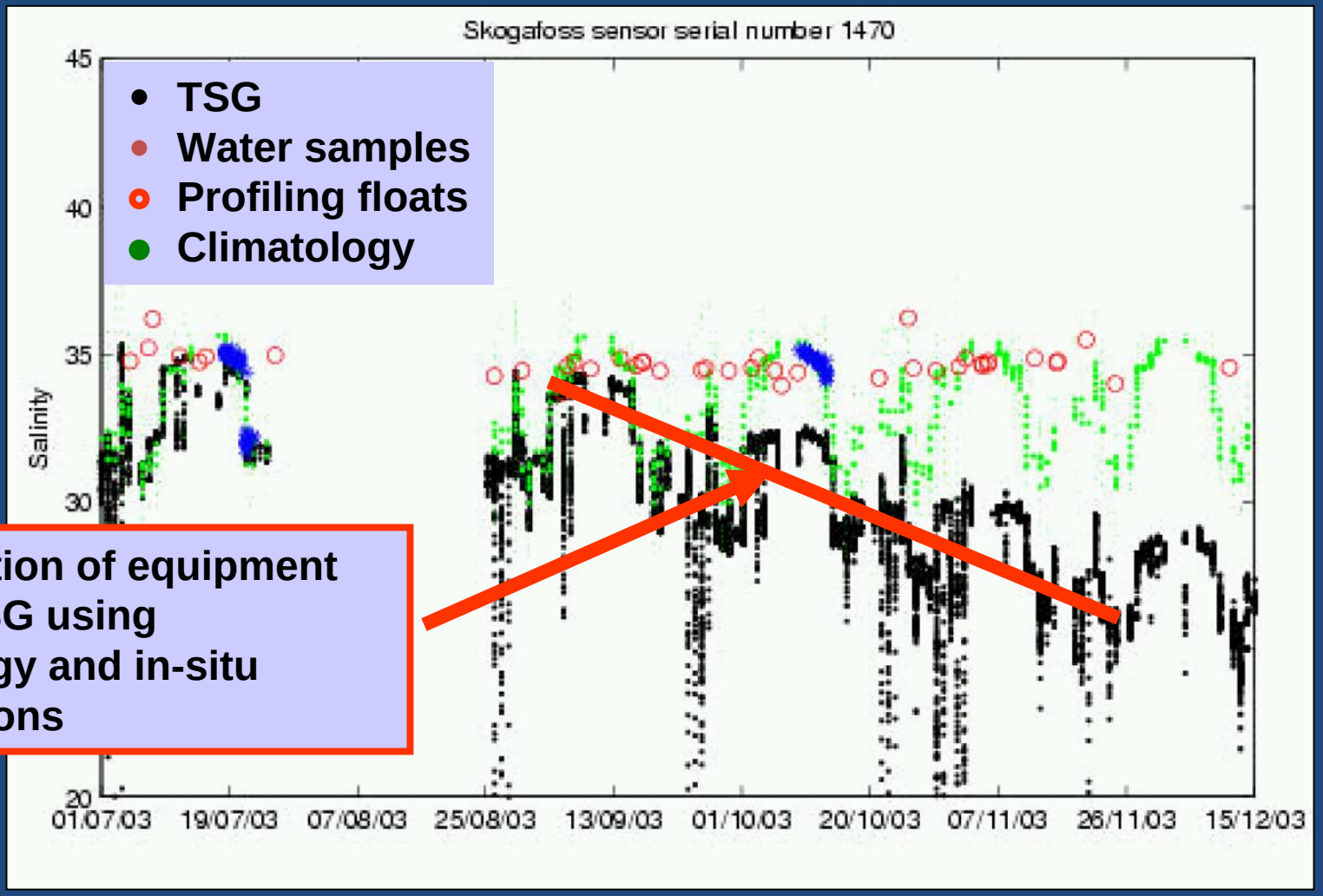
15 ships NOAA fleet
50 KS ships
15 SOOP ships

2001-2009
1.4M records

Data quality control

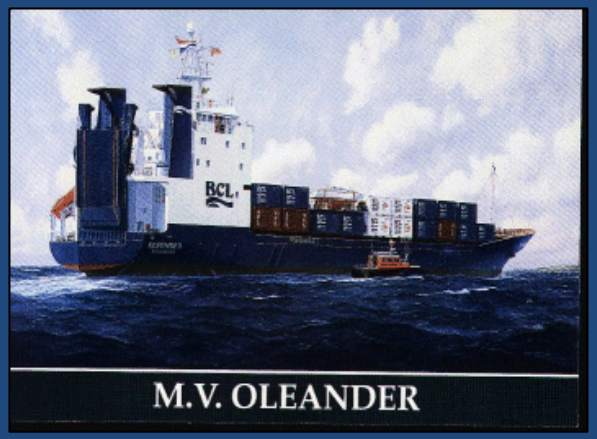


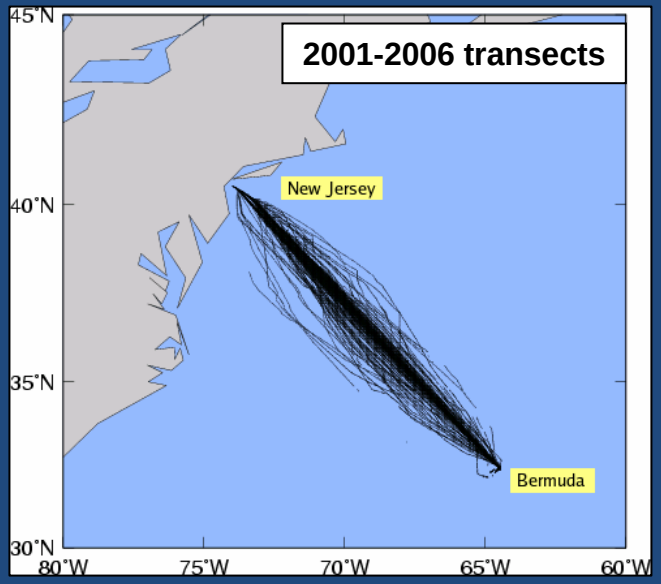
Data quality control



Identification of equipment bias in TSG using climatology and in-situ observations

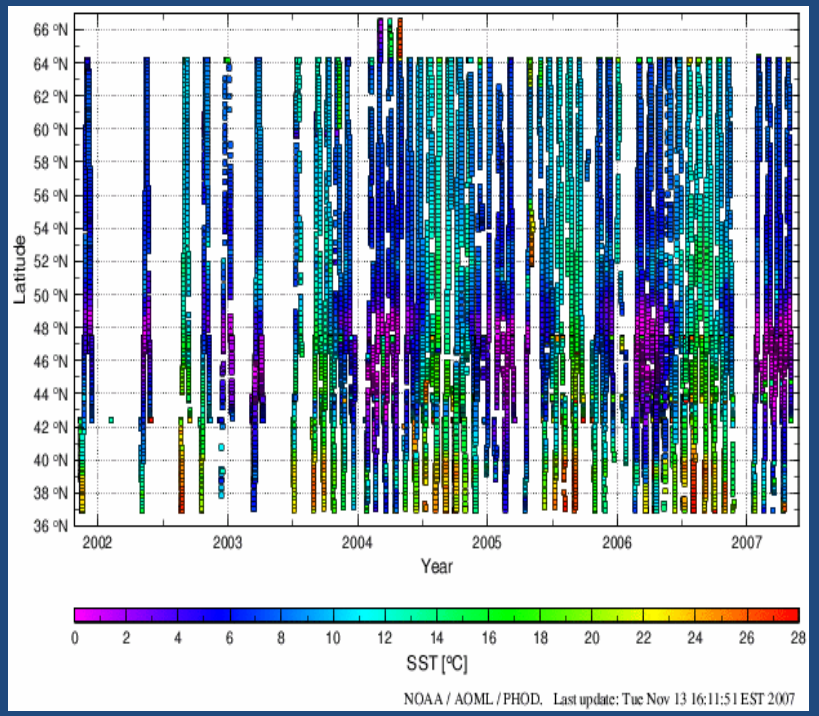
Oleander Project

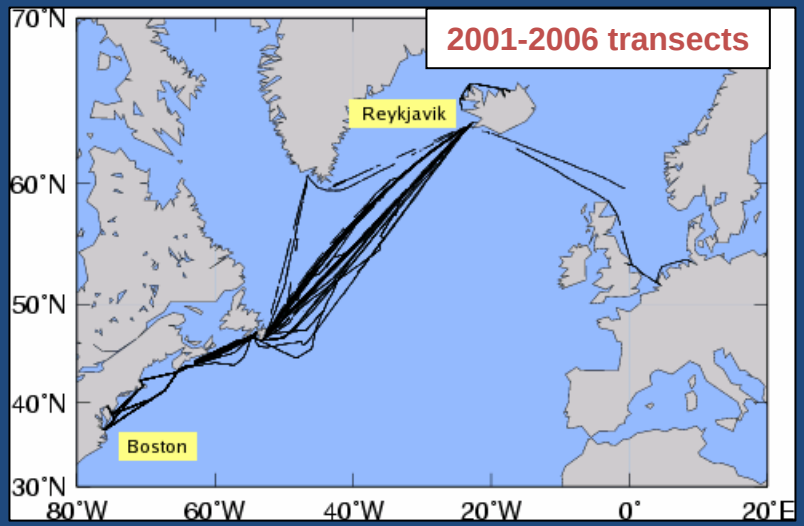




- **TSG NOAA/AOML and NOAA/NEFSC 1991 to present: RT transmission, water sampling, 10 sec TSG sampling, 2 transects/week all year.**
- **XBTs NOAA/NEFSC and NOAA/AOML 1976 to present.**
- **ACDP NOAA contract with URI and SUNY-LI mid 1990s to present.**
- **pCO_2 NOAA/AOML 2006 to present.**
- **CPR NEFSC 1975 to present.**

Skogafoss - Rjakafoss

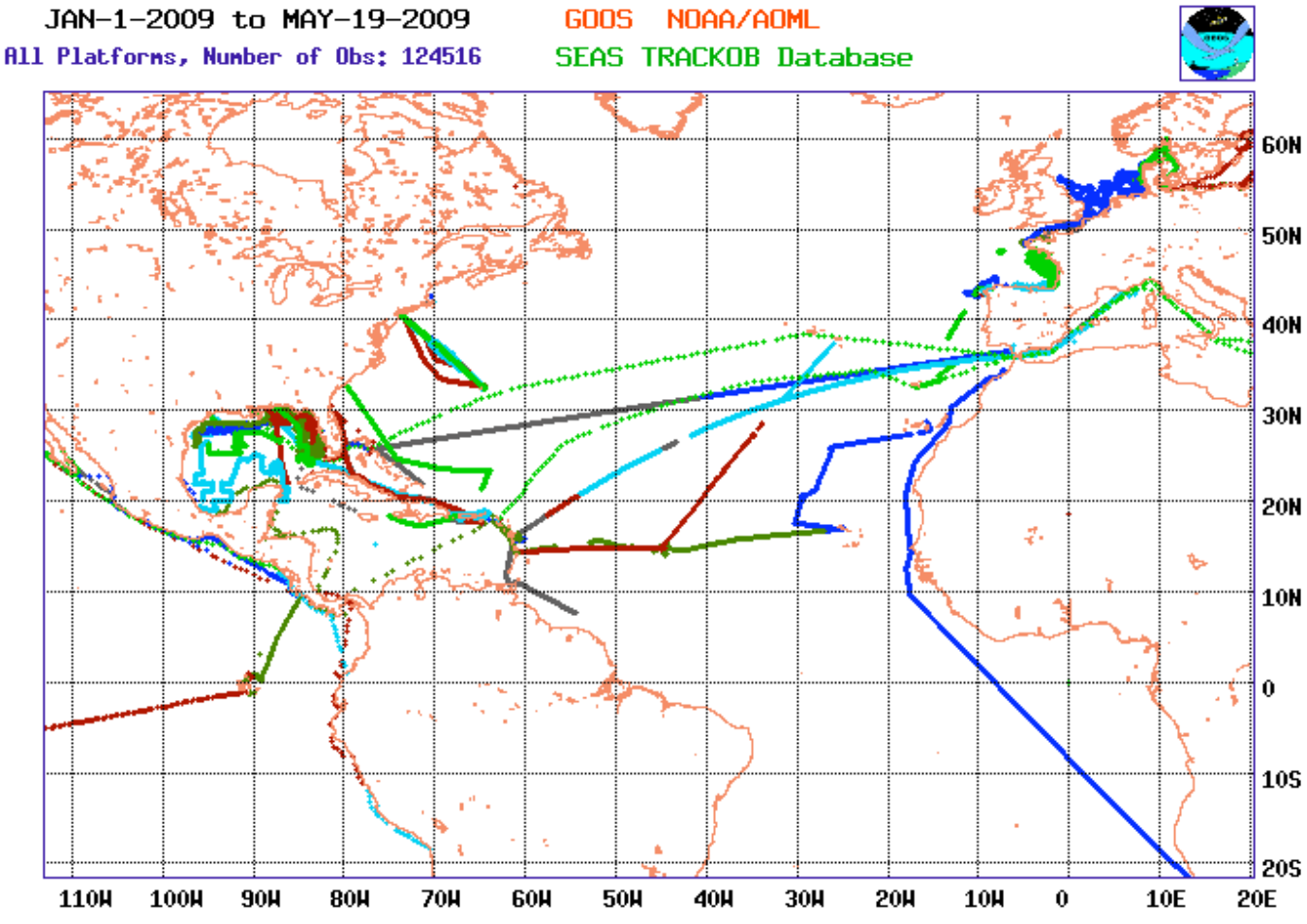




+ pCO2
+ water sampling
+ XBTs

Real-time monitoring

http://www.aoml.noaa.gov/phod/trinanes/SEAS/TRACKOB/



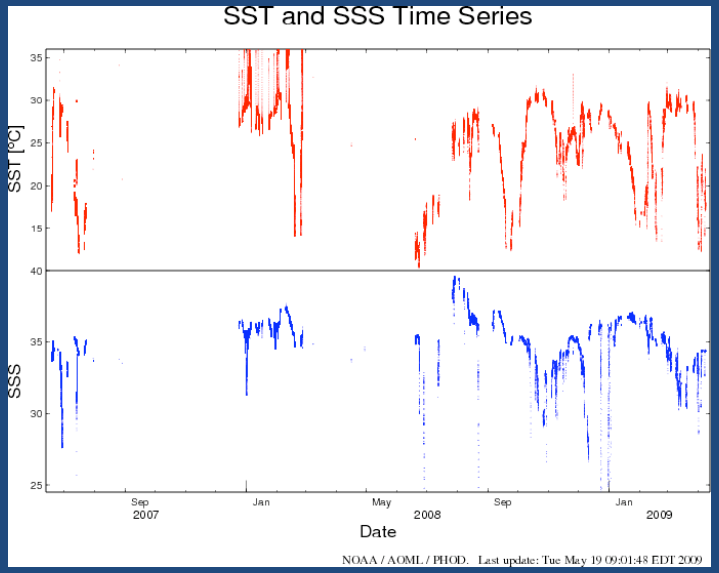
TSG Reports

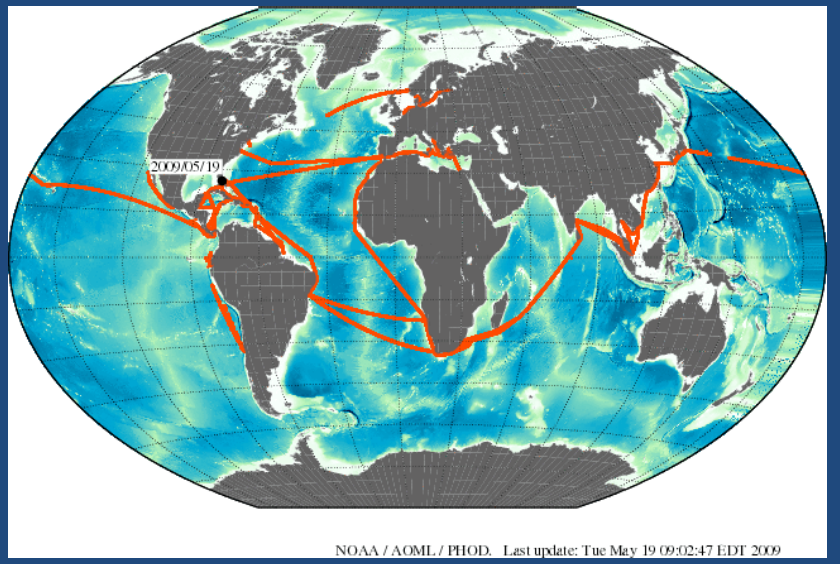
Help to identify errors, lack of transmissions, calibration problems, errors in format, truncated messages, etc.

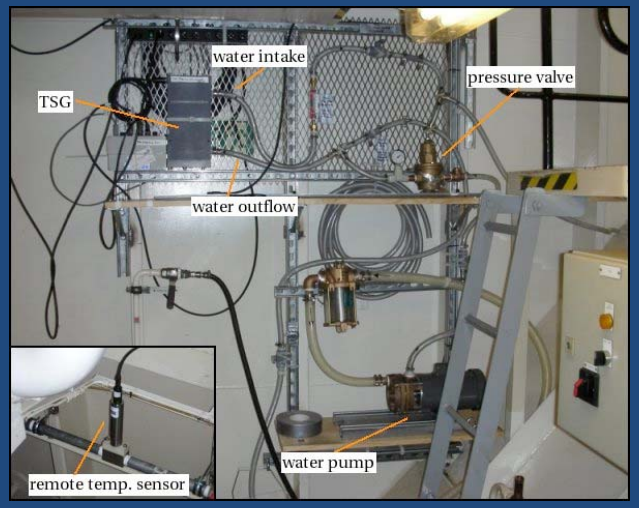
TSG data received since 2008-01-01

Call sign	Days	Records	Full Rec.	Good QCd Rec.	Last data received
C6TN4	222	285014	285009	214154 (75%)	2009-04-08 18:20
PJJU	400	2338583	2337415	1116667 (48%)	2009-04-02 14:26
WTDK	117	307581	307581	177334 (58%)	2009-03-23 23:59
WTDM	196	467806	467549	295622 (63%)	2008-10-06 18:54
WTDO	153	412497	412393	117233 (28%)	2009-04-27 23:59
WTEB	140	378774	0	0 (0%)	2008-12-15 19:00
WTEC	98	273326	273301	183760 (67%)	2008-05-17 23:59
WTEE	52	136947	136745	65685 (48%)	2009-04-03 00:46
WTEF	167	461248	389440	45012 (10%)	2008-10-31 23:59
WTEO	155	429894	369426	159697 (37%)	2009-04-28 23:59
WTEP	251	658131	655973	430813 (65%)	2009-04-28 23:59
WTER	194	497865	479112	270869 (54%)	2009-04-28 23:59
WTEU	151	419665	0	0 (0%)	2009-04-28 23:59
WTEY	79	217011	216984	119167 (55%)	2009-04-12 23:59

Science and Outreach







Future work

- **Unify quality of data placed into GTS and Coriolis**
- **US: find funding.**
- **Create a TSG bibliography.**

Recommendations

- **Continue the support of collaboration between NOAA and IFREMER on data acquisition, quality control and distribution.**

- **Continue the support of the link between the operational/logistics community (SOOPIP) with the data community (GOSUD).**

- **Implement installation of more external temperature sensors.**

- **Support the operations of SeaKeepers.**