

TSG transects maintained by NOAA/AOML

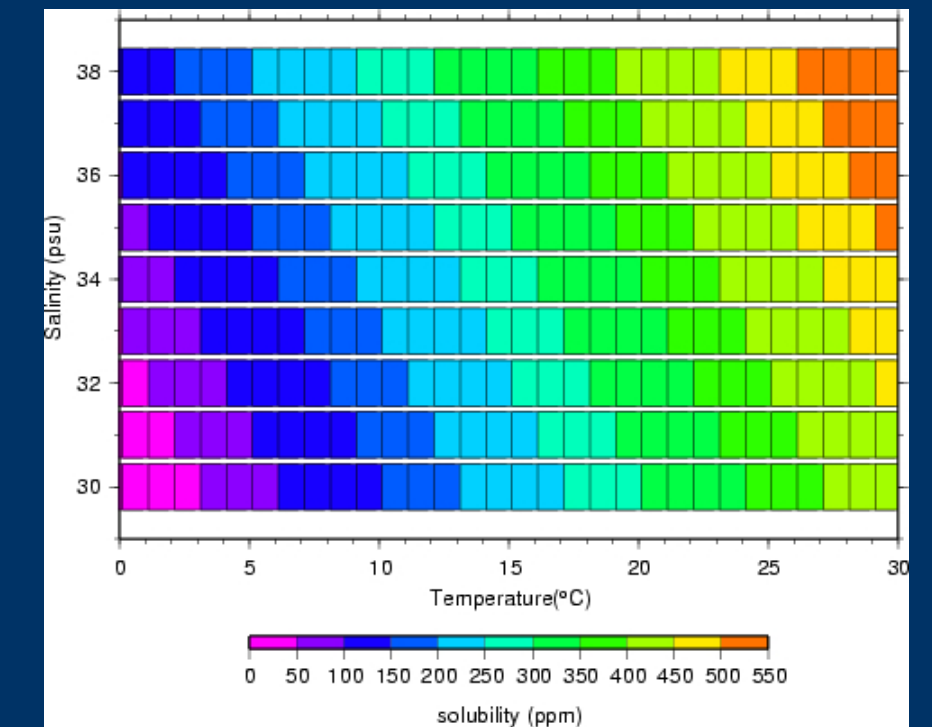
Gustavo Jorge Goni⁽¹⁾ and Huiqin Yang⁽²⁾

(1) National Oceanic and Atmospheric Administration, Atlantic Oceanographic and Meteorological Laboratory
(2) University of Miami, Cooperative Institute for Marine and Atmospheric Science

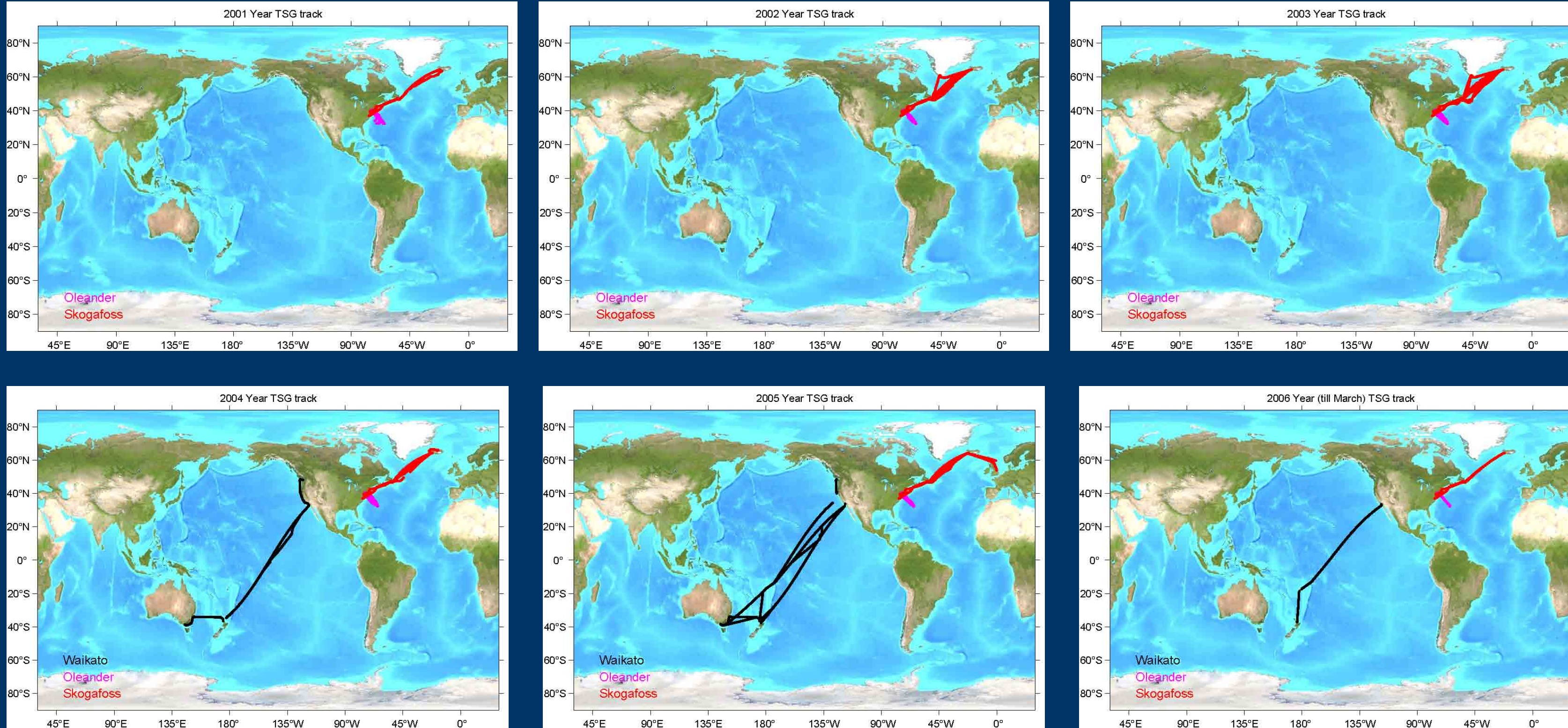
Gustavo.Goni@noaa.gov
Huiqin.Yang@noaa.gov

Overview.

This is a component of the proposal "Initial Steps Towards a Global Surface Water pCO₂ Observing System", by Rick Wanninkhof (NOAA/AOML), funded by the NOAA Office of Climate and Global Change Program. The objective of this component is to integrate data of sea surface temperature and salinity obtained from thermosalinograph (TSG) observations into the global surface pCO₂ observing system. AOML is currently maintaining **three transects** in ships of opportunity and is actively collaborating with other institutions in the maintenance of other transects. Current efforts are also dedicated in replacing old SBE21 TSGs with new SBE45 micro TSG units in two of the transects. TSG data obtained from these three transects are being quality controlled using the procedures established by GOSUD (Global Ocean Surface Underway Data), which are similar to those used by the Argo community with profiling floats. Additionally, a quality control is done by comparing the data with profiling float, XBT, CTD, and thermistor chain observations. SEAS2000, a program for **real-time transmission**, will be tested during this summer and is planned to be fully operational with the new installed equipment within a year.



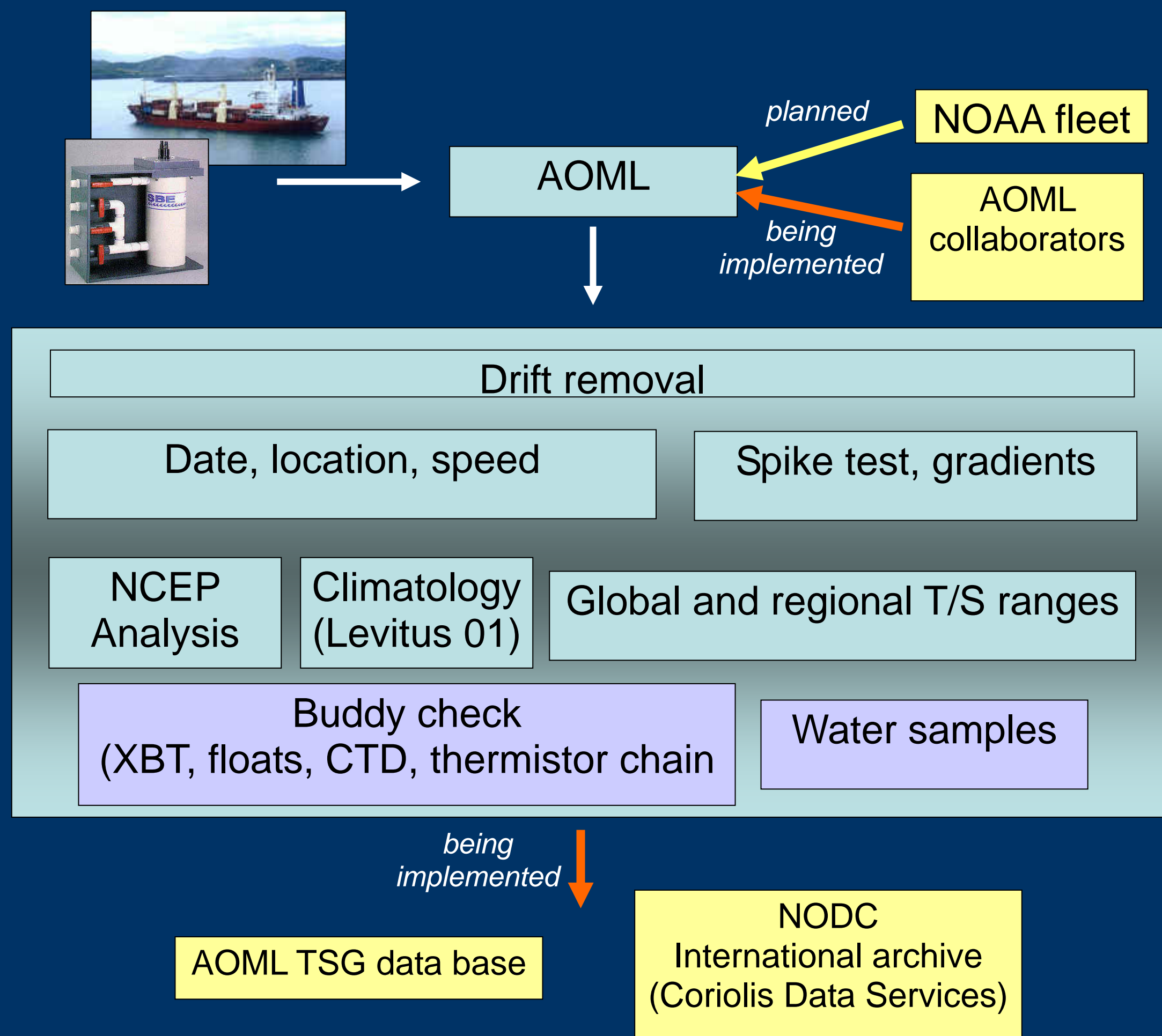
Solubility: the ability of CO₂ to dissolve in sea water, varies with sea surface temperature and salinity.



Operations.

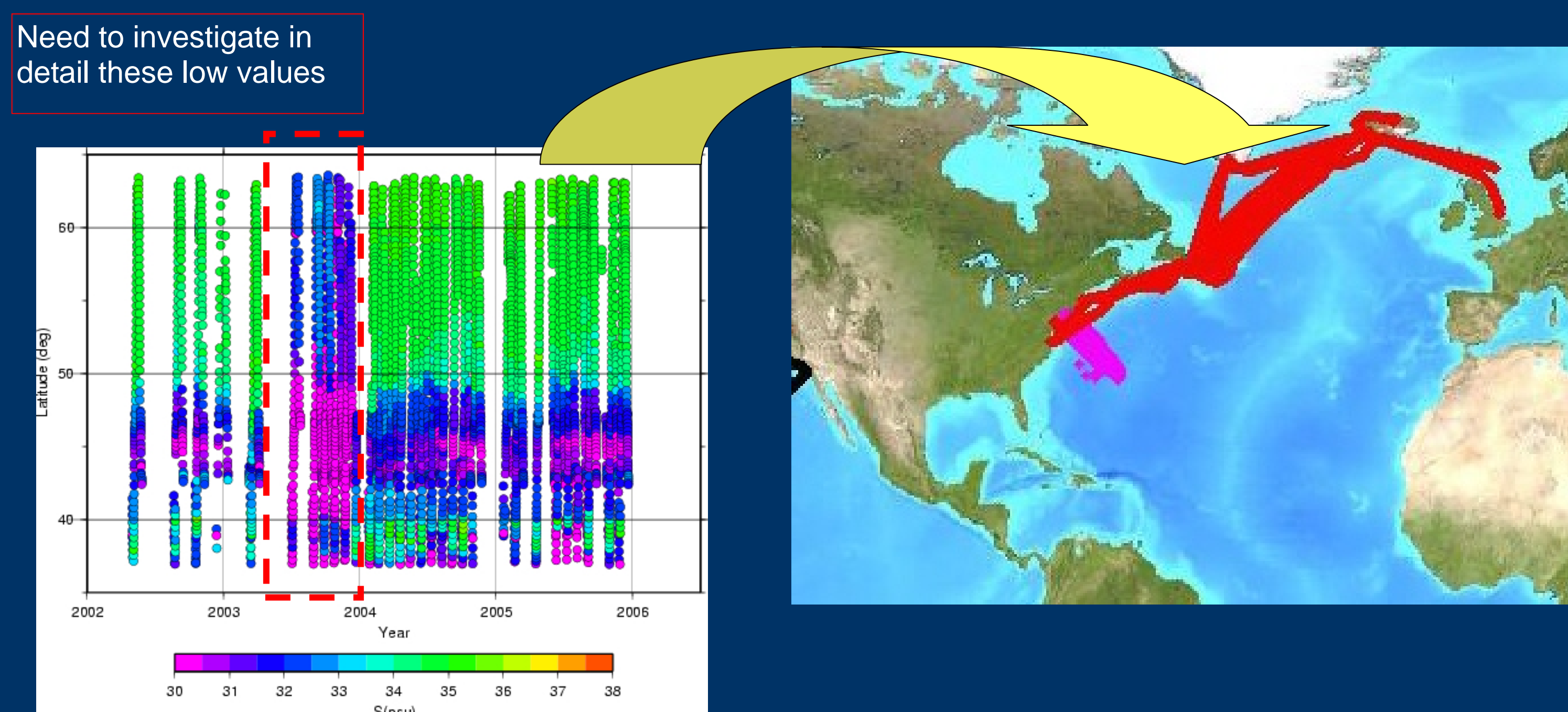
Three transects are currently maintained by NOAA/AOML (left), one in the Pacific Ocean and two in the Atlantic Ocean. Both transects in the Atlantic Ocean run from the NE coast of the United States, one to Iceland (Skogafoss) and another to Bermuda (Oleander). The transect in the Pacific Ocean runs from the west coast of the United States to New Zealand and Australia (Cap Victor, former Columbus Waikato). This ship will soon add to its route a zonal North Atlantic transect.

NOAA/AOML is currently in the process to make the operation of TSGs independent of the pCO₂ operations by having the instruments connected to different computers. This step will allow to obtain TSG observations when the pCO₂ instrumentation is disconnected.



Quality Control of Data.

NOAA/AOML has set up a procedure to quality control the TSG data, based on current GOSUD standards. After the initial step of removing the drift from the salinity data, the basic quality control steps include ship speed, spikes, constant value check, comparison of the data with climatological values, with NCEP weekly analysis, and with regional and global ranges. Additionally, we conduct comparisons with observations obtained close in time (within a week) and space (within 200km) from **XBT** (temperature only), **profiling float** (temperature and salinity), **CTD** (temperature and salinity) and **thermistor chain** data. We are currently setting the procedures to include flags with observations in intervals of one minute. We are planning to include comparisons with temperature obtained from **drifting buoys**.



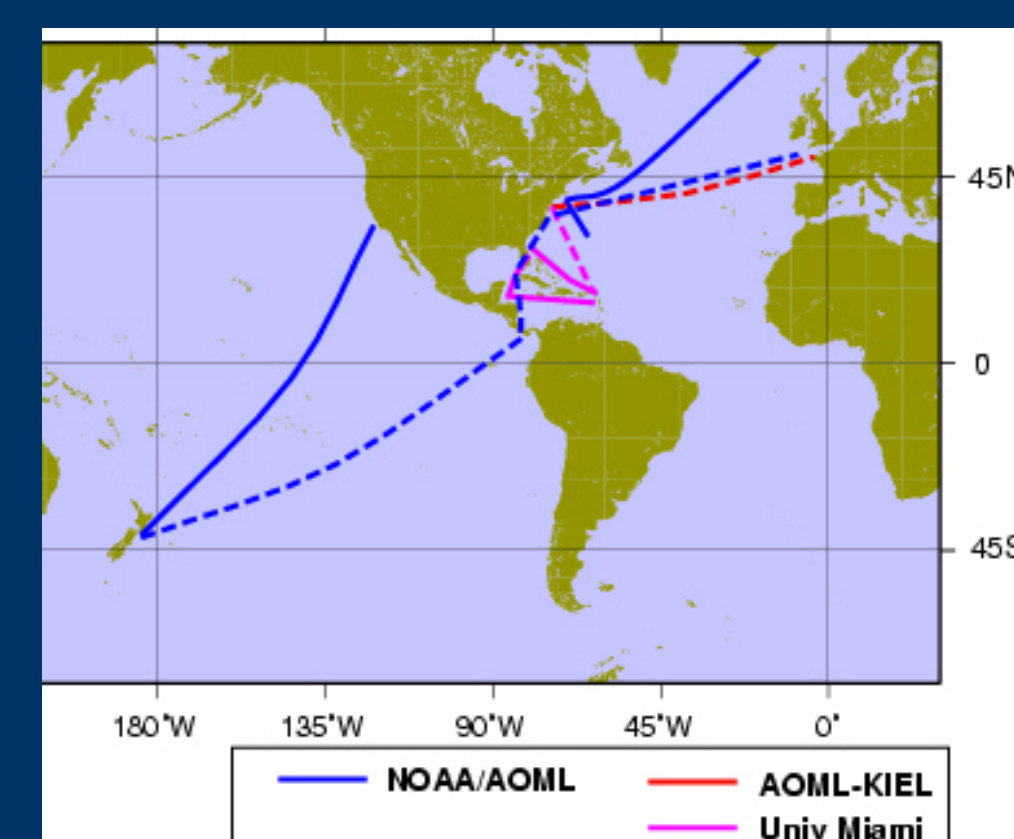
First Results.

The first results of quality controlled data obtained from the TSG observations along the NE Atlantic transect (Skogafoss) are shown above. The raw temperature and salinity data obtained during the period December 2003 and September 2004 are shown in the upper panels of the two figures above. These figures include the climatological values and the values of SST and SST obtained from ARGO profiling floats and used for the quality control of the data. The two lower panels show the distance between the ship location and the buddy check observation (XBTS, CTDs, profiling floats, and thermistor chains) and the time difference between these observations. The trend observed in the TSG-derived measurements of temperature is also observed in the hydrographic data. Salinity values are, in general, in good agreement between TSG and the other observations. A detailed comparison between all observations will be done to include flags in the quality controlled data.

Collaboration Efforts.

NOAA/AOML is currently collaborating with the University of Miami Rosenstiel School of Marine and Atmospheric Science with the operation of the TSG units aboard the Explorer of the Seas (Caribbean Sea) and with the University of Kiel aboard the Atlantic Companion (North Atlantic).

NOAA/PMEL has kindly provided the data obtained from the Columbus Waikato (Pacific run). NOAA/NMFS/NEFSC is helping with the data retrieval and logistics of the ships in the NE Atlantic runs.



Transects currently maintained (solid lines) and planned (dotted lines) by AOML and its collaborators.

Acknowledgements. This project is supported by the NOAA Office of Climate and Global Change Program.