Observing System Monitoring Center

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Project Summary

The Observing System Monitoring Center (OSMC) project exists to join the discrete "networks" of *in situ* ocean observing platforms -- ships, surface floats, profiling floats, tide gauges, etc. – into a single, integrated system. The OSMC addresses this goal through capabilities in three areas focusing on the needs of specific user groups: 1) it provides realtime monitoring of the integrated observing system assets to assist management in optimizing the cost-effectiveness of the system for the assessment of climate variables; 2) it makes the stream of realtime data coming from the observing system available to scientific end users into an easy-to-use form; and 3) it unifies the delayed-mode data from platform-focused data assembly centers into a standards- based distributed system that is readily accessible to interested users from the science and education communities. The increased emphasis on data integration is a shift in the OSMC project priorities that began in earnest in July 2011.

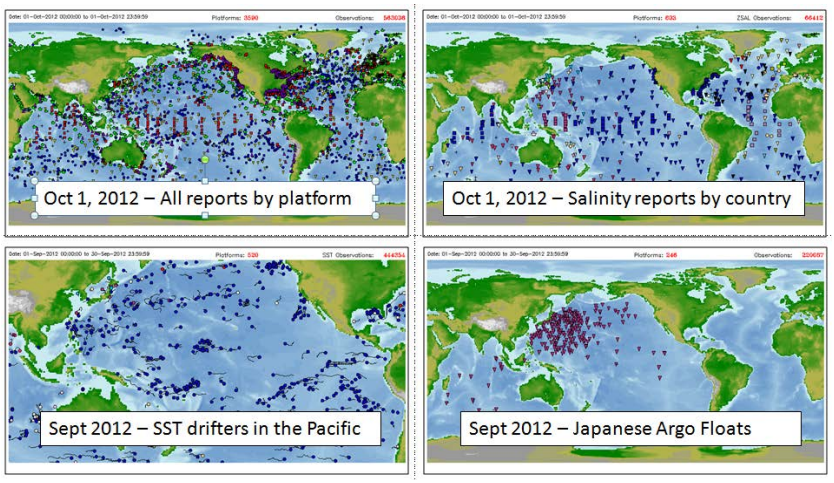

Figure 1. Several examples of maps generated by the OSMC

As a tool for observing system management, the OSMC helps the Climate Observation Division (COD) to ensure that NOAA meets the long-term observational requirements of forecast and modeling centers, international research programs, major scientific assessments, and decision-makers. The OSMC provides observing system managers with custom maps and tables that summarize the contributions of different countries and programs to the system at any point in time. It tracks the deployment progress of observing system elements over time. It provides tools to help scientists track the effectiveness of *in situ* observations for assessing the state climate variables – temperature, salinity, etc.

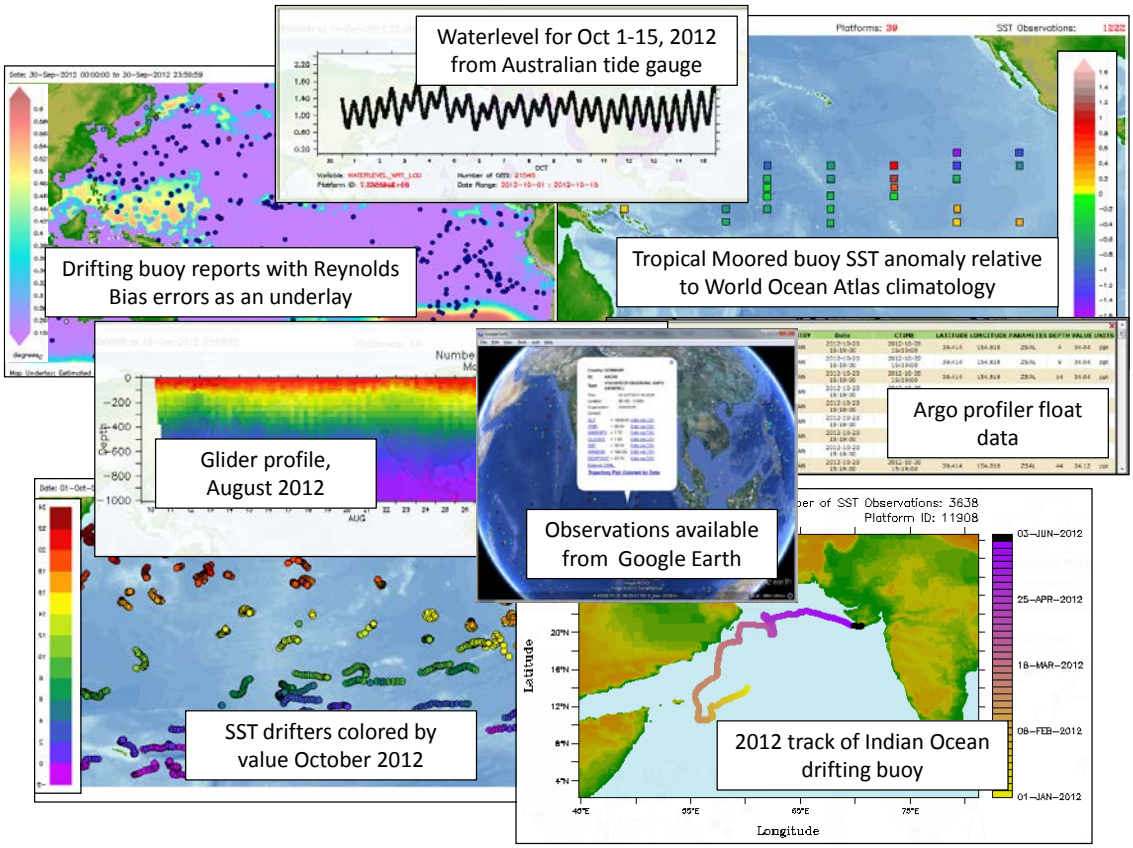

Figure 2. A sample of the drill down products available from the OSMC

The OSMC is also a key component in emerging data integration strategies. Work is underway to serve the realtime data ingested into the OSMC from the GTS and other sources to the public as an integrated, easy-to-use stream. The data will be served out using a number of popular "web services" (including OPeNDAP and SOS) and downloadable file formats, so that it can be accessed in web browsers and popular desktop analysis tools.

The OSMC project is working to unify access to the platform-focused, delayed-mode data assembly centers that perform quality assurance and quality control over elements of the ocean-climate data record. The OSMC data integration strategy will extend beyond *in situ* observations, including synthesis products, satellite observations and model outputs, with a target vision that managers and scientists should be able to compare and contrast *in situ* observations with all other data sources for the same space-time locations in support of such activities as IPCC AR5/CMIP5.

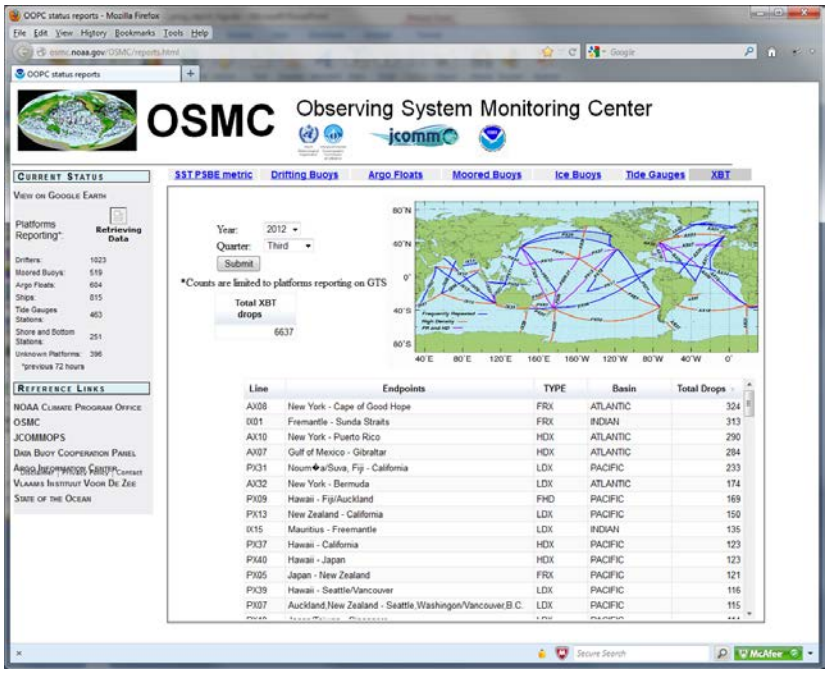

Figure 3. XBT drop metrics from the OSMC

Figure 1 illustrates how the OSMC maps display the status of the global observing system for *in situ* ocean surface meteorological and oceanographic measurements. Observing system managers may constrain their selections of observations by factors such as the platform type, the programs associated with platforms, the parameter that is observed (temperature, sea level height, etc.), the contributing nation, or the instrument ID. With a click the user can "drill down" to access details of a particular platform and the measurements it has made as shown in Figure 2. A variety of more detailed reports, summarizing the state of the observing system are available through a special reporting interface. Figure 3 illustrates one such example, the progress of completion of XBT drops along named lines The OSMC also displays observing system metrics, incorporated into the system as they are developed by NOAA observing system scientists and others. These analysis capabilities help managers and scientists to assess the adequacy of the observations to infer critical ocean state fields, such as sea surface temperature. Figure 4 shows two such examples.

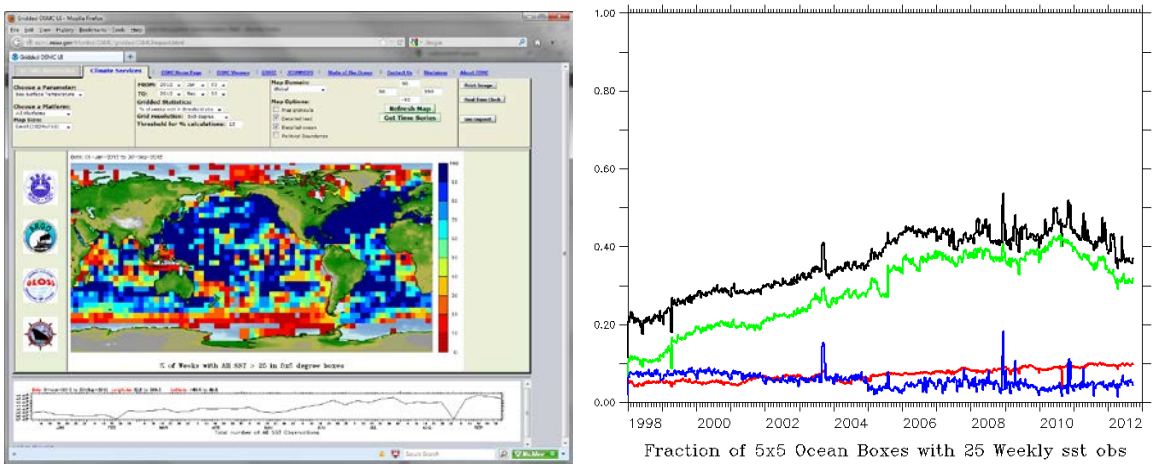

Figure 4. On the left, a metric measuring the percentage of weeks that 25 or more SST observations occurred in a given 5x5 degree box is shown. On the right is a time series showing the evolution of the SST observing system.

One of the great challenges in earth science data integration that must be addressed during the coming decade is the integration of observations and products. The OSMC is a platform for climate product integration as well as climate observations monitoring. Some illustrations of current capabilities are shown below in figure 5 -- the integration of OSMC observation records with SST bias errors computed by Dick Reynolds at NCDC and served by OPeNDAP (left); and the Equivalent Buoy Density (EBD) product on a 10x10º grid (right),

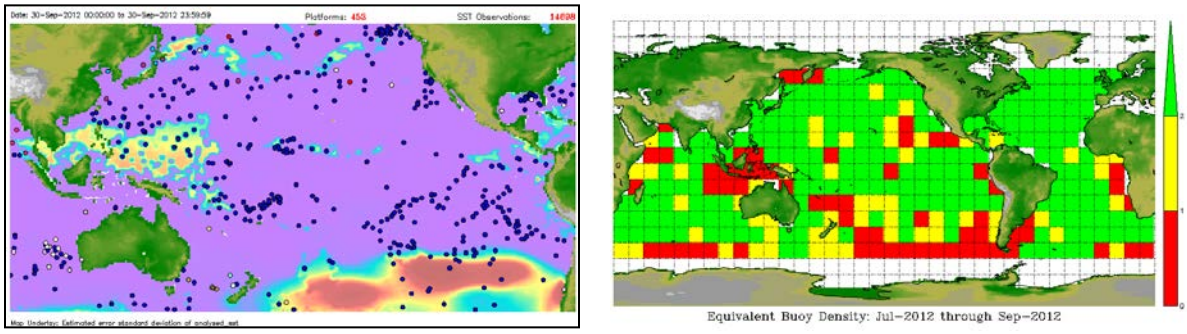

Figure 5. Observations over Reynold's SST bias errors (left); EBD for Jul–Sep, 2012 (right)

which shows where additional drifting buoys should be added in order to reduce satellite bias errors for SST – similarly hosted remotely at NCDC.

The web site for the program is http://www.osmc.noaa.gov