



New developments in the global ocean observing system Argo and its European component EuroArgo

Birgit Klein

New developments in the global ocean observing system Argo and its European component EuroArgo

Since about 2005 Argo is the largest source of in situ ocean data, with the number of Argo-profiles exceeding that of all ship-born profiles ever made. Having a dense and near-homogeneous global and temporal coverage, Argo data are essential to derive ocean-state estimates to initialize seasonal and decadal climate model forecasts and to validate climate model output. For instance, Argo data made it possible to accurately determine ocean heat content and show that it kept increasing during the so-called hiatus period (2000-2014), during which atmospheric near-surface temperature stayed almost constant. Climate models ought to be able to reproduce such events.

Currently Argo is entering new realms. New floats types are capable of measuring down to 4 km (instead of 2 km until now), and new sensors have been developed that can measure a variety of biogeochemical variables like oxygen, nitrate, or chlorophyll. These new data will be very important to validate and improve Earth System Models. First, about 40% of the ocean volume is in the depth-range 2-4 km, but observations are currently limited to a few sections in space and time. Deep Argo data will make a thorough validation of ocean models in this depth range possible for the first time. Secondly, the large amount of new biogeochemical data becoming available will allow process studies that will lead to improved parameterizations of biogenic and chemical processes in the ocean, improvements that can be implemented in the models to increase their realism. Third, the data form the first-ever set of biogeochemical data that is consistent and homogeneous over a large spatial and temporal extent will make it possible to validate the models to a degree that was hitherto impossible, simply because of the lack of data.

The Argo data system is composed of national Data Assembly Centers (DAC) that supply data to two mirrored Global Data Assembly Centers (GDAC). GDAC data exchanges are based on File Transfer Protocol (FTP) and made freely available to all users within 24 hours. On a schedule of 6 month the data undergo a thorough quality to correct for possible sensor drift and provide the scientific users with homogenous and high-quality data sets. A significant recent data system development is the assignment of a single dynamic DOI to GDAC holdings enabling time dependent unambiguous data citation at a monthly granularity. Argo data have been traditionally delivered via FTP protocol with developments are on-going to facilitate new users and emerging expectations on data delivery mechanisms. These experimental developments include access via Application Programming Interfaces such as ERDDAP, integration with other components of GOOS within the AtlantOS project, and a prototype 'Big Data' solution is being developed within the EU ENVRIplus project.