

Developing products from the Spanish Institute of Oceanography Observing System (IEOOS).

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The IEO has a wide observing system for monitoring oceanographic properties around the Iberian Peninsula and Islands. In the Atlantic Ocean, beside the tide-gauge stations network, working since 1943, a consolidated oceanographic time-series observation system (RADIALES programme) has been sampling oceanographic and plankton variability at different sections in the western and northern Iberian shelf since 1988. The Mediterranean Sea (RADMED) and Gulf of Cadiz (STOCA) sections has been added lately. The IEO Deep Spanish standard sections monitors shelf, slope and oceanic waters at western Galicia and the Canary region. Four deep water moorings completes the routine.



11 Tide-gauge stations.
Working continuously since 1943.
3 of them are GLOSS stations.

Fig.1

Products as diary, monthly or yearly sea level (Fig. 2), beaches temperature or salinity, HABS hazards possibilities, or heat and fresh water content (Fig. 4, 5 and 6) have been developed. EU projects as ECOOP, SeaDataCloud, EMODNET or the Marine Strategy Framework Directive, uses these products.

Standard Sections. More than 180 stations systematically sampled in Spanish waters.

Most of IEO standard section in Northern Iberian waters started in the late 1980s-early 1990s, are monthly sampled and covers the slope and continental shelf waters, except for the Finisterre section and the external oceanic station of the Santander standard section (SATS, 2800 m depth) (Fig. 6). The Finisterre section started in 2003, is performed yearly, and extends to 250 nm off Cape Finisterre. In summer 2017, in the framework of JERICO-NEXT UE project as a TNA, a first pilot glider mission was carried out.

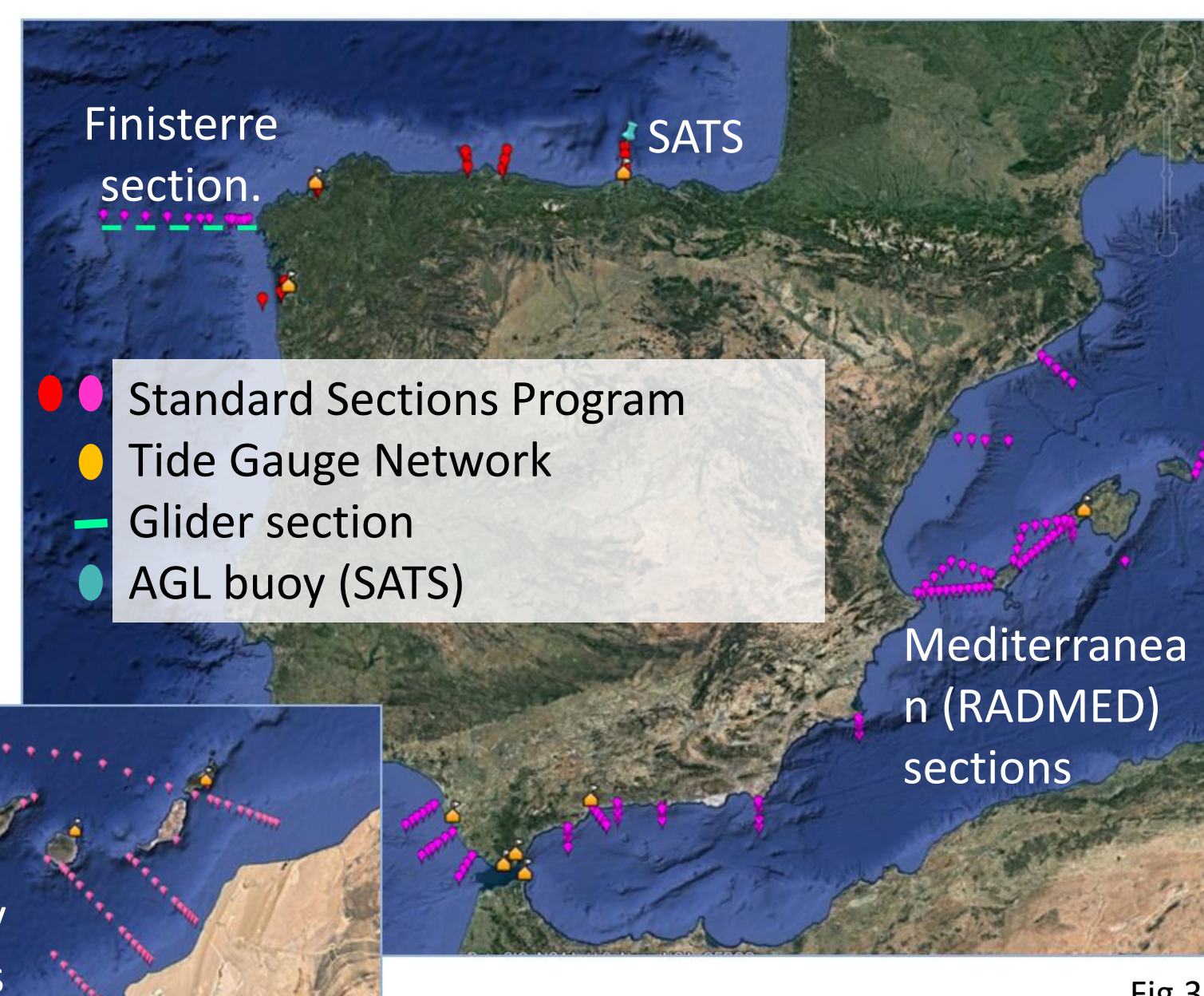


Fig.3

Hydrographic and biogeochemical ship-based sections in the Mediterranean and oceanic waters of the Canary Islands started in the mid-1990s and are sampled at least biyearly (Fig. 4 and 5).

Trends in heat and fresh water content

Canary Islands. Eastern boundary current system

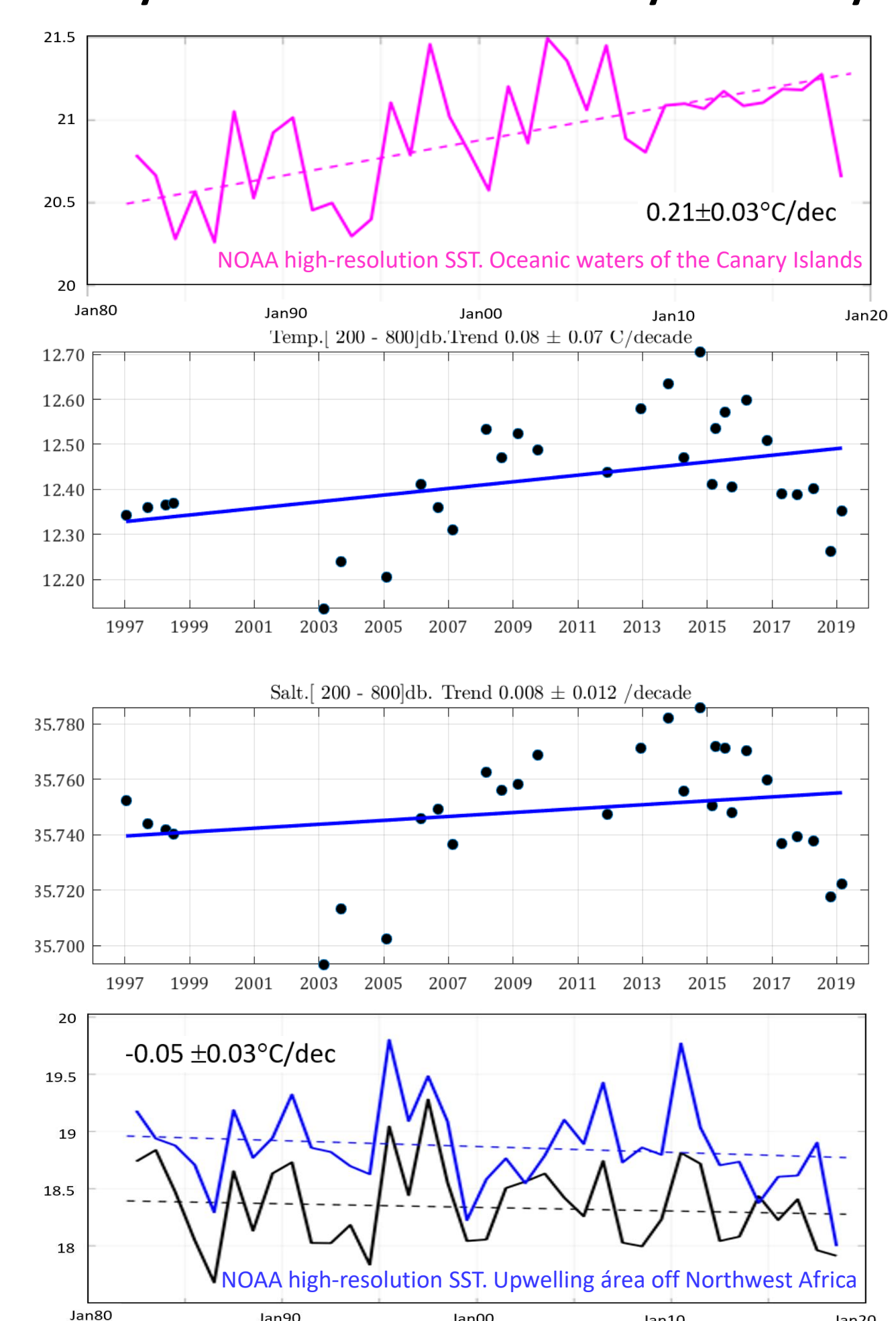
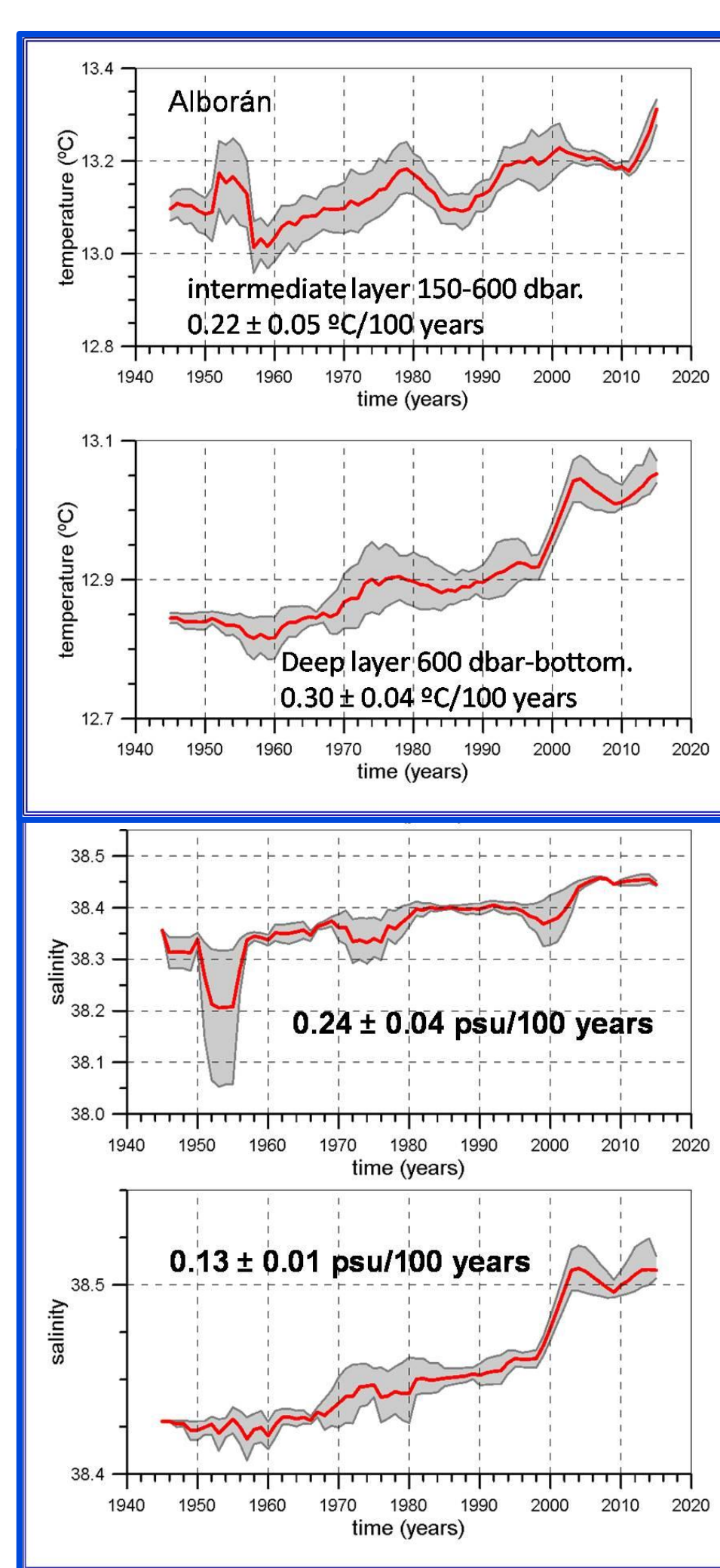


Fig. 4. Sea surface and intermediate (200-800 dbar) temperature and salinity trends in oceanic waters of the Canary Islands and in the upwelling area off Northwest Africa

Mediterranean



North Iberian Waters. Mid-latitudes of the Eastern North Atlantic

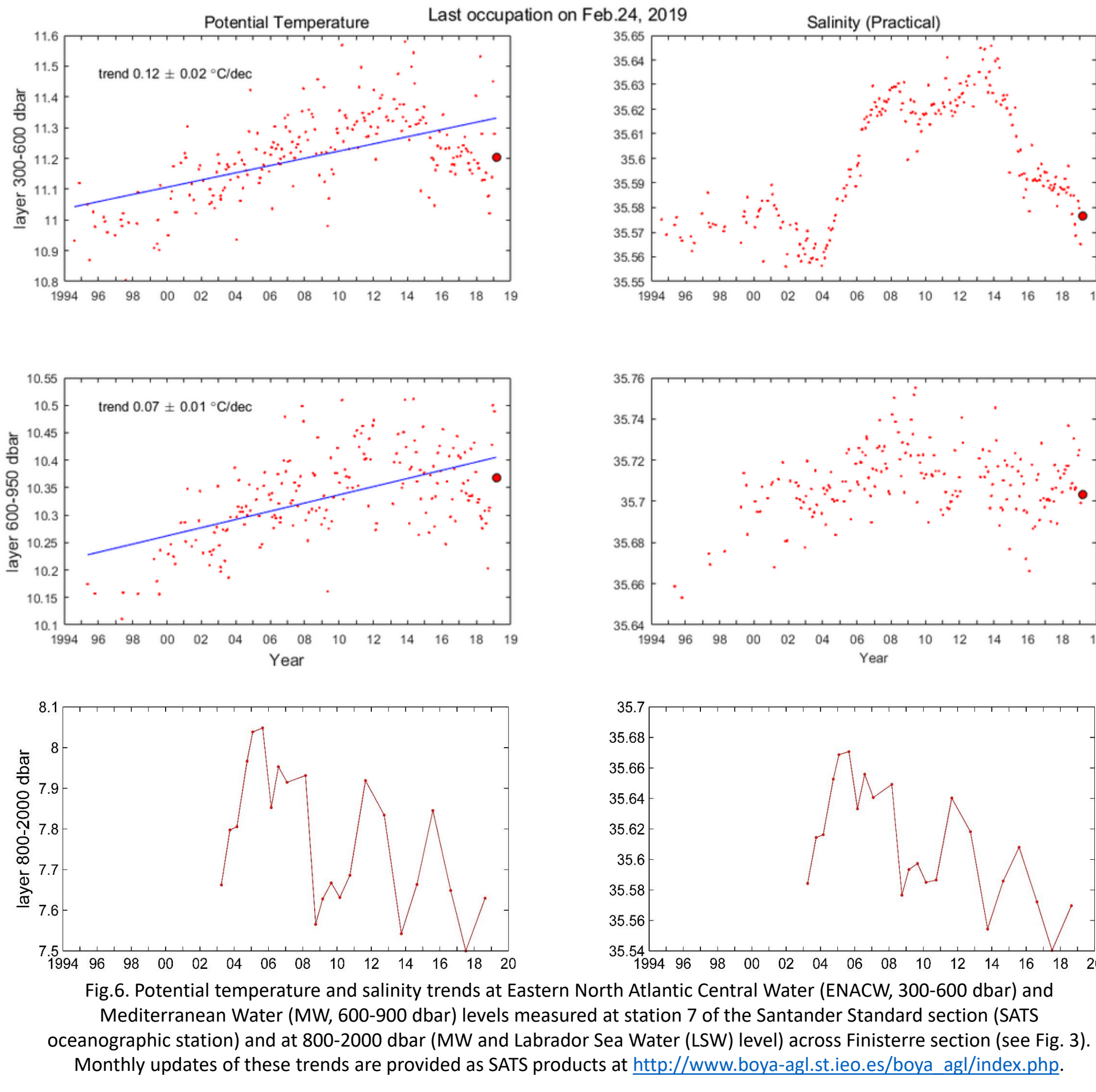
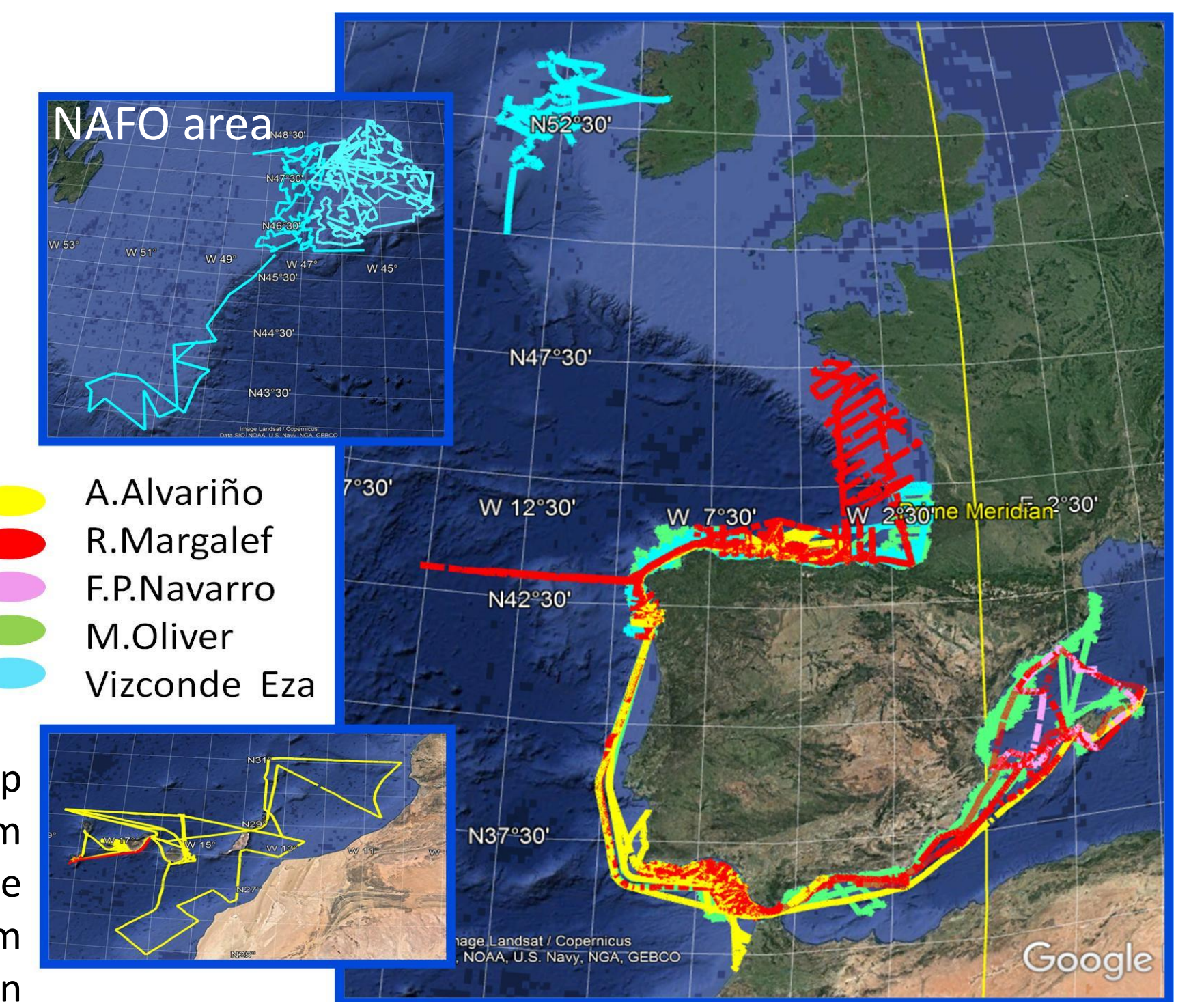


Fig. 5. Potential temperature and salinity trends at intermediate and deep waters levels measured in the Alboran Sea

Termosalinometers mounted on oceanographic vessels, an ocean-meteorological buoy AGL in the Bay of Biscay, and a modelling service complete the real time system. IEO is contributing to ARGO and participates in European Research Infrastructure initiatives as EuroARGO, SeaDataNet Eurofleets, FixO3, the future JRU-EMSO-España, and DBCP and SOT-10 (JCOMM).

Underway continuous measurements on RV (TSG+Meteo)



More than 3764000 record lines (onship automatic weather stations, single-beam sound and thermosalinometer) added to the system during the past year. All of them unrestricted and available at European marine data portal www.seadatanet.org

AGL-Buoy + Oceanographic station monthly sampled = **SATS, Santander Atlantic Time-Series**



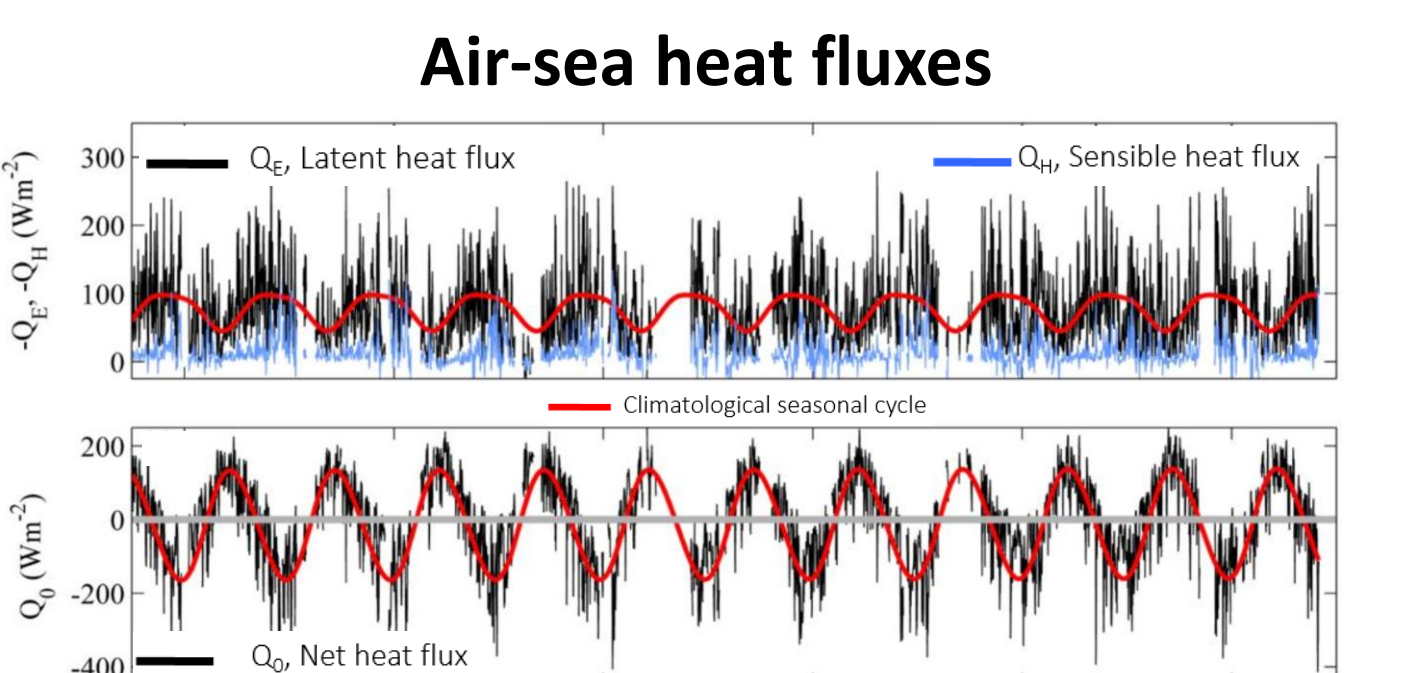
SATS has recently joined OceanSITES network



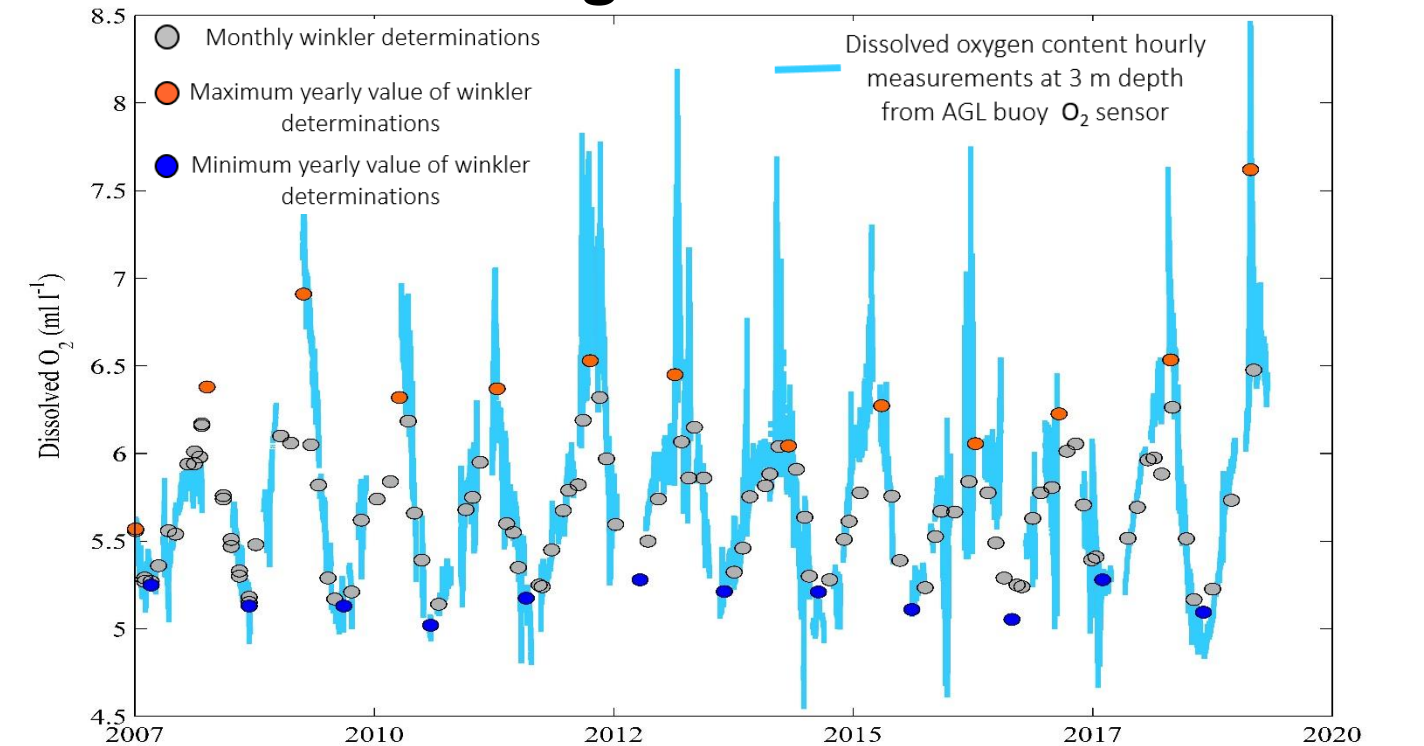
SATS, Santander Atlantic Time-Series

High frequency repeated observations of interlinked meteorological, oceanographic and biogeochemical variables that enable to obtain a comprehensive description of ocean processes from the atmosphere to the seafloor.

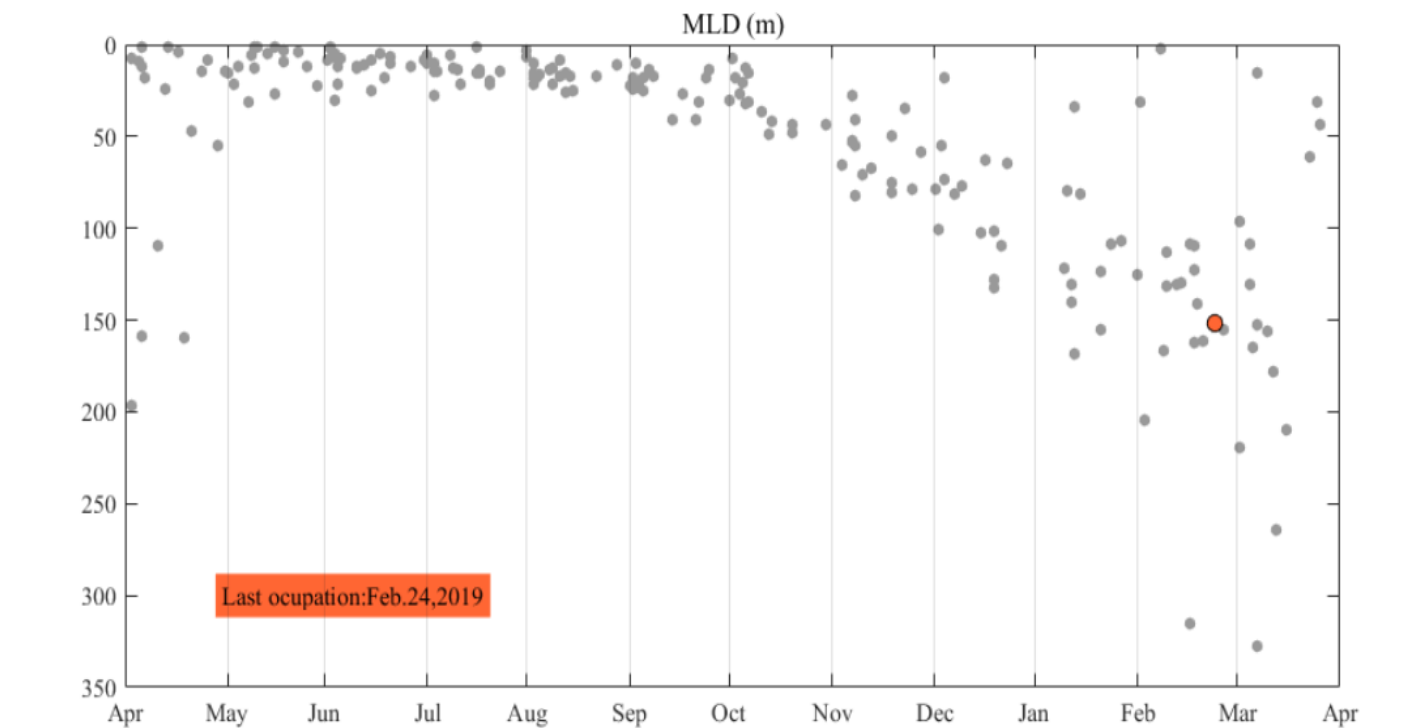
The AGL buoy was deployed in 2007, being available now at SATS more than 12 years of data. Besides, as products at http://www.boya-agl.st.ieo.es/boya_agl/index.php are accessible among others:



Calibrated biogeochemical time-series



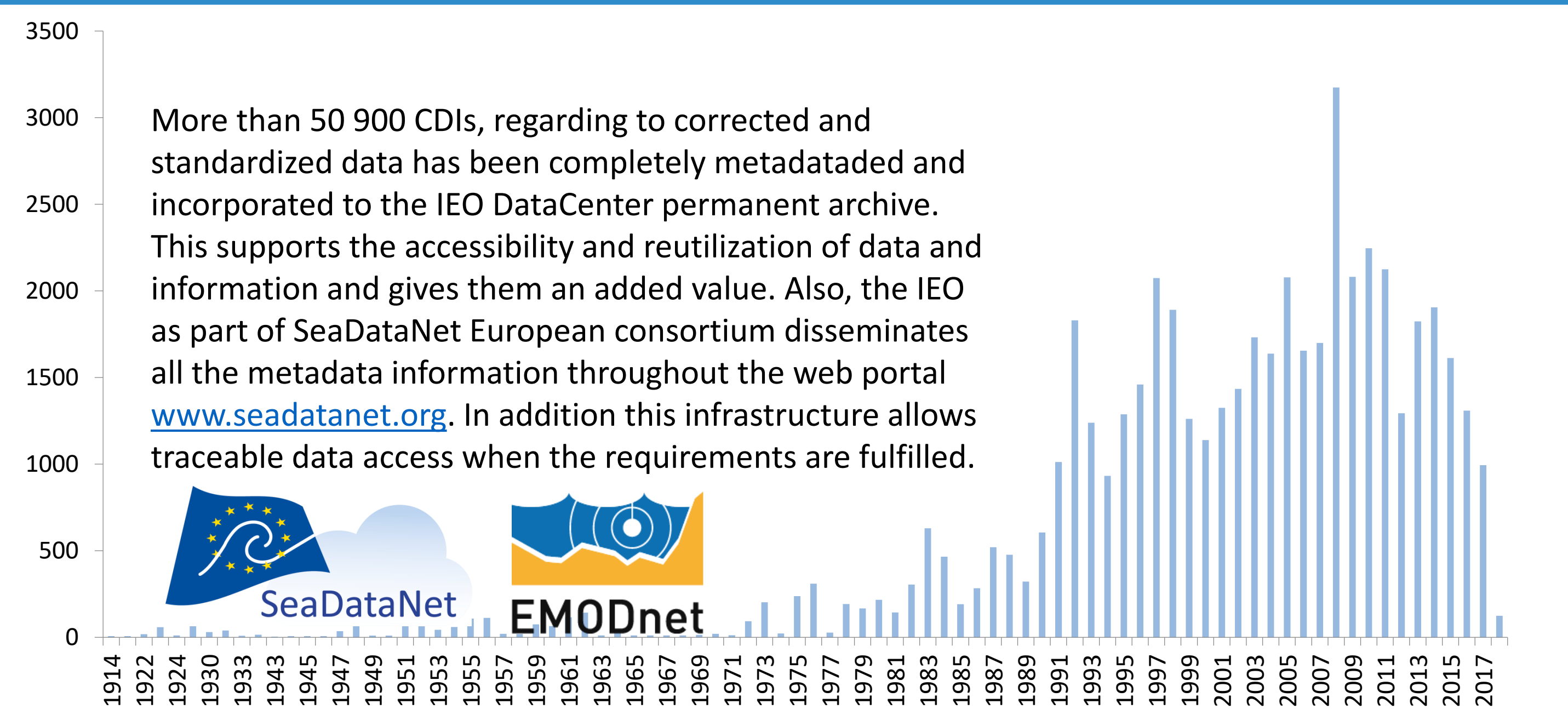
MLD and stratification estimates



With its easy access to the open ocean and deep waters, SATS is a perfect deep ocean laboratory. It should evolve to continue not only serving to monitor the North Atlantic Ocean Climate but being used to develop techniques that allow us to extract more or better information on a global scale.

All that activities form the IEO Observing System (IEOOS). Different systems from the traditional oceanographic ship-based sampling, to modern autonomous system as oceanographic buoys or Argo flow are been used for the data acquisition. After transmission, data quality procedures, calibration and management, different products are been elaborated on different time scales from real-time to long term values. They are accessible in IEO website, or on regional alliances as IBIROOS, MONGOOS or MyOcean portals, or international ones as JCOMMOBS or OCEANSITES.

The management of these volumes of data needs challenges to reduce the processing and validation times, and requires the implementation of new strategies that unify criteria and favor the interoperability and connection of the different systems. Recently, the implementation of a standardized database in PostGre/PosGis and Geonetwork interface as well (<http://datos.ieo.es>), have meant an important advance in the associated metadata management, making it possible to locate and access the stored data and to detect and correct historical errors.



More than 50 900 CDIs, regarding to corrected and standardized data has been completely metadated and incorporated to the IEO DataCenter permanent archive. This supports the accessibility and reutilization of data and information and gives them an added value. Also, the IEO as part of SeaDataNet European consortium disseminates all the metadata information throughout the web portal www.seadatanet.org. In addition this infrastructure allows traceable data access when the requirements are fulfilled.

