



Spatio-temporal variability of SSS and SST in the western Mediterranean basin with the TRANSMED data

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Spatio-temporal variability of SSS and SST in the western Mediterranean basin with the TRANSMED data

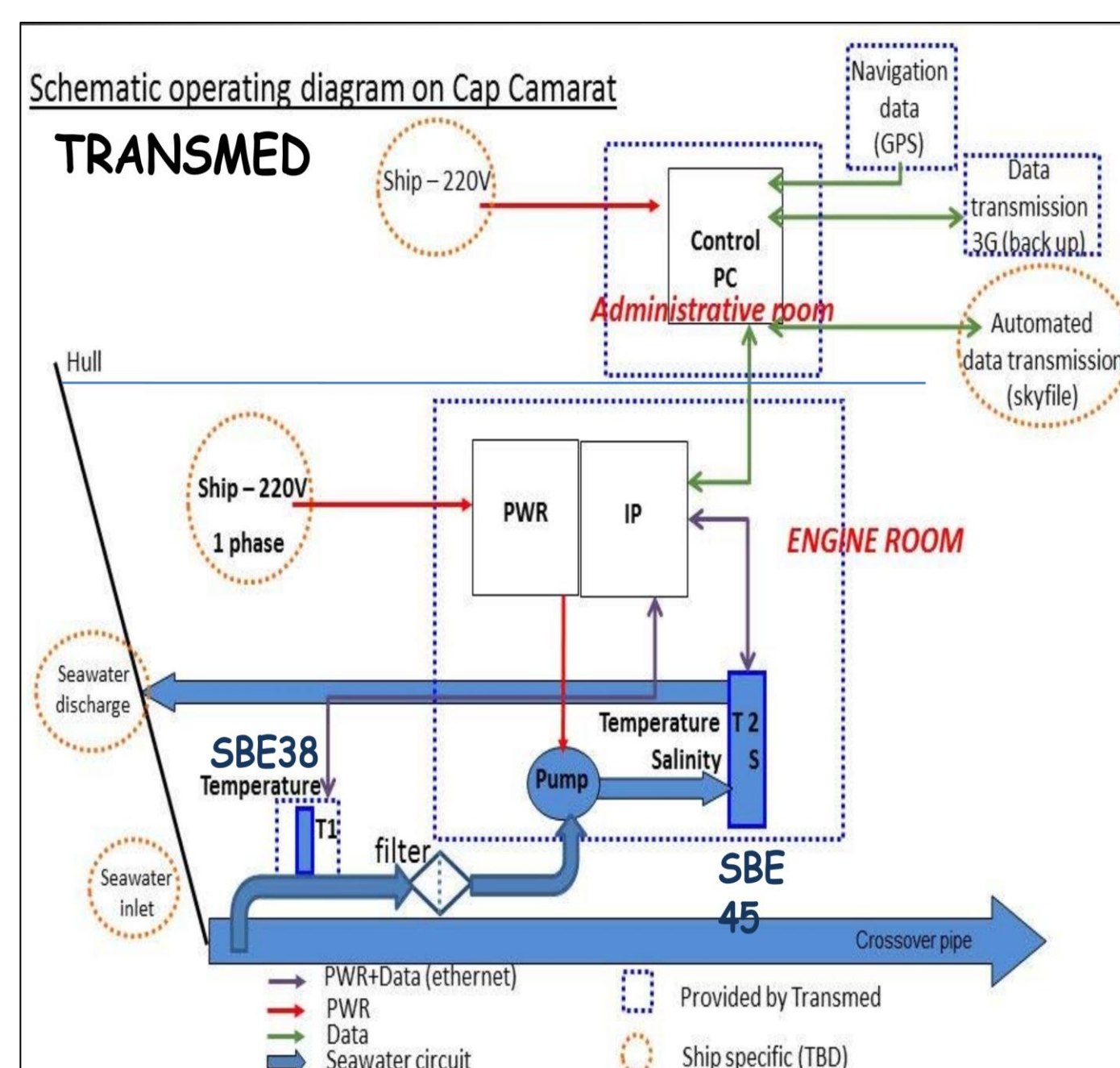
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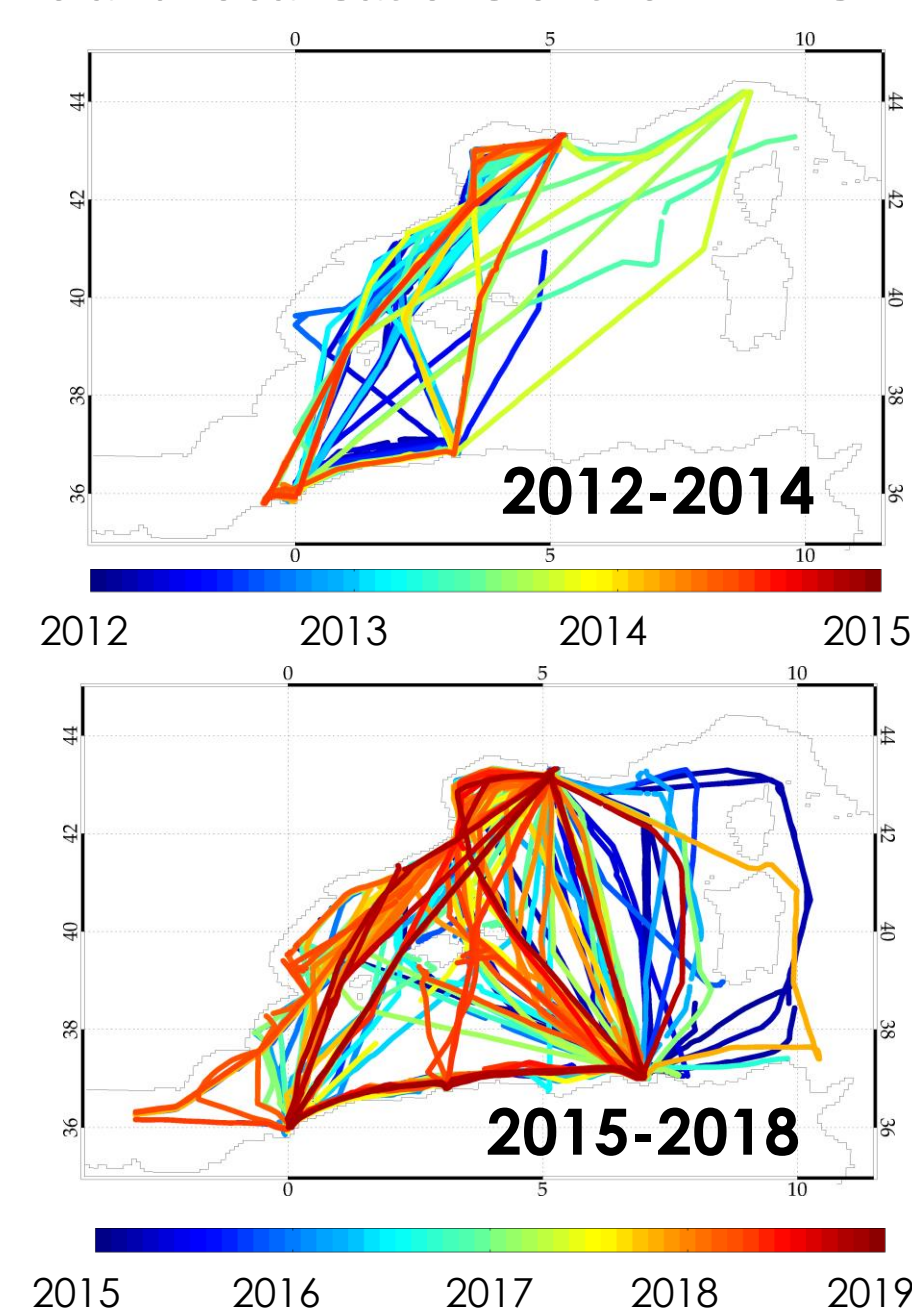
Initiated by the CIESM and upgraded to the operational status within the HyMeX/MISTRALS program, the TRANSMED initiative aimed at developing an autonomous and low-cost thermosalinometer system to record SSS (Sea Surface Salinity) and SST (Sea Surface Temperature) while underway. The seven-year time series recorded from February 2012 to November 2018 between France and Algeria yield an unprecedented insight in the basin-wide seasonal evolution of the Western Basin, up to mesoscale features, and will be used to validate the Copernicus Marine Service global operational system in the area.

The TRANSMED data

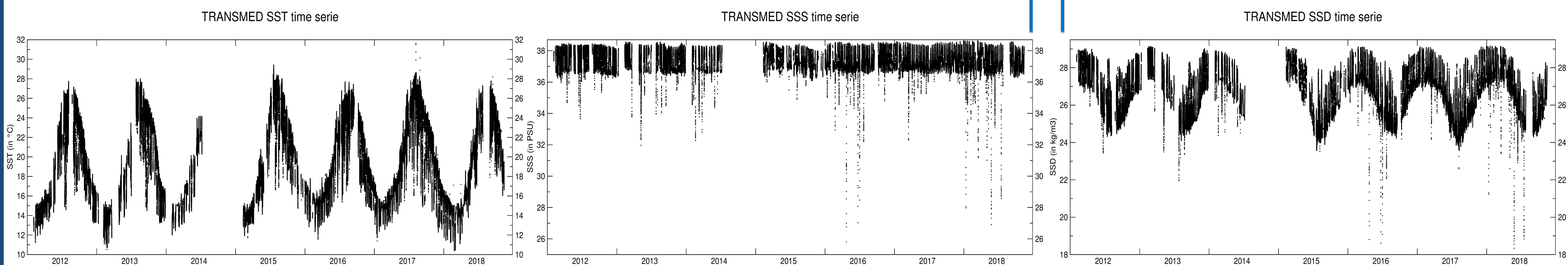
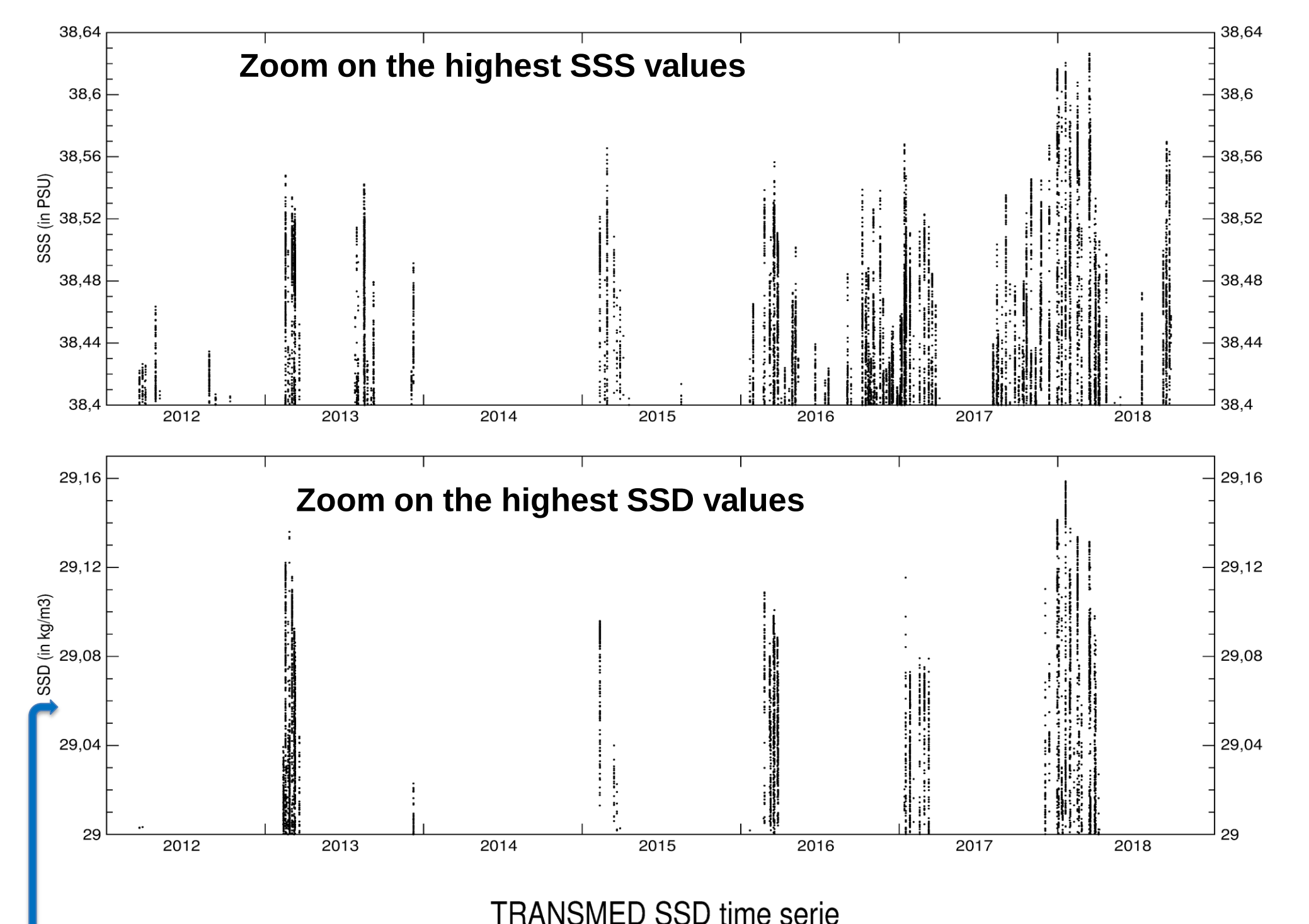
- Autonomous thermosalinometer recording **SST and SSS** every 10 seconds, ~1 round trip/10days, all year round.
- Data sent to Coriolis data center in near real-time : **median over 2 minutes** => spatial resolution < 1km.
- Data from ship Marfret Niolon (MN) from February 2012 to July 2014.
- Data from ship Cap Camarat (CC) from February 2015 to November 2018.
- ~ **600000** SST and SSS values spanning 7 years (~95% good « as is »).



Time and localisations of the TRANSMED data



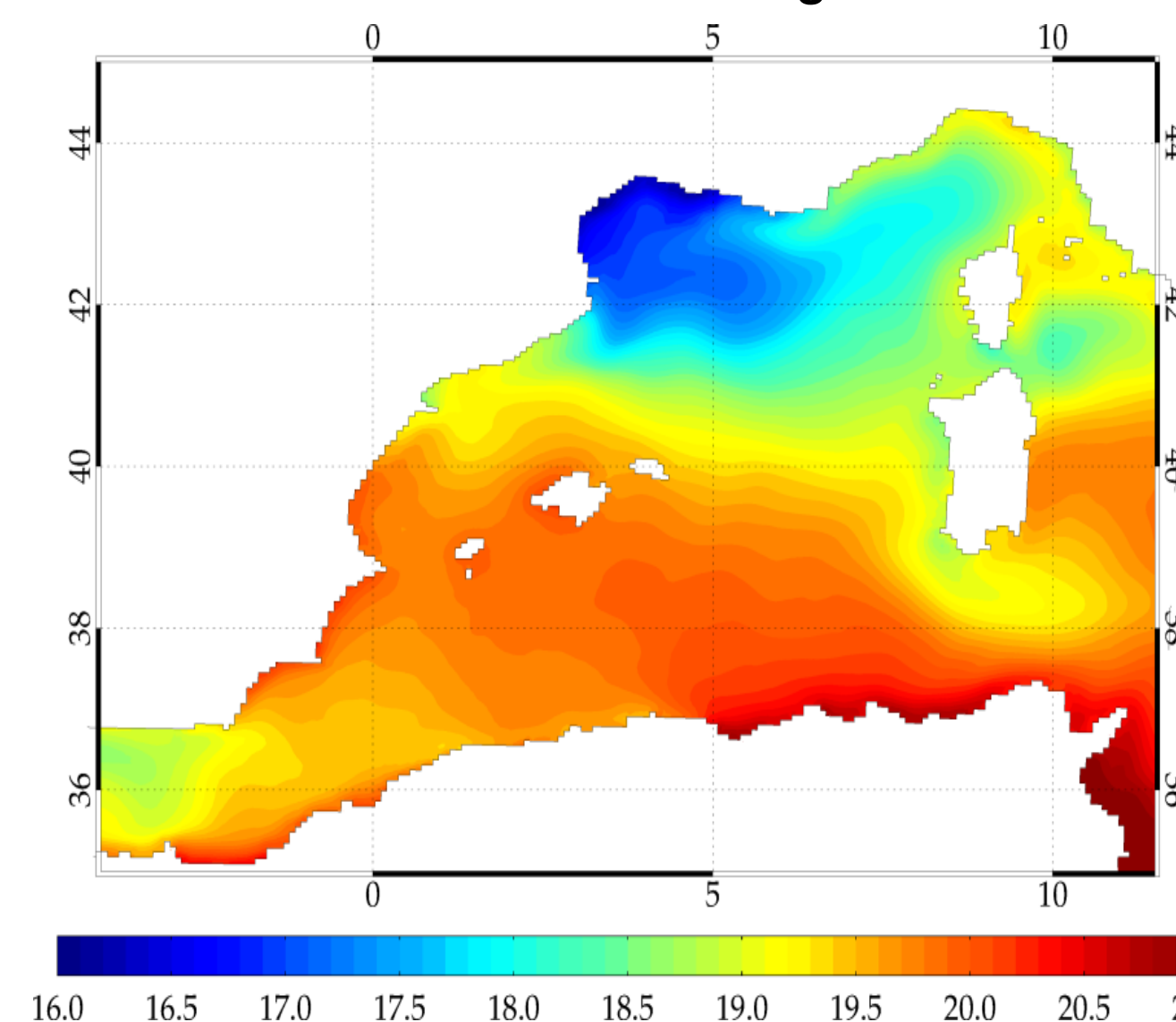
www.ifremer.fr/transmed



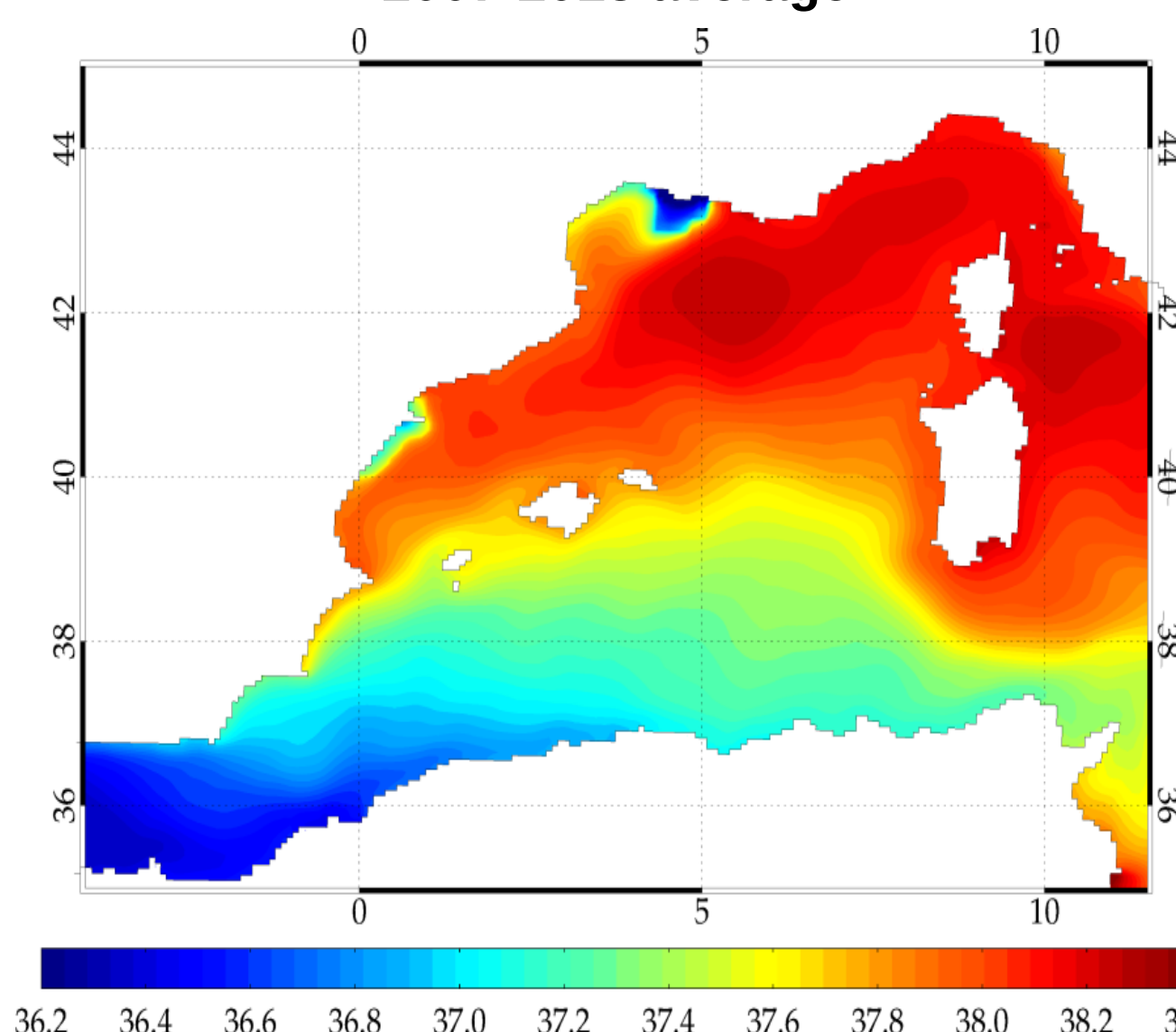
The CMEMS global operational system

- Copernicus Marine Environment Monitoring Service (CMEMS) Global operational system (Lellouche et al. 2018) :
 - global 1/12° high-resolution (~7km in the Western Mediterranean),
 - weekly analyses and real-time daily services with forecasts up to 10 days,
 - data available from January 2007 onwards, with the same configuration.
- TRANSMED brings a huge input of new data, especially for SSS (see Figure on the right), which will be useful for validation and assimilation.

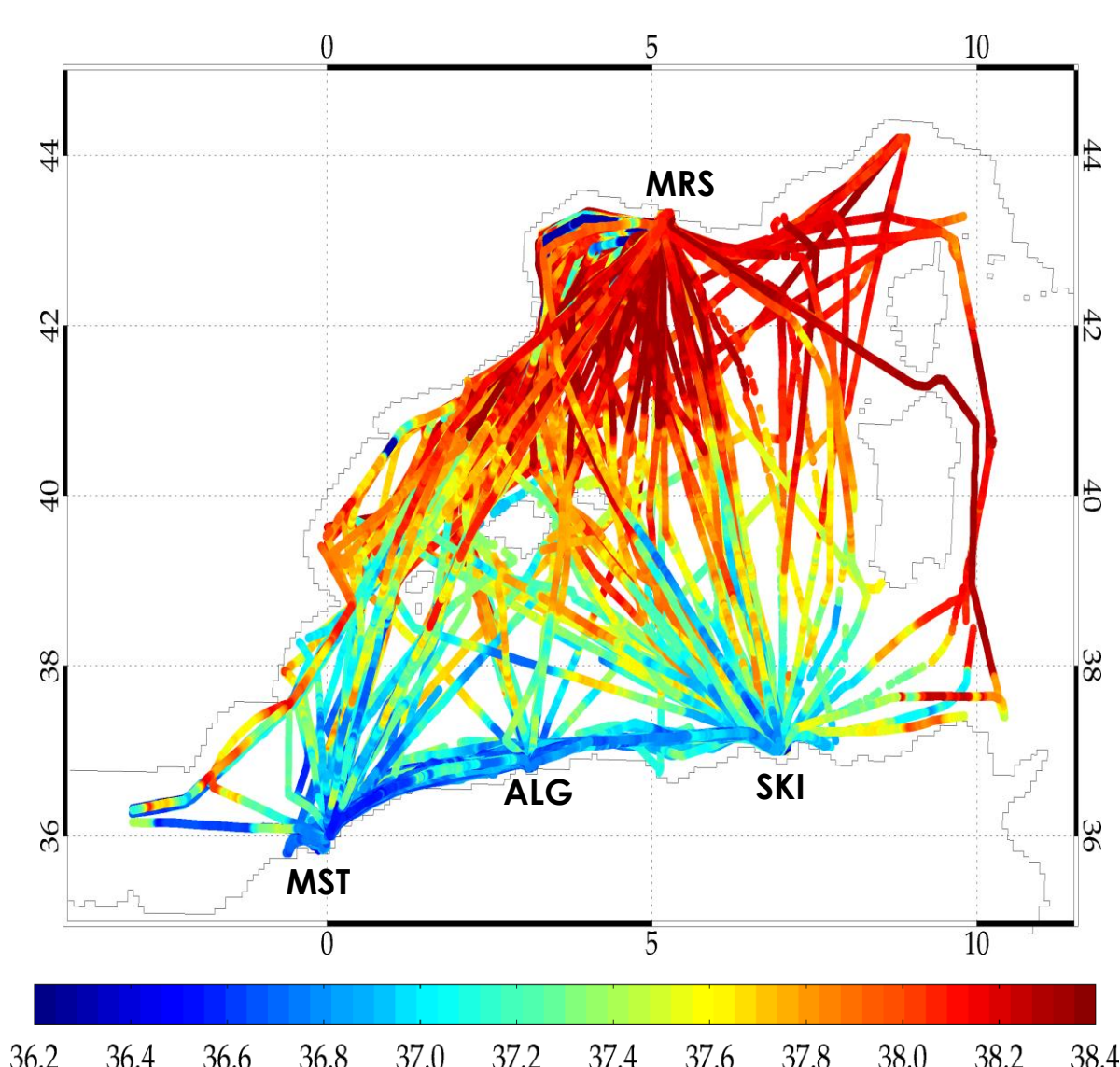
SST (°C) from CMEMS-GLO system 2007-2018 average



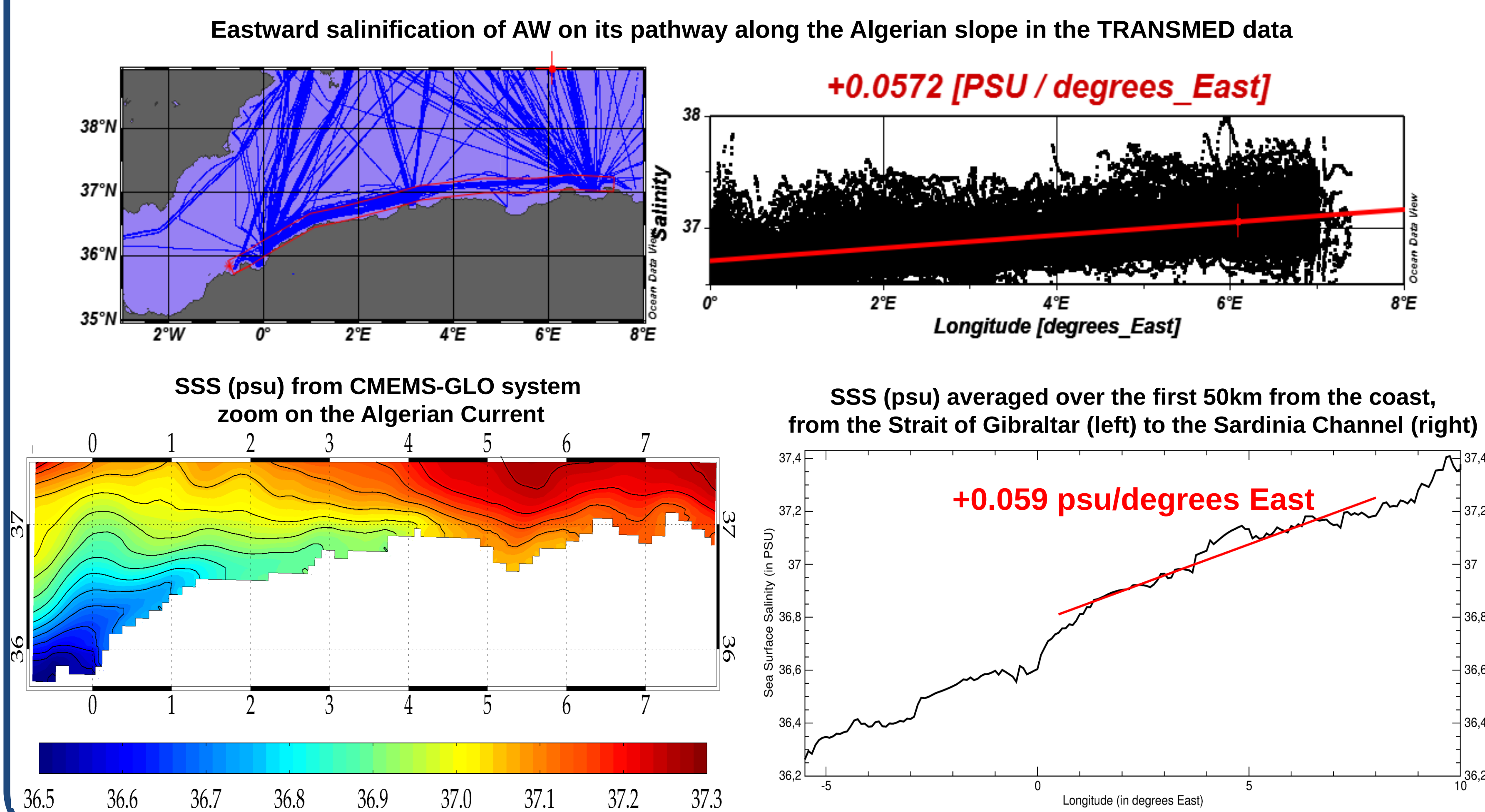
SSS (psu) from CMEMS-GLO system 2007-2018 average



SSS values (psu) of all TRANSMED data



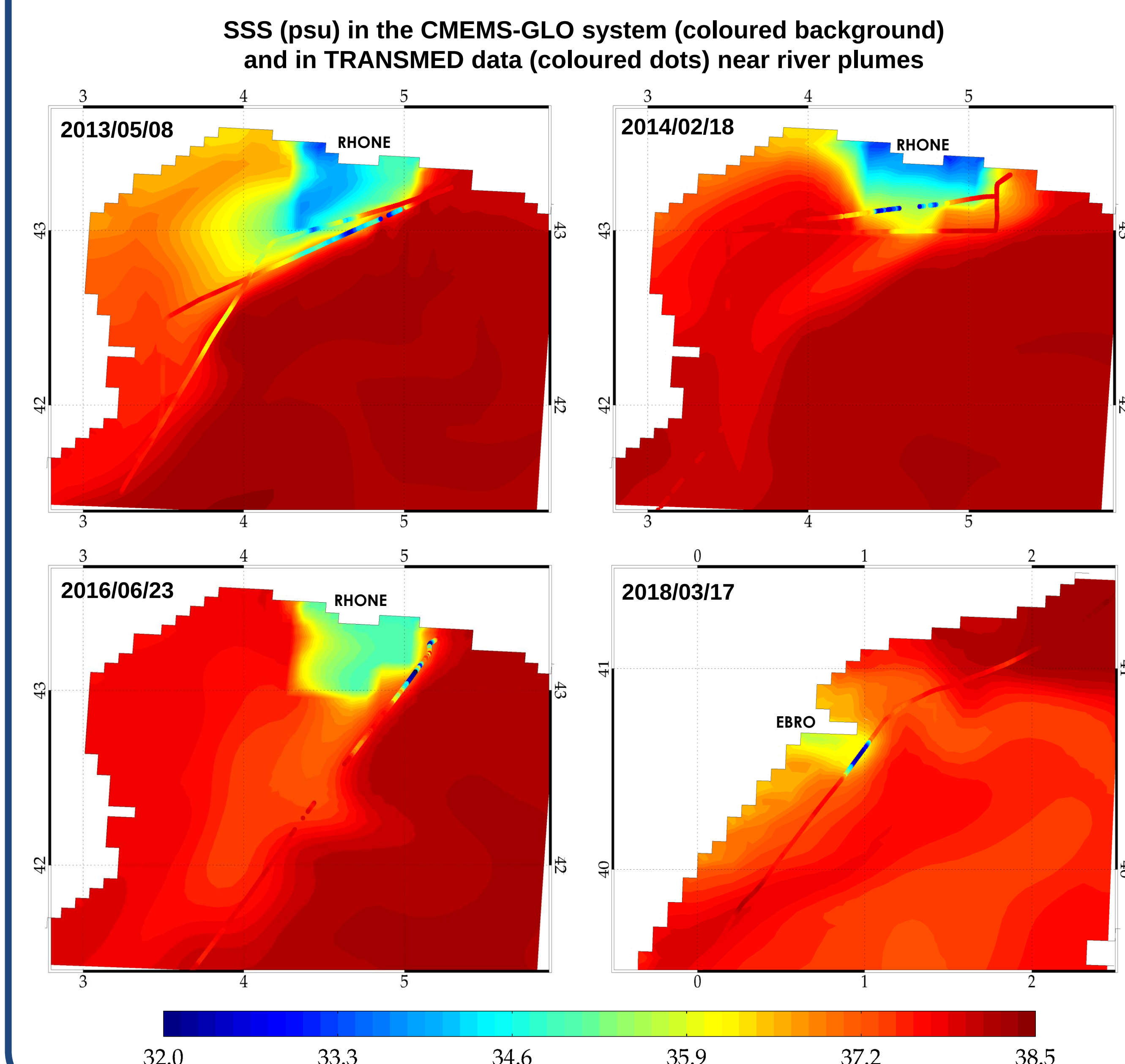
The Atlantic Water in the Algerian Current



The CMEMS-GLO system reproduces quite well on average the increase of the AW salinity on its pathway along the Algerian coasts (see Figures and charts above), in comparison with the salinification rate given by the TRANSMED data.

But improvements have to be made on the modelling of the low salinity areas in the vicinity of the main river mouths (see Figures on the right regarding the plumes of the Rhône and Ebro rivers).

The Rhône and Ebro river plumes



Références:

Lellouche, J.-M., Greiner, E., Le Galloudec, O., Garric, G., Regnier, C., Drévillon, M., Benkiran, M., Testut, C.-E., Bourdalle-Badie, R., Gasparin, F., Hernandez, O., Levier, B., Drillet, Y., Remy, E., and Le Traon, P.-Y. (2018) Recent updates to the Copernicus Marine Service global ocean monitoring and forecasting real-time 1/12° high-resolution system, *Ocean Sci.*, 14, 1093–1126, <https://doi.org/10.5194/os-14-1093-2018>.

Taupier-Letage, I., and Rougier, G. (2019) TRANSMED website <http://www.ifremer.fr/transmed>