New Black Sea SMOS Sea Surface Salinity products

We are pleased to announce the publication of the **first** dedicated **SMOS Sea Surface Salinity (SSS)** products for the **Black Sea** produced at BEC. These new SMOS Sea Surface Salinity products specific for the Black Sea region have been created under the funded ESA project ITT ***Earth Observation data for Science and Innovation in the Black Sea (EO4SIBS)*** (contract 4000127237/19/I-EF).

The measurements of SSS in the Black Sea from space has some unique, challenging features that have rendered the systematic production of high quality SSS maps. From the satellite data processing point of view the measurements are strongly degraded by: i) Land Sea Contamination (strong biases close to the coast); and ii) the Radio Frequency Interferences (RFI) that are produced by illegal emissions in the same frequency band used by the satellite. From the geophysical point of view, the SSS in the Black Sea presents significant differences with respect to the SSS in the global ocean: i) salinity values are very low (17-18 practical salinity units (psu) instead of 32-38 psu in the global ocean); ii) geophysical trends may be larger and may occur before than in the open ocean; and iii) stratification events in this basin could be more relevant than in the open ocean.

These geophysical properties have to be taken into account in the data processing: i) the dielectric constant models which relate the SSS and the Sea Surface Temperature (SST) with the Brightness Temperature (TB) measurements by the satellite are suited for the typical SSS values in the open ocean, namely 32-38 psu, but their accuracy in the range of 15-20 psu is very poor; ii) the potential satellite drifts could lead to spurious salinity trends that can be misinterpreted as geophysical trends in the basin; and iii) algorithms for

correcting temporal biases should prevent the use of in situ salinity measurements since they are typically acquired at some meters depth and the satellite represents the salinity in the first centimeters.


Black Sea BEC SMOS L3 SSS from May 2018 to September 2018.
The Black Sea SSS products comprise:

- L2 for ascending and descending orbits with 0.25 degrees spatial resolution and daily temporal resolution for the period (2011-2020).
- L3 with a spatial resolution of 0.25 degrees and 9 days temporal resolution. Maps are daily provided for the period (2011-2020).
- L4 provided in a 0.05 x 0.0505 degrees grid and daily temporal resolution for the period (2011-2019).

A detailed explanation of the product algorithms and validation can be found in Olmedo et al. 2021, "New SMOS SSS maps in the framework of the Earth Observation data For Science and Innovation in the Black Sea", *Earth Syst. Sci. Data Discuss.* The manuscript is available as a discussion paper in Earth System Science Data (ESSD). We ask you to consider whether you can support the review process. Your contribution would be very much appreciated.

More information about how to access the data and its metadata can be found in the BEC SMOS SSS Black Sea Product Description BEC_PD_SSS_BLACK_L2_L3_L4.pdf. Please, do not hesitate to contact us in case you have any questions or comment at smos-bec@icm.csic.es. Your feedback is most welcome!

Enjoy the products!

The BEC Team