The aim of the L2 ocean salinity processing is to retrieve sea surface salinity from SMOS brightness temperatures and auxiliary data. The L2 ocean salinity processor uses as input data:
- The L1c product, which is primarily the brightness temperatures associated with each ISEA grid point at the time of a satellite pass.
- Dynamic auxiliary data files (which change with time) are geophysical parameters (sea surface temperature, wind, etc.) provided by ECMWF. ECMWF data are interpolated on the ISEA grid by pre-processor.
- Look-Up Tables describing complex models for roughness effects.
- Static parameters that do not evolve with time (physical constants, sky emission map) or that represent monthly averages over the year (climatology of the SSS, climatology of ice).

The approach to retrieve sea surface salinity is a least square fit method (Levenberg-Marquardt algorithm). The cost function depends on measured and simulated brightness temperatures as well as a priori information on geophysical parameters. The retrieved parameters are the sea surface salinity (SSS), the sea surface temperature (SST), the wave speed (neutral wind speed component or friction velocity), other specific parameters such as the wave height or the inverse wave age and the total electron content (TEC).

The modular collection of forward models computes an estimate of the SMOS brightness temperatures using geophysical parameters. Among the contributors, roughness effects are derived using the two-scale model provided by the LOCEAN, or the SSA model of IFREMER (which includes a foam model), or an empirical model proposed by ICM.

### Conclusions

Expected performance depends on the position of the target across the swath: SSS error \(<0.6\,\text{psu}\) at the center of the swath and \(<2\,\text{psu}\) at the edge of the swath. Polarized brightness temperatures show better performances than Stokes 1 parameter.

About wind speed, sensitivity to bias of 0.4 psu/1 m/s is expected. The impact of sea surface temperature bias depends strongly on sea surface temperature value.

TEC is not retrieved uniformly across the swath with polarized brightness temperatures. Stokes 1 parameter avoids TEC bias impacts on retrieved SSS. Strong galactic noise contamination expected in January/February/March/April for ascending nodes and in July/August/September/October for descending nodes.