



## Product User Guide

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## Amendment Record Sheet

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## Acronyms

ATBD	Algorithm Theoretical Baseline Document
BEC	Barcelona Expert Center
ISC	Ice-Sea Contamination
LSC	Land-Sea Contamination
PUG	Product User Guide
PVR	Product Validation Report
SMOS	Soil Moisture and Ocean Salinity
SIC	Sea Ice Concentration
SSS	Sea Surface Salinity

Table 1: List of acronyms



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## 1 Introduction

This document holds the Product User Guide (PUG) v2 prepared by SO-FRESH team, as part of the activities included in the [WP300] of the Proposal (from SoW ref. AO/1-10461/20/I-NB). The objective of this document is to provide a detailed description of the SO-FRESH L3 SSS product.

The PUG is structured as follows:

- Section 1 covers the introduction of this document.
- Section 2 describes the format of the SO-FRESH L3 SSS product.

## 2 SO-FRESH L3 SSS product

### 2.1 Format of the product

SO-FRESH L3 SSS product is distributed in netCDF-4 format following the Climate and Forecast (CF) Metadata conventions (at least v1.6). Compression has been applied for variables stored in netCDF files and time dimension has been defined as a record dimension.

Grid mappings used are described in the netCDF variables section specifying its name by means of the `grid_mapping_name` attribute and map parameters and coordinates according to the grid mapping used.

### 2.2 Description of the SO-FRESH L3 SSS product

The SO-FRESH SSS product is generated in a EASE-Grid 2.0 South (EPSG:6932). Table 2 shows the main specifications of this product.

Note that the field of uncertainty can be used for filtering purposes. Higher values of uncertainty are found close to ice edges (as detailed in the comparison to in situ data in the Product Validation Report).

The citation of the dataset is the following:

González Gambau, Verónica; Olmedo, Estrella; García Espriu, Aina; González-Haro, Cristina; Turiel, Antonio; 2023; "Southern Ocean Sea Surface Salinity Level 3 maps (V.1.0) [Dataset]"; DIGITAL.CSIC; <https://doi.org/10.20350/digitalCSIC/15493>

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<b>SO-FRESH L3 SSS product</b>	
Geographical coverage	180°W -> 180°E; 30°S -> 90°S
Temporal coverage	2011-02-01 to 2022-12-31
Spatial resolution	25km x 25km
Coordinates reference system	EASE-SL 25km
Temporal resolution	9-day maps generated daily
Version	1.0
DOI	<a href="https://doi.org/10.20350/digitalCSIC/15493">https://doi.org/10.20350/digitalCSIC/15493</a>
Source	BEC FTP

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Table 2: SO-FRESH L3 SSS product.

The name convention for the SO-FRESH SSS product is the following:

*BEC\_SSS\_\_SMOS\_\_SO\_\_L3\_\_B\_yyyymmddT120000\_25km\_9d\_REP\_v100.nc*

where the string "yyymmdd" corresponds to the central date of the 9-day map, the string "25km" indicates the spatial resolution of the grid and the string "9d" stands for the moving temporal window.

The format of the netCDF files containing SO-FRESH SSS product is described below:

dimensions :

```
time = UNLIMITED ; // (1 currently)
y = 720 ;
x = 720 ;
```

variables :

```
int time(time) ;
time:standard_name = "time" ;
time:long_name = "Time" ;
time:units = "seconds since 1970-1-1 00:00:00" ;
time:time = "T" ;
time:calendar = "gregorian" ;
```

```
float x(x) ;
x:standard_name = "projection_x_coordinate" ;
x:long_name = "x coordinate of projection" ;
x:coordinate_defines = "center" ;
x:_CoordinateAxisType = "GeoX" ;
```

```
x:units = "m" ;

float y(y) ;
  y:standard_name = "projection_y_coordinate" ;
  y:long_name = "y coordinate of projection" ;
  y:coordinate_defines = "center" ;
  y:_CoordinateAxisType = "GeoY" ;
  y:units = "m" ;

float lat (y,x) ;
  lat:standard_name = "latitude" ;
  lat:long_name = "Latitude" ;
  lat:units = "degrees_north" ;
  lat:axis = "Y"
  lat:coordinate_defines = "center" ;
  lat:_CoordinateAxisType = "Lat" ;
  lat:valid_min = -90.f ;
  lat:valid_max = -30.f ;

float lon (y,x) ;
  lon:standard_name = "longitude" ;
  lon:long_name = "Longitude" ;
  lon:units = "degrees_east" ;
  lon:axis = "X" ;
  lon:coordinate_defines = "center" ;
  lon:_CoordinateAxisType = "Lon" ;

int crs ;
  crs:grid_mapping_name = "lambert_azimuthal_equal_area" ;
  crs:longitude_of_projection_origin = 0.f ;
  crs:latitude_of_projection_origin = -90.f ;
  crs:false_easting = 0.f ;
  crs:false_northing = 0.f ;
  crs:_CoordinateTransformType = "Projection" ;
  crs:_CoordinateAxisTypes = "GeoX GeoY" ;
  crs:datum = "WGS84" ;
  crs:proj4tex = "+proj=laea +lat_0=-90.000000+lon_0=0.000000
+x_0=0.000000 +y_0=0.000000 +ellps=WGS84 +datum=WGS84
+units=m +no_defs" ;

float sss(time, y, x) ;
  sss:missing_value = -999.f ;
  sss:_FillValue = -999.f ;
  sss:standard_name = "sea_surface_salinity" ;
```

```
sss:long_name = "Sea Surface Salinity" ;  
sss:description = "Sea Surface Salinity in Practical Salinity Units [psu]."  
sss:units = "1" ;  
sss:valid_min = 0.f ;  
sss:valid_max = 40.f ;
```

```
float uncertainty_sss(time, y, x) ;  
uncertainty_sss:units = "1" ;  
uncertainty_sss:standard_name = "uncertainty_sea_surface_salinity" ;  
uncertainty_sss:long_name = "Sea Surface Salinity Uncertainty" ;  
uncertainty_sss:description = "Practical Sea Surface Salinity [psu]" ;  
uncertainty_sss:grid_mapping = "crs" ;  
uncertainty_sss:coordinates = "time lat lon" ;  
uncertainty_sss:valid_min = 0.f ;  
uncertainty_sss:valid_max = 10.f ;  
uncertainty_sss:missing_value = -999.f ;  
uncertainty_sss:_FillValue = -999.f ;
```