
 National Oceanography Centre		 Channel Coastal Observatory

# FFSAR - COASTAL

Fully Focused SAR Altimetry and  
innovative river level gauges for  
Coastal Monitoring

*VorteX.io Micro-Station Data Format*  
Deliverable D3.2

Fully Focused SAR Altimetry and innovative river level gauges for Coastal  
Monitoring

ESA Contract 4000136960/21/I-DT-Ir

Project Reference FFSARCOASTAL\_ESA\_D3.2v1.1  
Issue:1.2

This page has been intentionally left blank


## Change Record

Date	Issue	Section	Page	Comment
19/09/2022	1.0	all	all	1st version
19/10/2022	1.1	all	all	Changes in file naming convention and in the NetCDF global attributes
28/10/2022	1.2	#3	#8	Update of the description of the "water_surf_vel" parameter

## Control Document

Process	Name	Date
Written by:	Jean-Christophe. Poisson	05/10/2022
Checked by	David Cotton	31/10/2022
Approved by:	David Cotton	31/10/2022

<b>Subject</b>	Fully Focused SAR Altimetry and Innovative River Level Gauges for Coastal Monitoring	<b>Project</b>	FFSARCOASTAL
<b>Author</b>	Jean-Christophe Poisson	<b>Organisation</b>	vorteX.io
		<b>Internal references</b>	FFSARCOASTAL_ESA_D3.2

	Signature	Date
For FFSARCOASTAL team		31/10/22
For ESA		

## 1 Table of Contents

1	Table of Contents.....	4
1	Introduction .....	5
1.1	The FFSAR Coastal Project.....	5
1.2	Scope of this Document.....	5
1.3	Applicable Documents .....	5
1.4	Reference Documents .....	5
1.5	Overview of this Document .....	5
2	Naming convention .....	6
3	Data structure .....	6
	List of Acronyms .....	8

## 1 Introduction

### 1.1 The FFSAR Coastal Project

The project will apply the Fully Focussed (FF) SAR altimetry processor on Sentinel-3 data and evaluate its potential to make a significant new contribution to coastal and estuarine monitoring systems, when coupled with innovative water level gauges for validation.

Applications will focus on the benefits offered by the very high along-track resolution in water level and backscatter that can be provided through Fully Focussed SAR processing. User agencies and groups from the two regions will be consulted to identify gaps and priorities for monitoring requirements.

Innovative in-situ water level gauges will be used to validate the satellite data. Time series will be provided by autonomous gauges placed at fixed locations, gauges mounted on drones will be used to provide water level profiles between the fixed locations and satellite tracks.

### 1.2 Scope of this Document

The objective of this document is to describe the vorteX.io micro-station data format.

### 1.3 Applicable Documents

AD-01: Fully Focussed Sar Altimetry And Innovative River Level Gauges For Coastal Monitoring (FFSAR-Coastal) - ESA Contract No. 4000136960/21/I-DT-Ir

### 1.4 Reference Documents

RD-01 FFSAR-Coastal Proposal. V1.1 29/07/21, SatOC and FFSAR-Coastal team.

### 1.5 Overview of this Document

In addition to this Introduction chapter, this campaign report includes the following chapters:

- Naming convention
- Data structure

## 2 Naming convention

The files are named as follows:

**vortexio\_ffsarcoastal\_satname\_ron\_station\_id\_YYYYMMDDThhmmss\_YYYYM  
MDDThhmmss.nc**

with:

- vortexio: data producer
- ffsarcoastal: project name
- satname: satellite platform name
- ron: relative orbit number of the satellite platform
- station\_id: identification of the micro-station
- YYYYMMDDThhmmss: time of the first measurement
- YYYYMMDDThhmmss: time of the last measurement

## 3 Data structure

The data files are provided in NetCDF format which are self-described and compliant with the CF convention.

The time units provided in the NetCDF files are aligned with the units of the Sentinel-3 products.

Here is the data description and structure:

```
netcdf .\vortexio_ffsarcoastal_fos-sur-mer_1_20220727T000000_20221005T170129 {  
dimensions:  
    index = 771 ;  
    position = 1 ;  
variables:  
    double time(index) ;  
        time:long_name = "time (sec. since 2000-01-01)" ;  
        time:standard_name = "time" ;  
        time:calendar = "gregorian" ;  
        time:units = "seconds since 2000-01-01 00:00:00.0" ;  
        time:comments = "The time is given in UTC" ;  
    double latitude(position) ;  
        latitude:long_name = "latitude" ;  
        latitude:standard_name = "latitude" ;  
        latitude:units = "degrees_east" ;
```

---

```
latitude:comments = "Positive latitude is North latitude, negative latitude is
South latitude." ;
double longitude(position) ;
    longitude:long_name = "longitude" ;
    longitude:standard_name = "longitude" ;
    longitude:units = "degrees_north" ;
    longitude:comments = "East longitude relative to Greenwich meridian." ;
float wsh_wgs84(index) ;
    wsh_wgs84:units = "m" ;
    wsh_wgs84:long_name = "water surface height above WGS84 ellipsoid" ;
    wsh_wgs84:comments = "water surface height above WGS84 ellipsoid
measured by the vorteX.io uVTX-1 micro-station" ;
float water_surf_vel(index) ;
    water_surf_vel:units = "m.s-1" ;
    water_surf_vel:long_name = "water surface velocity" ;
    water_surf_vel:comments = "water surface velocity measured by the vorteX.io
uVTX-1 micro-station. A NaN value means that the system is not able to provide a
measurement" ;
float temperature(index) ;
    temperature:units = "C" ;
    temperature:long_name = "temperature" ;
    temperature:comments = "local temperature at the micro-station location in
Celsius degree" ;
float rain_rate(index) ;
    rain_rate:units = "mm.h" ;
    rain_rate:long_name = "rain_rate" ;
    rain_rate:comments = "rain rate at the micro-station location" ;

// global attributes:
:description = "vorteX.io measurements acquired by the micro-station named
fos-sur-mer_1 between 2022-07-27 00:00:00 and 2022-10-05 17:01:29 UTC" ;
:sensor = "vorteX.io uVTX-1 Micro-Station" ;
:id = "fos-sur-mer_1" ;
:project = "ESA FFSAR-Coastal" ;
:project_webpage = "https://eo4society.esa.int/projects/ffsar-coastal/" ;
:production_date = "2022-10-05 19:01:31" ;
:produced_by = "vorteX.io" ;
:satellite_platform = "S3B" ;
:realtime_orbit_number = 179 ;
}
```

## List of Acronyms

AD	Applicable Documents
CCO	Channel Coastal Observatory
DTU	Danmarks Tekniske Universitet (Technical University of Denmark)
EO	Earth Observation
ESA	European Space Agency
MTR	Mid Term Review
NOC	National Oceanography Centre
RD	Reference Document
SAR	Synthetic Aperture Radar
SatOC	Satellite Oceanographic Consultants Ltd
SMAP	Stand Alone Multi-Mission Processor
SRAL	SAR Radar Altimeter
S3A, S3B	Sentinel 3A, and Sentinel 3B