

Training on In situ Ocean Colour Above-Water Radiometry towards Satellite Validation

Demo on measurement and data handling software TriOS MSDA_XE Focus: export data to .mlb (HyperCP compatible)

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FRM4SOC Phase-2

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fiducial reference measurements for satellite ocean colour https://frm4soc2.eumetsat.int/deliverables

Deliverables

D-1 Project Management Plan (PMP)

D-2 Reflectance Measurement Requirements Document (RMRD)

D-3 Database to host FRMOCnet specifications, data and documentation for the OCR models as well as for individual instruments and their deployment history

D-4 FRMOCnet Database Architecture Design and User Manual document (ADUM)

D-5 OCDB Database WebUI, CLI, Python API, and Architecture Design and User Manual document

D-6 Technical Report: Measurement Procedure Document (MPROCD)

D-7 Technical Report: Complete characterisation and calibration results for FRMOCnet OCR models and recharacterisation routine: an update

D-8 Technical Report: Guidelines for individual OCR full characterisation and calibration

D-9 Data Package: FRMOCnet OCR models full characterization and calibration results

Measurement Procedure for operating the TRIOS/RAMSES radiometers to obtain Fiducial Reference "Measurements (MPROC)

D6. Measurement Procedure Document (MPROCD)

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https://frm4soc2.eumetsat.int/sites/default/files/inline-files/FRM4SOC-2_D-06_MeasurementProcedure_v3.1_24032023_RBINS_EUMETSAT_signed.pdf The Section 3 summarises how the MSDA_XE software is configured and prepared before a cruise and should be used in conjunction with the MSDA_XE Manuals

6. Post-acquisition preparation of data for processing

6.1 Radiometer data extraction

After the collection of data, it can be exported with MSDA_XE for HyperCP compatible format.

Extraction will give a raw data file in ASCII format and containing digital counts for each of the 3 radiometers (*Ed*, *Ld*, *Lu*) and for each station selected for processing.

Each data file contains

- a header of typically 18 rows
 - starting with "%" and containing instrument serial number and other metadata
- one column header row
 - starting with "%DateTime"
- and then one row of data for each acquired scan.

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Each row of data contains the following (meta)data values separated by spaces:

- Datetime in Julian Day with 6 decimal places (approximately 0.1s)
- Latitude in decimal degrees North (as measured by the GPS)
- Longitude in decimal degrees East (as measured by the GPS)
- Integration Time in ms
- 255 data values as digital counts (corresponding to the 255 pixel detectors of the spectrometer, of which typically the last 18 are dark pixels used for dark correction)
- 2 training text comments each starting with "%"

- To obtain these data files, data is extracted using MSDA-XE as follows:
- EXPORT RAW files from the database (DB_Sender table obtained from Database>Data command) for each sensor separately

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Figure 34 Screenshot preparing export of data showing data filter options for one radiometer.

1) Use the filters:

a) For the radiometers

1. Data Type_1: RAW

2. Device (select a sensor each time): SAM_8068 then SAM_806B then SAM_8069 [adapt to actual device Serial Numbers]

b) For the inclinometer use filters:

1. Device: IPc071 [adapt to actual device Serial Number]

2. DataType: Inclination

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Figure 36 Screenshot preparing export of data showing data filter options for a second radiometer.

2) Select all and Export using Masks:

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8/06/2022 09:59:50	70.50 2022.06.08	Page MAR	SPECTRUM	RAW.		50.482022	A 244905 09-58-50		
🧧 🗹 (DataType_1 ec		e equal: SAM_8069) 📼							Customize
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election: 0	📑 🖪 💽 Com	nments							
d Caluaria III III D									
d Selection 👻 🔣 D	elay 1 🔅 🔣 <		> > 🖩 🖉 🚺 🔼						

Figure 36 Screenshot preparing export of data showing data filter options for a second radiometer.

Tab: Matlab Serial Data

Sub-tab (left): Masks

Directory: C:\Users\MyUserName\TRIOS\CruiseData\ThisCruise\

Mask: \${Comment0}_\${IDDevice}_\${DataType1}_\${DataType}

	Layout 🕌 🛗 📅							-		
Date/Time 7 .	 IDData 7D5A_2022-06-08_ 	the second se	Comme DataType C SPECTRUM	(DataTyj 🗶 Latitude 🗶 L	ongitu 🕌 Time 🗣			
8/06/2022 10:00:40	7D5A_2022-06-08_		SPECTRUM	Export 231 record(s	s) to file(s)					×
8/06/2022 10:00:30	7D5A_2022-06-08_		SPECTRUM	TriOS Fe	ormat	📣 MatLab Code	MatLab Serial Data	RAW Format		
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8/06/2022 10:00:10	7D5A_2022-06-08_	the second se	SPECTRUM							
8/06/2022 10:00:00	7D5A_2022-06-08_1		SPECTRUM				to build data dependent file ood can split record in differe		I ant multipla	
8/06/2022 10:00:00	7D5A_2022-06-08_		SPECTRUM	Single		nd on the mask this metr is to one file.	iod can spin record in dinere	nt directories anoyor co	liect muniple	
8/06/2022 09:59:50	7D5A_2022-06-08_0	I SAM_8069	SPECTRUM				sk you have a guaranty of u	nique filenames.		
8/06/2022 09:59:50	7D5A_2022-06-08_0	I SAM_8069	SPECTRUM						_	
8/06/2022 09:59:40	7D5A_2022-06-08_0	and the set of the set	SPECTRUM	Ken	Director	y C:\Users\Remsem\T	RIOS_FRM4SOC\CruiseData	\TestCruise\		
8/06/2022 09:59:40	7D5A_2022-06-08_	and the second	SPECTRUM	Key						
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8/06/2022 09:59:20	7D5A_2022-06-08_1	I SAM_8069	SPECTRUM							
8/06/2022 09:59:10	7D5A_2022-06-08_0	I SAM_8069	SPECTRUM							
8/06/2022 09:59:10	7D5A_2022-06-08_0	SAM_8069	SPECTRUM	Mask						
8/06/2022 09:59:00	7D5A_2022-06-08_0	SAM_8069	SPECTRUM	- Andrews						
8/06/2022 09:59:00	7D5A_2022-06-08_0	SAM_8069	SPECTRUM							
9/06/2022 09:59:50	7054 2022.06.08	SAM ROES	SPECTRUM		T					
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				Ok	Cancel					
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Figure 37 Screenshot while exporting data from one radiometer - showing output filename setting.

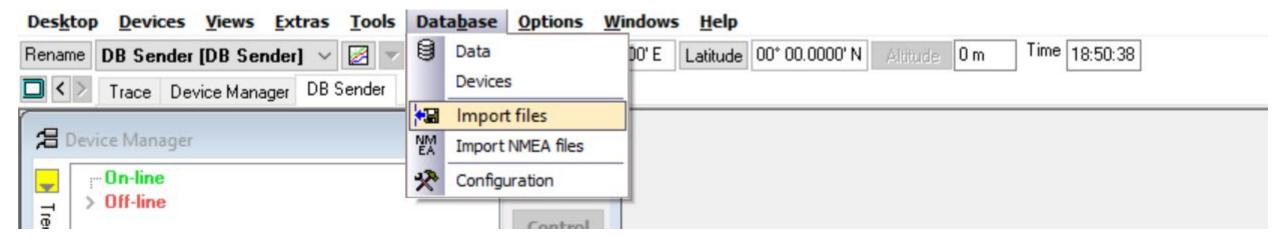
- In this way for each sensor one file for each station is created.
- Example:

StationName_SAM_8068_RAW_SPECTRUM.mlb StationName_SAM_806B_RAW_SPECTRUM.mlb StationName_SAM_8069_RAW_SPECTRUM.mlb

- Hands-on exercise to export TriOS RAMSES data to .mlb (HyperCP compatible) with MSDA_XE software.
- Input data from the Baltic Sea (8th July 2023, GMT 7:03 7:09:50, every 10 s)
 - SAM_8166 *Ld*
 - SAM_8595 *Lu*
 - SAM_8329 *Ed*

Name	\sim	Date modified	Туре	Size
SAM_8166_Spectrum_RAW_2023-07-08_07-01		08.07.2023 07:02	DAT File	5 KB
SAM_8166_Spectrum_RAW_2023-07-08_07-02	2	08.07.2023 07:02	DAT File	5 KB
SAM_8166_Spectrum_RAW_2023-07-08_07-02	2	08.07.2023 07:02	DAT File	5 KB
SAM_8166_Spectrum_RAW_2023-07-08_07-03	3	08.07.2023 07:03	DAT File	5 KB
SAM_8166_Spectrum_RAW_2023-07-08_07-03	3	08.07.2023 07:03	DAT File	5 KB
SAM_8166_Spectrum_RAW_2023-07-08_07-03	3	08.07.2023 07:03	DAT File	5 KB
SAM_8166_Spectrum_RAW_2023-07-08_07-03	3	08.07.2023 07:03	DAT File	5 KB
SAM_8166_Spectrum_RAW_2023-07-08_07-03	8	08.07.2023 07:03	DAT File	5 KB
SAM_8166_Spectrum_RAW_2023-07-08_07-03	3	08.07.2023 07:03	DAT File	5 KB

- Import test dataset:
 - Database \rightarrow Import files



• Open the dataset

MSDA_XE: Default.dsk - 'C:\Users\Public\Doc	MSDA_XE: Default.dsk - 'C:\Users\Public\Documents\MSDA_XE\UserData\Databases\data.mdb' - Mission: No Mission (1)												
Desktop Devices Views Extras Tools	Dat	a <u>b</u> ase <u>Options</u> <u>W</u> in	ndows <u>H</u> elp										
Rename DB Sender [DB Sender] 🗸 🛃 🔻	8	Data	00'E Latitude 00° 00.0000'N Altitude 0 m Time 09:41:04										
□ < > Trace Device Manager DB Sender		Devices											
_	† 2	Import files											
🔁 Device Manager	NM EA	Import NMEA files											
↓ On-line	*	Configuration											

 Use Filter to specify the Device and export data for all three sensors separately

-	: :	Date/Time 🛛 🗸	IDData 🗸	Devi	ce 🗸	Comme 🗸		×	Comme 🗸	DataTyj 🗸	Comme 🗸	DataTyj 🗸	
-		08.07.2023 07:10:00	0C1E_2023-07-08_(SAM.	_8329	FRM4SOC2_	SPECTRUM			RAW			
2	•	08.07.2023 07:09:50	0C1E_2023-07-08_(SAM.	_8329	FRM4SOC2_	SPECTRUM			RAW			
Tipe	•	08.07.2023 07:09:40	0C1E_2023-07-08_0	SAM	_8329	FRM4SOC2_	SPECTRUM			RAW			
-	•	08.07.2023 07:09:30	0C1E_2023-07-08_0	SAM	_8329	FRM4SOC2_	SPECTRUM			RAW			
	•	08.07.2023 07:09:20	0C1E_2023-07-08_0			CDM40000	COLOTOUN			DAV			
Distance	•	08.07.2023 07:09:10	OC1E_2023-07-08_0	SAM	Filter builder	- [untitled.flt]							
3	•	08.07.2023 07:09:00	0C1E_2023-07-08_0	SAM	Filter AND <ro< td=""><td>ot></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></ro<>	ot>							
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• Under MatLab Serial Data, choose Mask tab

- Specify the output Directory
- Add Mask

• Repeat it for two other sensors

Export 45 r	ecord(s) to file(s)					×
М. Т	riOS Format	4	MatLab Code	MatLab Serial Data	RAW Format	
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Sing	le Dep	end on t ords to or	he mask this meth ne file.	k to build data dependent f hod can split record in diffe ask you have a guaranty of	rent directories and/or colle	ect multiple
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Ok	Cancel					