



ESA-MOST China Dragon 4 Cooperation

→ ADVANCED TRAINING COURSE IN OCEAN AND COASTAL REMOTE SENSING

12 to 17 November 2018 | Shenzhen University | P.R. China

Sea Surface Temperature Retrievals SNAP & S3 SLSTR Data - Francesco Nencioli, Plymouth Marine Laboratory



ERSE CSA

In this practical session you will use the SNAP GUI to:

1) Explore and visualise SST data.
 2) Subset and save a region of interest.
 3) Apply bias corrections and masks to SST data.
 4) Filter cloud pixels with user-defined flags.



IMPORTANT NOTE:

This lesson requires **Sentinels Application Platform (SNAP) software** and **Sentinel Toolboxes** which can be downloaded at :

http://step.esa.int/main/download/

This should already be available on your machines.

• Start the SNAP program (You can simply type snap and hit enter from the command line)

This should provide an interface that looks like this





- Click the open file icon
- Navigate to the Data folder

As for the OC practical we will work with observations from October 2 2018

		🙆 🕑 🚺	3 gp 10:110	6 NOV 2016 Fra	ncesco r
ile Film View Analysis Laver Vertor Daster Ontical Dadar Tools Window Helm	SNAP			Q. Search	↑
			🔹 🎘 1	81 😙 👤	a *
oduct – Norer X Pixel Info					
	StrAD Open Product Losk Jr. Data SSA_SL_2_WST20181002T010550_20181002T024555_20181003T113739_6055_036_216MAR_0_NT_000.5EH3				
wigation - [1] Uncertainty Vis Layer Editor Colour Mani X World Map	Tile glame: Tiles of ⊡pe: [All Files ↓ Open Cancel				
This soil window is used to manpulate the colouring of images shown in an image view. Right now, there is no selected image view.					

- S3 folder naming convention already provides useful information for the user.

MMM_SL_L_TTTTTT_date1_date2_date3_[instanceID]_GGG_[classID].SEN3

- 1.MMM: mission id (S3A)
- 2. SL: Data source (SL=SLSTR)
- **3.** *L*: processing level (**2** = Level 2)
- 4. TTTTTTT: data type ID (WST_____ = L2P sea surface temperature)
- 5. date1: sensing start time (20181002T010530; format yyyymmddThhmmss)
- 6. date2: sensing end time (20181002T024629)
- 7. date3: product creation date (20181003T113739)
- 8. [instance id]: duration_cycle number_relative orbit (6059_036_216____)
- 9. GGG: id of centre generating the files (MAR)
- 10.[classID]: Platform_timeliness_baseline (O_NT_003: operational, non-time critical)11.SEN3: filename extension



- Enter the folder for the October 2 2018 file
- Click and open the netcdf
- It will take few minutes to load

(As opposed to OC files, all SST variables are contained within a single netcdf file;

No need to used the .xml file)





- The Data are now available for browsing in the "Product Explorer" tab
- If you click on the World Map button from the top-down menu in the right you will be able to visualize where the data are located





- Data within the file are organized in:
- 1. Metadata (info on file and variables)
- 2. Index and Flag codings (specific flag values)
- *3. Vector data* (empty)
- 4. Bands (data matrices)





- First (as for OC data) take your time to check the Metadata!!! Lots of information there:
- 1. General info for the whole file is on the global attributes

				1	1 1 3 gl	11:37 06 Nov 2018	Francesco Ne	ncioli
[1] Global_Attributes - [20181002010530-MAR-L2P_GHRSST-SSTskin-SLSTRA-201810	03113739-v02.0-fv01.0] • [/users/rsg/fne/DA	IA/Meetings_and_Seminars/China_Nov2018/Da	ta/S3A_SL_2_WST2018	B1002T010530_201810	2T024629_20181	003T113739_6059_036	216 🔶 🔶 🗕	a x
Elle Edit View Analysis Layer Vector Raster Optical Radar Tools Window Help						Q	Search (Ctrl+I)	
😑 🔩 🦻 🥐 🔏 👢 🕨 🖻 🔍 🗁 🖉 🖬	🔍 🚇 🔟 Σ 🕺 🗞 🗮	836 📽 🎇 🕨 🕴		7 🗖 🕈 🔿 🎽		🕴 🏹 101 👻	👤 🛒 🕴	*
Product Explorer × Pixel Info	[1] Global_Attributes ×						• • •	
P State 1 20181002010530-MAR-L2P_GHRSST-SSTskin-SLSTRA-20181003113739-v02.0-fv01.0	Name	Value	Type	Unit		Description		R
e 🔄 Metadata	Conventions	CF-1.6, Unidata Observation Dataset v1.0	ascii					A du
Global Attributes	Metadata_Conventions	Unidata Dataset Discovery v1.0	ascii					
- 0 Variable_Attributes	acknowledgment	European Commission Copernicus Programme	ascii					Cer
🗢 🧰 Index Codings	cdm_data_type	swath	ascii					
- Elag Codings	comment	GHRSST SST L2P	ascii					
Bands	creator_email	ops@eumetsat.int	ascii					5
	creator_name	EUMETSAT	ascii					lyer
	creator_url	http://navigator.eumetsat.int/	ascii					Mai
	date_created	20181003T113739Z	ascii					lage
	easternmost_longitude	171.75506591796875	float64					1
	file_quality_level	3	int16					
	gds_version_id	2.0r5	ascii					4
	geospatial_lat_resolution	0.009	float32					Mas
	geospatial_lat_units	degrees_north	ascii					3
	geospatial_lon_resolution	0.009	float32					Seut
	geospatial_lon_units	degrees_east	ascii					ler.
	history	Sentinel-3 Optical Instrument Processing Facility 20): ascii					1
	id	SLSTRA-MAR-L2P-v1.0	ascii					6
	institution	MAR	ascii					1
	keywords	Oceans > Ocean Temperature > Sea Surface Temp	or ascii					6
	keywords_vocabulary	NASA Global Change Master Directory (GCMD) Scien	nc ascii					1
	license	Copernicus Programme free, full and open data pol	lir ascii					1
Navigation - [1] Uncertainty Vis Layer Editor Colour Manipul World Map 🐘 🗙 🖬	metadata_link	N/A	ascii					6
	naming_authority	org.ghrsst	ascii					6
	netcdf_version_id	4.2 of Jul 5 2012 17:07:43 \$	ascii					1
	northernmost_latitude	89.04261779785156	float64					
	platform	Sentinel3A	ascii					1
	processing_level	L2P	ascii					6
	product_version	1.0	ascii					1
	project	Group for High Resolution Sea Surface Temperature	e ascii					6
	publisher_email	ghrsst-po@nceo.ac.uk	ascii					1
	publisher_name	The GHRSST Project Office	ascii					6
	publisher_url	http://www.ghrsst.org	ascii					1
Contraction of the second s	references	S3IPF PDS 005.3 - i2r7 - Product Data Format Specif	fi ascii					1
	sensor	SLSTR	ascii					
	source	IPF-SL-2 06.15	ascii					6
	southernmost_latitude	-85.90237426757812	float64					1
	spatial_resolution	1 km at nadir	ascii					
	standard_name_vocabulary	NetCDF Climate and Forecast (CF) Metadata Convent	ti ascii					
	start_time	20181002T010529Z	ascii					
	stop_time	20181002T024628Z	ascii					1
	summary	Sentinel-3A SLSTR skin sea surface temperature	ascii					
	time_coverage_end	20181002T024628Z	ascii					
	time_coverage_start	20181002T010529Z	ascii					H.
	title	Sentinel-3A SLSTR L2P SST dataset	ascii					4



- First (as for OC data) take your time to check the Metadata!!! Lots of information there:
- 1. General info for the whole file is on the global attributes
- 2. Specific info for every given variable is on the variable attributes (e.g. sea surface temperature)

9 = 7 = =				ð 🔸 🖬 💌 🕮 🤇	gb 11:42 06 Nov 2018 Francesco Nenci
[1] sea_surface_temperature - [20181002010530-MAR-L2P_GHRSST-SS		· [/users/rsg/fne/DATA/Meetings_and_Seminars/Chi	na_Nov2018/Data/S3A_SL_2_WST	201810021010530_2018100210	24629_20181003T113739_6059_03(* 🖃 📾
le <u>E</u> dit ⊻iew Analysis Layer Vector Raster Optical Radar <u>T</u> ools <u>W</u> indow	Help				Q Search (Ctrl+I)
🖴 😼 🧶 🖉 🕼 🕼 🐌 🖉 💭 🗖	φλ 🔝 🌑 🗟 🗽 🗷 🛇	****		🗏 🥎 O 🕌 🖴 🛝	🔹 ≿ 181 😮 👤 🐙 *
Product Explorer × Pixel Info	[1] Global Attributes × [1] sea_	surface_temperature ×			
← 🚺 Abstracted_Metadata	 Name 	Value	Type	Unit	Description
- [] Global_Attributes	FillValue	-32768	int16		
Variable_Attributes	add offset	273 15	float64		
adjudine_nom_sst	comment	Marine skin surface temperature	ascii		
- 0 brightness temperature	coordinates	Ion lat	arcii		
- 🚺 dt_analysis	doubh	10 micromotroe	andi		
— 🚺 dual_nadir_sst_difference	uepti .	10 micromedes	ascii		
- 🕚 I2p_flags	long_name	sea surrace skin temperature	ascii		
- 🚺 lat	scale_factor	0.01	float64		
- U lon	standard_name	sea_surface_skin_temperature	ascii		
nadir_sst_theoretical_uncertainty	units	kelvin	ascii		
Inter I	valid_max	4500	int16		
probability cloud single in	valid_min	-300	int16		
guality level	ChunkSize.1	1	int32		
- 🗿 satellite_zenith_angle	ChunkSize 2	6733	int32		
sea_ice_fraction	ChunkSize 3	250	int32		
 — 1 sea_ice_fraction_dtime_from_sst 	_criteriosize.o	250	111032		
— 🚺 sea_surface_temperature					
— 🕚 sses_bias					
 — 0 sses_standard_deviation 					
- U sst_algorithm_type					
sst_dtime					
Ssc deored cal dicertainty					
- 6 wind speed					
wind speed dtime from sst	-				
ation 111 Uncertainty Mr. Laure Editor Colour Maninul Merild Man					
adon - [1] oncertainty vis cayer cutor colour Hampul wond Hap					
	and the second se				
	The second s				
	n Frank				
The Article And And Article Ar					
	Sec. 1				
	Max 1				
No. 1999 - Contractor and the second					





- Now within the Bands products select the sea_surface_temper ature variable
- You can also switch the bottom panel to the Colour Manipulation tab

(Your window should look something like this)





To better visualize the data you can change the colour palette from the "Colour Manipulation" tab

- Click on the "Import coulour palette from text file" button
- Select one of the palettes from the list
- You can test with different ones but I recommend to use the
 JET one for the rest of the practical





You should obtain something like this

As SST files are smaller in size than the OC ones, they are provided as granules as well as **full swath/orbit cycle** (like in this example; See also the "**World Map**" tab)

The swath starts at the south pole (top of the graph)





- Let's check the direction of the swath:
- In the "Navigation" tab click in the "zoom in" button to focus on a smaller region of the swath.





Let's check the direction of the swath:

- In the "Navigation" tab click in the "zoom in" button to focus on a smaller region of the swath.
- Moving the box up in the "Navigation" tab you should be able to recognize Brazil!
- The orbit goes from the south pole over the Americas to the north pole.





From the North pole it goes back south over Asia

 Moving the box in the "Navigation" tab down you should be able to identify the region of the Yellow and East China sea





From the North pole it goes back south over Asia

- Moving the box in the "Navigation" tab down you should be able to identify the region of the Yellow and East China sea
- You can further zoom in with the "zoom in" button





From the North pole it goes back south over Asia

- Moving the box in the "Navigation" tab down you should be able to identify the region of the Yellow and East China sea
- You can further zoom in with the "zoom in" button
- You can adjust the colours via the "Colour Manipulation" tab







SNAP gives the possibility to subset a given dataset

 From the "Raster" button select the "Subset" option

This should open a dialogue window like this one







SNAP gives the possibility to subset a given dataset

 From the "Raster" button select the "Subset" option

This should open a dialogue window like this one

You can inspect the geographical limits in the "Geo Coordinates" tab





• If you press "**Ok**", you should see a new product appearing in the "Product explorer" tab









- If you press "Ok", you should see a new product appearing in the "Product explorer" tab
- Open the product to display "Sea Surface Temperature"
- "Zoom out" from the "Navigation" tab

The product contains the same variables as the original one, but spans only the desired area







You can now save the product

- Select it from the "Product explorer" tab
- Click on the "File" button
- Select the "Export"/"NETCDF4-CF" options on the menu
- Click "Export product" to save to disc

(This subset product will be used with OC in the synergy Practical)



→ ADVANCED TRAINING COURSE IN OCEAN AND COASTAL REMOTE SENSING



i 💼 🔿 🔳 🖬 👼

You can now close the window from the full swath product







esa

📜 🔜 📯 gb 🛛 15:07 06 Nov 2018 🛛 Francesco Nencio

SNRSCC

3 6 6



- Go back to full view by using the "Zoom all" button in the "Navigation" tab
- What is displayed here is **raw SST**.
- Before we can use it, we have to:
- 1. Correct it by its bias
- 2. Mask undesired pixels







- Go back to full view by using the "Zoom all" button in the "Navigation" tab
- What is displayed here is **raw SST**.
- Before we can use it, we have to:
- 1. Correct it by its bias
- 2. Mask undesired pixels







 The "sses_bias" field is characterized by "stripe" patterns







esa

NRSCC



- The bias is provided within the dataset as the variable "sses_bias"
- The "sses_bias" field is characterized by "stripe" patterns
- These are directly related to the type of algorithm used to derive the SST observations (based on Nadir view or dual view)
- You can see it by visualizing
 "sst_algorithm_type"





- Back to the SST field To apply the bias correction:
- 1. Click on "Raster"
- 2. Select "Band Maths"
- 3. In the dialogue window change the **Name** field to "**Corrected_sst**"
- 4. In the **Band maths** expression subtract the bias from the sst (by variable name)
- 5. Also, convert from degree Klevin to Celsius by subtracting 273.15

→ ADVANCED TRAINING COURSE IN OCEAN AND COASTAL REMOTE SENSING



NRSCC













- You should obtain a plot like this
- You should see the new variable appearing in the "Product Explorer" tab
- Select again the JET colour palette from the "Colour Management" tab

(You should obtain something like this)







Compared to raw SST this image has lots of areas masked (e.g. the area north of the Yangtze river mouth)

Why that? Let's explore the pixels in the sea_surface_temperature tab







- Click on the "Pixel info" tab
- Open the "Flags" menu
- Hovering over the map you will see the info changing depending on the pixel
- The ones north of the Yangtze river mouth are all flagged as clouds







To better visualize this we can display the cloud mask

 Click on the "Mask manager" button

Unlike OC data, there are no masks readily available for SST







To better visualize this we can display the cloud mask

Click on the "Mask manager" button

Unlike OC data, there are no masks readily available for SST

That's because all masks are grouped together in the "**I2p_flag**" variable as **bitwise flags**





Values for the individual flags are given in the Flag_coding/l2p_flags variable

These are combined together bitwise into 16 digits integers (one binary digit per flag).

Example: a point that is both a land point and and ice point have a flag:

01100000000000000

This corresponds to a value of 6.

				9 👂 📓 📕 🗐 🤤	gb 16:08 06 Nov 2018 Francesc	co Nencioli
File Edit View Analysis Laver Vector Raster Optical Radar Tools Window Help		SNAP			Q Search (Ctri-	- @ X
a 🖫 🦻 🥵 🚛 👪 🖉 🖻 🥥 🗁 🔟	🌑 🗟 🔤 🗷 Σ 🚳 ί	****	▶ 👩 � Ք °°° ≻ ₹		🔹 ≿ 181 😮 👤 🐙	* *
Product Explorer × Pixel Info	121 sea surface temperature ×	[2] sses bias x	121 corrected SST x	(2) [2p flags x		
- Divector Data	Name	Value	Туре	Unit	Description	1
 Bands I I subset 5 of 20181002010530-MAR-I 2P_GHRSST-SSTskin-SI STR4-20181003113739-vC 	microwave	1	uint32			ouct
🔶 🛅 Metadata	land	2	uint32			5
← 🛄 Index Codings	ice	4	uint32			Viel
e 📷 Flag Codings	lake	8	uint32			
 Vector Data 	river	16	uint32			5
e 🖼 Bands	tidal	32	uint32			5
D prightness_temperature	cosmedc_m	128	unts2			97
adi dtime from sst	sup glipt	256	uint32			ene
- 📓 aerosol_dynamic_indicator	cloud	512	uint32			ger
dt_analysis	pointing	1024	uint32			
- a l2n flans	exception	2048	uint32			2
- alat	overflow	4096	uint32			70
- 🔟 Ion	stratospheric	8192	uint32			* 3
madir_sst_theoretical_uncertainty matrix statute and a lag	dual_nadir_diff_sst_type	16384	uint32			ana
probability_cloud_single_in						ger
- 🛄 quality_level						
- satellite_zenith_angle						
sea ice fraction dtime from sst						
sea_surface_temperature						
Navigation Uncertainty Visualis Layer Editor Colour Manipulat X World Map						
25						
10 A						
This tool window is used to manipulate the colouring of images shown in an image view						
Right now, there is no selected image view.						
0						
					to lan Zaam lan	-



6 🗧 🕱 🖿 🔳 🛋 🖬



3 6 📓

📕 🛋 👩 gb 16:00 06 Nov 2018 Francesco Nenciol

Back to masking:

- SNAP cannot interpret SST bitwise flags
- Individual masks must be created by the user

8													• -	a x
ile <u>E</u> dit <u>V</u> iew Analysis Layer V	ector Raster Optical Radar <u>T</u> ools <u>W</u> indow <u>H</u>	delp										C	Search (Ctrl+I)	
a 🖫 🦻 🦨 🞜	4 4 🕨 🖉 🖉 🖉	φ,λ 🔝 🕚	. 🕼 🔤 🖉	Σ	} ₩ <mark>/</mark> / %	C * 88	9 k	🗑 🔍 🖓 ^{GCP}	$\searrow \supsetneq$	1 0 (° 1	1 📩 🔨	. 🔹 🔆 🕅 😵	2 🐔 🛚	*
Product Explorer Pixel Info ×			[2] sea_surface_ter	mperature 🗴 🛐	[2] sses_bias ×	[2] sst algorithm type	× 🛐 [2] con	rected_SST ×	Mask Manager				×	• 0
Position								-	D Name	Type Color	r Tran	Description	6(14)	(v) 3
mage-X	Invalid pos. pixel		1 A. S									b e b e i fi d e i	J(X)	
mage-Y	Invalid pos. pixel	2											4	1ct
ongitude	Invalid pos.degree	E												5
Latitude	Invalid pos.degree	13												
🗄 Time													En .	
🖃 Bands														· · · ·
sea_surface_temperature	Invalid pos. kelvin													5
sses_blas	Invalid pos. kelvin												Ib.	12/ 5
sst_algorithm_type	Invalid pos.													-× a
corrected_SST	Invalid pos.						<mark></mark>						101	S 7
Tie-Point Grids													JL.	
E Flags							. <u> </u>						2	
2p_flags.microwave	Inv	alid pos.						- 🥳 👔 -					Q.1	3r
I2p_flags.land	Inv	alid pos.			100			and the second se						
12p_nags.ice	INV	Valid pos.					1	<u> </u>						
I2p_flags.lake	Inv	alid pos.			- 11 - 1 <u>-</u>			Caro a						2
I2p Bags tidal	Inv	alid por						1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1						a.
2p flags cosmetic fill	Inv	alid pos.				in the Sector 📒		 A 1 						sk P
2p flags day	Tay	alid pos.						A CONTRACTOR OF						i an
2p flags sun glint	Inv	alid pos.				And a California								De
2p flags.cloud	Inv	alid pos.				6 (Carlos -								er l
2p_flags.pointing	Inv	alid pos.						1						
2p_flags.exception	Inv	/alid pos.				- 1		1						
2p_flags.overflow	Inv	/alid pos.						· · · · · · · · · · · · · · · · · · ·						
2p_flags.stratospheric	Inv	alid pos.						-4						
l2p_flags.dual_nadir_diff_sst_type	Inv	/alid pos.				A Acres Gall		And the second						
Snap to selected pin						- 1 (Ma teria) (S	1	5						
						1 - 1 - 1 - 1 - 1 - 4 - 4 - 4 - 4 - 4 -	2							
Navigation - [2] Uncertainty Vis	Layer Editor Colour Mani X World Map					1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -								
Editor: O Basic @ Slidars O Tab		3 B					and and	Share and and						
		2 u					3 K 1 1	1 - All - Al						
	Name: sea_surface_temperature Unit: kelvin	95% 100%						- 1. 11						
	Min: 270.15	6 6 6 6					11 July 🖕 👘	a de la compañía de l						
	Max: 317.97 Rough statistical	- ଲୋ ଲୋ						- 🕐 🥕 👘						
	indigit statistics.							1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -						
		21 21						1 6 1 1 1 1 1 1						
		Log10 633												
					2 <u>14</u>		·							
					20 - 10 - 10									
		_					14 M 1							
	a di Fili													
						 Antipation (1) 	s e 👌 🤐							
						N 18 1	1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -	and the second						
						1 No. 1 1		100 C 100						
						- 1 🔥 - 1 - 1		2 N N N N N N N N N N N N N N N N N N N						
				Constraints of the				1						
						- 18 A.	1	1 No. 1						
							- <u>Sa</u> te	1 S S S						
							1. 19 1 - 1	N 189 1						
می که اور باهندان باشد. از دهدش او دونت با باشته است. بر او مستقدان در عدید و ا	A Alizava a disambility a two second and						and the second	ê 🍓 👘 et 👘						
							Sec. Sec.	200 - C						
	29 30 29						1. 1. 1. 1. 1.	1 A 1						
	9.60 S 22													
								~~~ A						
A More Ontions		0				1 - Carlos -			4					Ø
- optional					6.5	and the second second	era p							~
										Х Ү	L	.at Lon	Zoom Level -	•





- 1. Mask can be created from logical math bands expressions
- Click on the f(x) button in the Mask Manager menu







- 1. Mask can be created from logical math bands expressions
- Click on the f(x) button in the Mask Manager menu
- Define the land mask building the expression
   l2p_flags.lake or
   l2p_flags.land or
   l2p_flags.river







- 1. Mask can be created from logical math bands expressions
- Click on the f(x) button in the Mask Manager menu
- Define the land mask building the expression
   l2p_flags.lake or
   l2p_flags.land or
   l2p_flags.river







- 1. Mask can be created from logical math bands expressions
- Click on the f(x) button in the Mask Manager menu
- Define the land mask building the expression
   l2p_flags.lake or
   l2p_flags.land or
   l2p_flags.river
- Change colour to black , and set transparency to 0







- 1. Mask can be created from logical math bands expressions
- Click on the f(x) button in the Mask Manager menu
- Define the land mask building the expression
   l2p_flags.lake or
   l2p_flags.land or
   l2p_flags.river
- Change colour to **black** and set transparency to **0**

You should obtain this







- 2. Mask can be created from value range (we can use this for cloud masking)
- Click on the [x] button in the Mask Manager menu







- 2. Mask can be created from value range (we can use this for cloud masking)
- Click on the [x] button in the Mask Manager menu
- Select the "probability_cloud_sin gle_in" from the dialogue menu
- Set the limits between 0.8 and 1







- 2. Mask can be created from value range (we can use this for cloud masking)
- Click on the [x] button in the Mask Manager menu
- Select the "probability_cloud_sin gle_in" from the dialogue menu
- Set the limits between 0.8 and 1
- Change colour to pink





The cloud mask matches the masked pattern of the unbiased SST







The cloud mask matches the masked pattern of the unbiased SST

However not all masked pixels seems to be associated with clouds

Cloud mask (derived from bayesian method) not entirely accurate in coastal and turbid regions

Always check your flags!!!





### Exercise 4: User-defined cloud masks



Can you define a more accurate **regional** cloud mask using S3 data?

 Untick the cloud mask from the "Mask Manager" menu

Note that clouds are usually associated with high and low values of SST

- Define a mask based on SST values from mask manager
- Other variables to use? → ADVANCED TRAINING COURSE IN OCEAN AND COASTAL REMOTE SENSING





## Exercise 4: User-defined cloud masks



- To use SST you will need two masks:
- 1. One for the lower threshold
- 2. One for the upper one
- 3. Also, remember that raw SST is still in deg Kelvin

**Note:** although this will work for this specific area for this specific time, this is not an approach that can be used for the whole dataset!!!





# Exercise 4: User-defined cloud masks



- To use SST you will need two masks:
- 1. One for the lower threshold
- 2. One for the upper one
- 3. Also, remember that raw SST is still in deg Kelvin

This map was created masking all SST values lower than 290 and higher than 300

More on cloud masking in the Synergy Practical



