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Hauling	SPL (°C)	CHL (mg/m³)	Hasil Tangkapan (Ekor)
1	29,99	0,56	45
2	28,92	0,30	135
3	29,99	0,56	32
4	28,68	0,28	315
5	28,56	0,36	193
6	29,99	0,50	90
7	29,90	0,55	42
8	30,52	0,63	50
9	29,76	0,53	63
10	29,50	0,31	169
11	29,87	0,50	98
12	29,50	0,19	218
13	29,56	0,29	45
14	29,50	0,36	15
15	29,25	0,36	118
16	29,50	0,37	221
17	29,25	0,34	94
18	30,38	0,29	192
19	29,56	0,22	510
20	30,38	0,29	42
21	30,27	0,19	77
22	30,34	0,25	98
23	30,36	0,28	232
24	30,26	0,45	55
25	30,25	0,36	312
26	30,29	0,23	122
27	28,96	0,22	76
28	30,32	0,17	58
29	29,92	0,23	101
30	30,44	0,22	135
31	30,21	0,22	187
32	30,21	0,22	109
33	30,32	0,22	222
34	30,21	0,21	40
35	29,75	0,23	114
36	29,97	0,45	128
37	30,89	0,17	30
38	30,80	0,20	11
39	30,90	0,17	8
40	30,90	0,17	17
41	30,91	0,16	6

Lampiran 1. Data primer hasil tangkapan ikan cakalang dan parameter oseanografi di perairan Selat Makassar

	÷		
42	30,91	0,16	9
43	31,05	0,18	8
44	30,80	0,15	9
45	30,71	0,19	12
46	30,71	0,18	14
47	30,95	0,11	92
48	30,06	0,05	131
49	29,82	0,12	208
50	30,40	0,47	226
51	30,52	0,10	312
52	30,25	0,06	165
53	29,81	0,06	198
54	29,40	0,06	335
55	30,45	0,13	42
56	29,39	0,08	279
57	30,49	0,09	353
58	30,59	0,16	146
59	29,50	0,14	114
60	30,39	0,16	246
61	29,85	0,10	239
62	29,18	0,15	124
63	29,18	0,12	102
64	29,06	0,11	314
65	29,14	0,13	238
66	28,88	0,34	159
67	28,91	0,31	237
68	29,37	0,13	184
69	29,17	0,08	178
70	28,54	0,29	189
71	29,21	0,38	217
72	28,67	0,25	149
73	28,74	0,17	72
74	29,34	0,14	68
75	29,33	0,15	87
76	29,11	0,14	57
77	29,07	0,14	132
78	29,16	0,20	109
79	29,26	0,15	75
80	29,33	0,14	118
81	28,81	0,23	122
82	28,98	0,12	413





Lampiran 3. Langkah-langkah dalam mengolah data Sentinel-3 untuk melihat kandungan Klorofil-A

1. Unduh Data

Data yang akan diolah diperoleh dari Copernicus Online Data Acces. Berikut ini adalah langkah-langkah pengunduhan data dari Copernicus Online Data Acces. Data yang akan diolah diperoleh dari Data Space Copernicus <u>https://dataspace.copernicus.eu/</u>. Berikut ini adalah langkah-langkah pengunduhan data dari Copernicus Online Data Acces.

1) Buka laman Data Space Copernicus melalui internet. Kemudian pilih laman Copernicus Data Space Ecosystem.



2) Kemudian klik Login yang berada pada ujung kanan laman. Lalu login dengan menggunakan akun yang telah didaftar.

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personal dashboard to easily access a wide varlety of Earth observa resources. Don't have an accountly etc? Register now to easily create new account in just a few minutes.	lion a
Login to access your account	Register and create an account for free in 60 seconds
Email	Access a variety of Earth observation data
fanfadhilat@gmail.com	Manage your personal settings
Password	Follow your credits and orders
	REGISTER
Eurgot Passwerd?	
	Do vou have questions?

 Setelah login, kembali ke laman web Data Space Copernicus. Kemudian untuk memperoleh data yang diinginkan, pilih daerah yang ingin dikaji dengan menggunakan tools Polygon.



4) Selanjutnya klik di ujung kiri Search, kemudian untuk bagian "Time Range" pilih data tanggal berapa yang diinginkan. Untuk bagian Data Sources, pilih "Sentinel-3, OLCI, Level-1 ERF" Seteleh itu klik Search untuk melihat data yang muncul.



5) Setelah data muncul, pilih data yang daerahnya sesuai dengan daerah pada data Sea Surface Temperature sebelumnya dan yang mengandung lebih sedikit awan. Jika ingin melihat visualisasi data dengan jelas makan klik "Visualize"



6) Kemudian download data yang telah dipilih

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2. Pengolahan Data Klorofil di Software Sentinel Application Platform (SNAP)

Data yang diunduh dari CODA Eumetsat akan diolah terlebih dahulu melalui SNAP untuk mendapatkan data Klorofil pada daerah yang telah dipilih. Berikut ini langkahlangkah pengolahan data Klorofil menggunakan SNAP:

1) Buka aplikasi SNAP



 Setelah terbuka, klik File > Open Product. Kemudian pilih data yang telah diunduh dari CODA Eumetsat. Pastikan bahwa data yang telah diunduh sudah diextract.



Data yang dipilih dalam bentuk xfdumanifest.xml Kemudian klik Open.

 Langkah selanjutnya adalah *Reprojection Data* yaitu data akan diproyeksi ke dalam system proyeksi yang lain. Pilih Raster lalu klik Geometric > Reprojection.

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4) Setelah kotak dialog muncul, pastikan pada bagian I/O Parameters, data yang akan diproyeksi adalah data pertama [1] kemudian Save as tidak dicentang.

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5) Kemudian klik bagian Reprojection Parameters, lalu klik Predefined CRS. Kemudian klik Select.

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6) Kemudian pada bagian Filter, kita akan memilih titik koordinat. Ketik "4326" lalu akan muncul pilihan EPSG:4326 - WGS 84. Lalu klik "Ok". Kemudian klik "Run"

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- 7) Selanjutnya data akan dipotong sesuai dengan titik koordinat daerah yang ingin dikaji (hal ini juga dapat dilakukan pada data sea surface temperature).
 - Klik Raster lalu pilih Subset
 - Ketika kotak dialog muncul pilih "Geo Coordinates" lalu masukkan titik koordinat
 - Kemudian klik Ok

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Extract Data Klorofil-a

 8) Langkah selanjutnya yaitu mengekstrak data klorofil-a dengan proses algoritma *Case 2 Religonal Coast Colour* (C2RCC). Klik "Thematic Water Processing – C2RCC Prosessor – OLCI"



 Ketika kotak dialog muncul, pada bagian I/O Parameters pastikan data yang diolah adalah data ketiga [3] kemudian Save as tidak dicentang kemudian klik Run.

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10) Pada kotak dialog Product Explorer, klik symbol "+" pada file [4] C2RCC. Kemudian klik 'bands" lalu klik "conc" kemudian klik kanan "conc_chl" lalu pilih "convert band" lalu klik dua kali "conc_chl" kemudian gambar data konsentrasi klorofil-a akan muncul.



 Untuk mengubah warna data Klorofil, pilih View > Tool Windows > Colour Manipulation. Kemudian pada kotak dialog Colour Manipulation, klik Import Colour, lalu pilih file warna yang diinginkan, lalu klik Open.



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Masking Data

12) Selanjutnya yaitu proses Masking Data agar klorofil yang ada di bagian daratan serta citra yang terkena gangguan awan akan hilang.

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Klik View, lalu klik Tool Windows > Mask Manager

13) Kemudian ketika kotak dialog Mask Manager muncul, pilih "Create a new mask based on a logical band maths expression" dengan symbol f(x).

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14) Kemudian centang bagian "Show mask" lalu pilih data yang akan dihilangkan di bagian "Data sources" dengan mengklik data mask pertama kemudian klik symbol
@ or @ lalu pilih data mask kedua, dan seterusnya. Centang "show mask" kemudian pada tahap ini kita akan menghilangkan data "quality_flags_land", "Cloud risk", "c2rcc flags.Cloud risk" kemudian klik Ok.



15) Kemudian data mask yang baru akan muncul. Pada bagian "Transparency", ganti menjadi angka 0.0 lalu tekan Enter.



16) Kemudian pilih Raster lalu klik Masks > Land/Sea Mask

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17) Setelah kotak dialog muncul, pastikan pada bagian I/O Parameters, data yang akan diproses adalah data keempat [4]. Save as tidak dicentang.

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18) Kemudian pada bagian Processing Parameters, pilih "Use Vector as Mask" kemudian pilih "new_mask_54" yaitu data mask yang telah dibuat pada bagian Mask Manager sebelumnya. Kemudian centang "Invert Vector" lalu klik Run.

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19) Untuk melihat hasil Masking Data, pada kotak dialog Product Explorer, klik symbol "+" pada file [5] reprojected_msk. Kemudian klik 'bands" lalu klik "conc_chl". Kemudian ubah warnanya dengan cara yang sama seperti di atas. Setelah itu, pada band conc chl klik kanan lalu pilih "Band Maths"



20) Setelah kolom Band Maths muncul, pada bagian Target Product pstikan data yang dipilih adalah data "reprojected_msk" Kemudian pada bagian Name, ubah nama band yang diinginkan lalu pastikan pada bagian Virtual (save expression only, don't store data) tidak dicentang. Lalu klik Ok



21) Setelah membuat band baru, langkah selanjutnya adalah Export data band yang baru dengan pilih File > Export > Geo TIFF



22) Lalu ketika kolom Export Product muncul, klik Subset. Kemudian pilih Band Subset lalu klik Select none kemudian centang band baru yang telah dibuat yaitu "chl_a" lalu klik OK. Ketika muncul kotak dialog No Flag Data Selected, pilih No



23) Kemudian edit nama file data yang ingin diexport, lalu klik Export Product

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Level-3 Binning

24) Tahapan *binning* dilakukan untuk mencari nilai rata-rata data dalam satu bulan.
 Langkah pertama yaitu klik Open Product > Pilih file yang telah diekspor dalam bentuk Geo Tiff > Open

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25) Selanjutnya pilih Raster > Geometric > Level-3 Binning



26) Setelah kotak dialog Binning muncul, pada bagian Source Product klik tanda "+" lalu pilih file yang ingin dirata-ratakan. Pada bagian Save as pilih Geo TIFF.



27) Kemudian pada bagian configuration, klik tanda "+" lalu pada Source band name, pilih band yang ingin dilakukan proses average lalu klik Ok.

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29) Setelah data muncul, pilih bands lalu klik dua kali "chl_mean" maka hasil rata-rata dari data klorofil-a dalam satu bulan akan muncul. Selanjutnya export file dengan cara klik File > Export > Geo TIFF. Lalu klik subset kemudian centang select none lalu pilih chl_mean kemudian klik Ok lalu save product.



Lampiran 4. Langkah-langkah dalam mengolah data Sentinel-3 untuk Suhu Permukaan Laut.

1. Unduh Data

Data yang akan diolah diperoleh dari Data Space Copernicus. Berikut ini adalah langkah-langkah pengunduhan data dari Copernicus Online Data Acces.

1) Buka laman Data Space Copernicus melalui internet. Kemudian pilih laman Copernicus Data Space Ecosystem.

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2) Kemudian klik Login yang berada pada ujung kanan laman. Lalu login dengan menggunakan akun yang telah didaftar.

Login to access your account	Register and create an account for free in 60 seconds
Enail	Access a variety of Earth observation data
fanfadhilaf@gmail.com	Manage your personal settings
Password	Follow your credits and orders
	REGISTER
Eoroot Password?	

 Setelah login, kembali ke laman web Data Space Copernicus. Kemudian untuk memperoleh data yang diinginkan, pilih daerah yang ingin diketahui Suhu Permukaan Lautnya dengan menggunakan tool Polygon.



4) Selanjutnya klik di ujung kiri Search, kemudian untuk bagian "Time Range" pilih data tanggal berapa yang diinginkan. Untuk bagian Data Sources, pilih "Sentinel-3, SLSTR, Level-2 WST" Seteleh itu klik Search untuk melihat data yang muncul.



5) Setelah data muncul, download data yang ukurannya kecil dan mencakup daerah yang ingin dikaji.



6) Pada bagian Product, kita dapat melihat berapa nilai dari Relative Orbit data tersebut agar ketika ingin mencari data pada daerah yang sama dapat dimasukkan dan disesuaikan pada bagian "Data Sources - Filters". Relative Orbit pada data ini adalah 231.



- 2. Unduh Software SNAP
- 1) Buka laman ESA SNAP melalui internet, lalu pilih SNAP Download Esa STEP.



2) Kemudian pada bagian Sentinel Toolbox, klik Main Download sesuai dengan kapasitas penyimpanan PC yang dimiliki.



- 3. Pengolahan Data SST di Software Sentinel Application Platform (SNAP) Data yang diunduh dari CODA Eumetsat akan diolah terlebih dahulu melalui SNAP untuk mendapatkan data Sea Surface Temperature pada daerah yang telah dipilih. Berikut ini langkah-langkah pengolahan data Sea Surface Temperature menggunakan SNAP :
 - 1) Buka aplikasi SNAP



 Setelah terbuka, klik File > Open Product. Kemudian pilih data yang telah diunduh dari CODA Eumetsat. Pastikan bahwa data yang telah diunduh sudah diextract. Data yang dipilih dalam bentu NCDF Poduct: .nc Kemudian klik open.



3) Untuk melihat apakah data yang didownload memiliki banyak tutupan awan atau tidak, maka klik "+" kemudian pilih "Bands", lalu klik dua kali "quality_level" Pada data ini dapat dilihat bahwa data yang didownload memiliki kandungan awan sebesar 60.851% yang berarti nilai tutupan awan cukup besar sehingga data tidak baik untuk diolah lebih lanjut. Selanjutnya silahkan mendownload data yang lain yang memiliki nilai tutupan awan rendah.



4) Setelah medapatkan data yang baik untuk diolah selanjutnya klik dua kali "sea_surface_temperature"



Reprojection Data

 Kemudian data akan diproyeksi ke dalam system proyeksi yang lain. Pilih Raster lalu klik Geometric > Reprojection.



 Setelah muncul kotak dialog, klik Reprojection Parameters, lalu klik Predefined CRS. Kemudian klik Select.



7) Kemudian pada bagian Filter, kita akan memilih titik koordinat. Ketik "4326" lalu akan muncul pilihan EPSG:4326 - WGS 84. Lalu klik "Ok". Kemudian klik "Run"





8) Pada kotak dialog Product Explorer, klik symbol "+" pada file [2] reprojected. Kemudian klik 'bands" lalu klik dua kali "sea_surface_temperature" kemudian gambar data yang telah diproyeksi akan muncul.



Masking Data

 Selanjutnya yaitu proses Masking Data agar suhu permukaan yang ada di bagian daratan serta citra yang terkena gangguan awan akan hilang.

Klik View, lalu klik Tool Windows > Mask Manager



10) Setelah muncul kotak dialog Mask Manager, kemudian pilih Create a new mask based on value range [x] isi bagian Min. value dengan angka 0 dan Max. value dengan angka 2. Pada bagian Raster, pilih "quality_level" Kemudian klik "Ok"



 Setelah itu, pada kotak diaolog Mask Manager, ganti warna pada bagian "Colour" menjadi warna hitam. Kemudian pada bagian "Transparency" ganti menjadi angka 0.0 lalu tekan Enter.



12) Untuk mengubah warna data Sea Surface Temperature, pilih kotak dialog Colour Manipulation, kemudian klik Import Colour, lalu pilih file warna yang diinginkan, lalu klik Open.





13) Kemudian pilih Raster lalu klik Masks > Land/Sea Mask

14) Setelah kotak dialog Land/Sea Mask muncul, pilih Processing Parameters lalu pilih
"Use Vector as Mask" lalu pilih "new_mask_1" kemudian ceklis bagian "Invert
Vector". Lalu klik "Run"



15) Untuk melihat hasil Masking Data, pada kotak dialog Product Explorer, klik symbol "+" pada file [3] reprojected_msk. Kemudian klik 'bands" lalu klik "sea_surface_temperature". Kemudian ubah warnanya dengan cara yang sama seperti di atas.



16) Setelah itu, data akan diekspor dengan pilih cara File, lalu klik Export, kemudian pilih "Geo TIFF / Big TIFF"



17) Setelah kotak dialog SNAP – Export product muncul, klik Subset. Kemudian muncul kotak dialog Specify Product Subset, pilih Band Subset, lalu klik "Select none" kemudian klik/centang hanya pada pilihan "sea_surface_temperature" lalu klik "Ok"





18) Pada saat muncul kotak dialog No Flag Data Selected, klik "No"

19) Kemudian ganti nama file dengan menambahkan "STT_MASKED_" dan menghapus nama file yang tidak diinginkan. Misalkan: subset_SST_MASKED_20220310014434.tif Setelah itu klik "Export Product"



20) Selanjutnya data sudah dapat diimport dan diolah di aplikasi seperti SeaDAS, ArcGIS dan QGIS