



Corine Land Cover 2018

- One of **THE** key datasets to go into **SOER2020** publication
- Keeping the **August 2018 deadline for production is critical** to enable input in the first part of SOER2020 that will be published already in mid-2019
- Challenges:
 - Unprecedented speed of production (in comparison with previous CLC exercises). Making a "CLC 2018" available in 2018!
 - New contractual setup
 - New source of satellite input imagery



CLC2018 Image support task

	CLC1990	CLC2000	CLC2006	CLC2012	CLC2018
Satellite data used dominantly	Landsat-4/5 TM single date (in a few cases Landsat MSS)	Landsat-7 ETM single date	SPOT-4 and / or IRS LISS III dual date	IRS, SPOT-4/5 and RapidEye	Sentinel-2 and Landsat-8 for gap filling
Time consistency	1986-1998	2000 +/- 1 year	2006+/- 1 year	2011-2012	2017-2018
Geometric accuracy satellite images	≤ 50 m	≤ 25 m	≤ 25 m	≤ 25 m	≤ 10 m (Sentinel-2)
CLC mapping MMU	25 ha	25 ha	25 ha	25 ha	25 ha
CLC mapping minimum width	100 m	100 m	100 m	100 m	100 m
Geometric accuracy CLC data	100 m	better than 100 m	better than 100 m	better than 100 m	better than 100 m
Thematic accuracy	≥ 85% (probably not achieved)	≥ 85% (achieved [13])	≥ 85%	≥ 85% (probably achieved)	≥ 85%
Change mapping	-	boundary displacement min. 100 m; change area for existing polygons ≥ 5 ha; isolated changes ≥ 25 ha	boundary displacement min. 100 m; all changes > 5 ha must be mapped	boundary displacement min. 100 m; all changes > 5 ha must be mapped	boundary displacement min. 100 m; all changes > 5 ha must be mapped
Production time	13 years	5 years	4 years	3 years	1,5 years
Documentat-ion	incomplete metadata	standard metadata	standard metadata	standard metadata	standard metadata
Access to the data	unclear dissemination policy	disseminat-ion policy agreed from the start	free access for all kind of users	free access for all kind of users	free access for all kind of users
Number of European countries involved[1]	22(28)	32 (39)	38 (39)	39	39



CLC2018 image support task - context:

- **Changing image provision for national teams:** moving from ESA selected coverages based on contributing mission HR data (in the past) to Sentinel-2 provision through the ESA data hub(s)
- This means **improved image quality** and availability, but potential **challenges with regards to image selection, download and re-processing/re-projection**
- Solution for CLC2018: **Image support by service provider** for national teams (pre-selection, re-projection, delivery of visual product)



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CLC2018 Image support task – aquisition windows

Country	Ext Window start	Nar Window start	Nar Window end	Ext Window end	<country id>	<sub-country>
Albania	15.06.17	10.06.17	31.07.17	15.08.17	AL	AL
Austria West (<13°E)	15.05.17	01.06.17	15.08.17	31.08.17	AT	AT_W
Austria East (>13°E)	15.06.17	15.06.17	15.08.17	10.09.17	AT	AT_E
Belgium	01.06.17	15.06.17	15.09.17	15.09.17	BE	BE
Bosnia and Herzegovina	01.06.17	15.06.17	15.08.17	15.09.17	BA	BA
Bulgaria	01.06.17	15.06.17	15.09.17	15.09.17	BG	BG
Croatia	01.06.17	15.06.17	15.09.17	15.09.17	HR	HR
Cyprus	01.05.17	01.06.17	31.07.17	15.08.17	CY	CY
Czech Republic	01.06.17	15.06.17	15.09.17	15.09.17	CZ	CZ
Denmark	05.06.17	15.06.17	15.09.17	15.09.17	DK	DK
Estonia	05.06.17	15.06.17	15.08.17	31.08.17	EE	EE
Faroe islands	20.06.17	10.07.17	31.08.17	15.09.17	FO	FO
Finland North (> 65°N)	20.06.17	01.07.17	10.08.17	15.08.17	FI	FI_N
Finland Central (61°N - 65°N)	15.06.17	01.07.17	10.08.17	15.08.17	FI	FI_C
...



Satellite Image provision:

- Main visual product, re-projected into national projections, based on Sentinel 2 data (or Landsat 8 for gap filling)
- Additionally the full products with no modifications, for those countries that want to go beyond visual interpretation

	Visual product	Full product
Sentinel 2A/B	<ul style="list-style-type: none">• GeoTIFF, 16bit, 3 bands, no compression, ToA reflectance• Using S2 bands 8, 11 and 4• Re-projection to national projection as specified by EEA with EPSG codes• No geometric improvements• No radiometric improvements• Band 11 brought to 10 m by sharpening	<ul style="list-style-type: none">• no modification of projection, format, naming convention, radiometry, meta data
Landsat 8	<ul style="list-style-type: none">• Re-projection to national projection as specified by EEA with EPSG codes• No geometric improvements• DN to ToA reflectance conversion, followed by HPF sharpening	<ul style="list-style-type: none">• no modification of projection, format, naming convention, radiometry, meta data



Visual product – pan-sharpened



Figure 1 Nearest neighbour resample for SWIR band

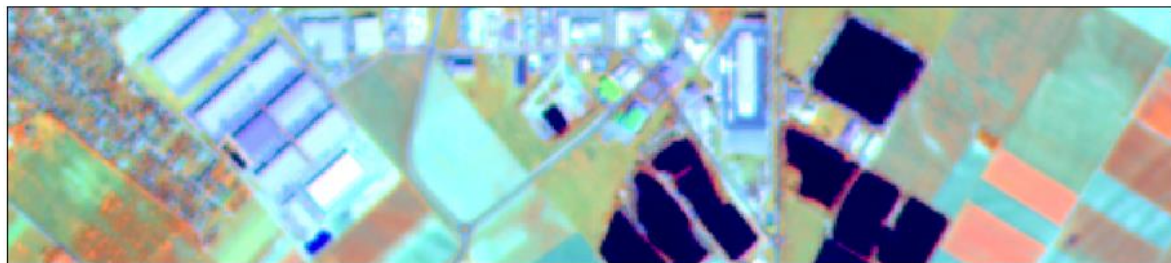


Figure 2 Cubic convolution resample for SWIR band



Figure 3 SWIR band sharpened with virtual pan-band gradient



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Visual product – pan-sharpened Landsat 8 Visual product ToA original resolution vs pan-sharpened





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CLC2018 Image support task

Workflow step	Activity	Who is doing this?	Timing
1	After closure of extended window, pre-selection and documentation of imagery by SP	SP (service provider)	Up to 4 weeks (with first deliveries starting 3 rd October)
2	Approval and rejection of pre-selected S2 image tiles/LS8 scenes and possibly selection of additional image tiles. Based on shapefile, natural colour quicklooks and detailed instructions provided by SP	Country teams	Up to 2 weeks (total of 6 weeks after end of extended window)
3	Production of imagery and provision for FTP download	SP	Up to 4 weeks (total of up to 10 weeks after end of extended window)
4: Only in exceptional cases	Propose further S2 image tiles/LS8 scenes for the two coverages and/or further additional S2 image tiles.	Country teams	Up to 2 weeks (total of 12 weeks after end of extended window)
5: Only in exceptional cases	Only in accordance with the SP and EEA: Production of imagery and provision for FTP download	SP	Up to 4 weeks (total of up to 16 weeks after end of extended window)



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CLC2018 Image support task

Image selection process

Contractor: Data Selection after
closure of Extended Window

S2 selection

LS8 gap filling

Cov1, Cov2 pre-selection incl. gap fillers (=optimized coverage from
contractors point of view)
plus selection of further S2 image tiles and LS8 scenes

MS: revision of proposed
coverage

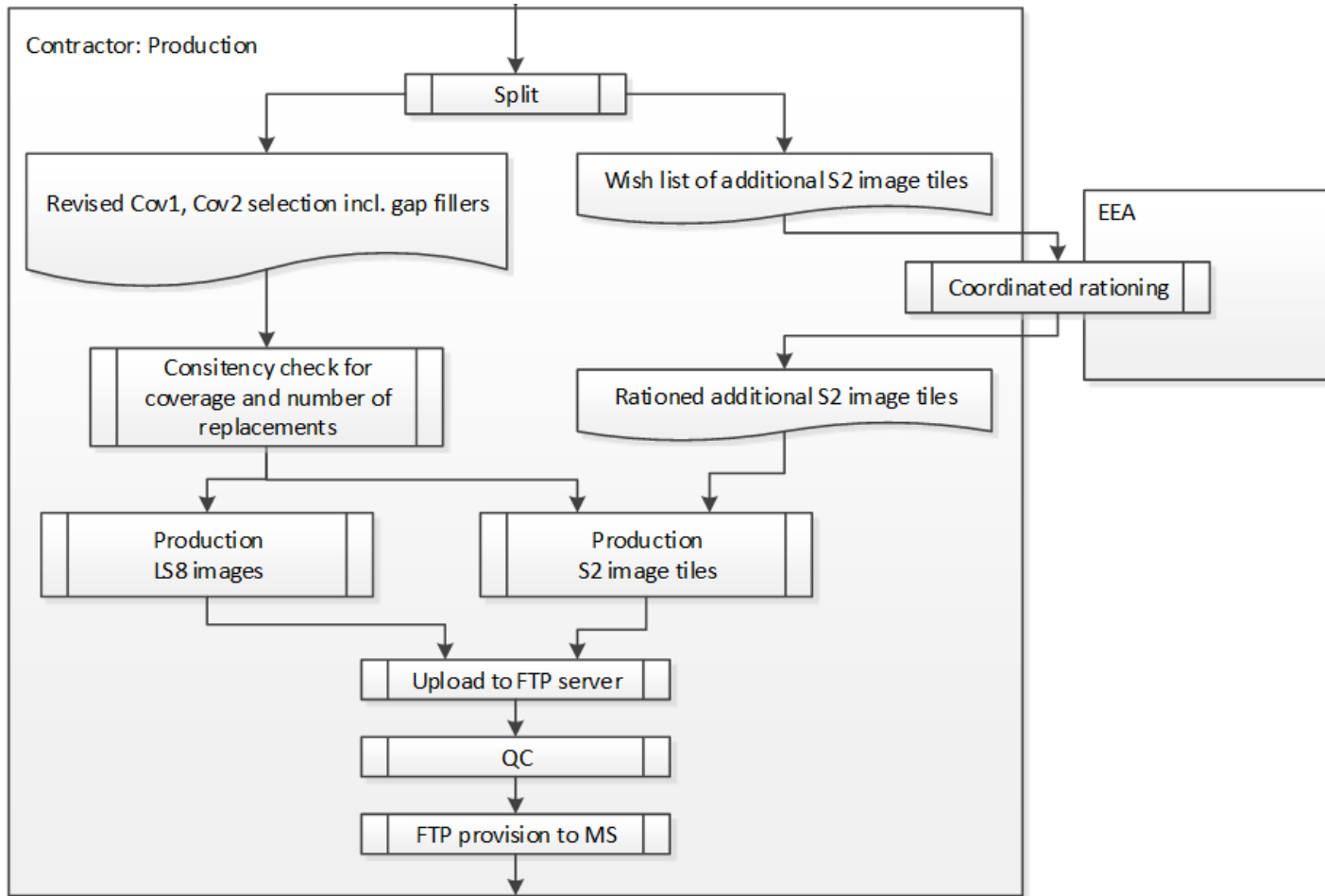
Approval and rejection of
pre-selected
S2 image tiles /
LS8 scenes

Selection of alternative
S2 image tiles

Selection of additional
S2 image tiles



Production workflow





Current status – pre-selection provided (3rd, 5th and 9th October)





Country	JR	GAF	SIRS
Albania			1
Austria	1		
Belgium			1
Bosnia and Herzegovina			1
Bulgaria			1
Croatia	1		
Cyprus	1		
Czech Republic			1
Denmark			1
Estonia			1
Faroe islands			1
Finland			1
France			1
Germany			1
Greece			1
Hungary	1		
Iceland			1
Ireland			1
Italy	1		
Kosovo			1
Latvia			1
Liechtenstein	1		

Lithuania			1
Luxembourg			1
Malta	1		
Macedonia (Republic of)			1
Montenegro			1
Netherlands			1
Norway	1		
Poland			1
Portugal			1
Romania			1
Serbia			1
Slovakia			1
Slovenia	1		
Spain			1
Sweden	1		
Switzerland	1		
Turkey			1
UK			1
Azores			1
Canaries			1
Guadaloupe			1
French Guiana			1
Madeira			1
Martinique			1
Mayotte			1
Reunion			1



Selection process (simplified)

1. Download and unpack pre-selection results
2. Prepare GIS session
3. Check in detail quicklooks for each tile
4. Accept or reject images and select further images (if necessary)
5. Upload final selection

The selection is documented by editing relevant fields in the attribute table of the provided shapefile

Field name	Field description	Possible values
MS_decisio	Indicator whether MS accepts or rejects the pre-selection	0 – initial value=no decision by MS 1 – accepted 2 – rejected
MS_cov1	Indicator for further S2 image tile or L8 scene for Cov1	0 – not selected 1 – selected
MS_cov2	Indicator for further S2 image tile or L8 scene for Cov2	0 – not selected 1 – selected
MS_addS2	Indicator for additionally selected Sentinel-2 image tile	0 – not selected 1 – selected
MS_addS2pr	Indicator of priority for additionally selected Sentinel-2 image tiles	0 – initial value=no decision by MS 1 – 1 st priority (highest priority) 2 – 2 nd priority etc.
MS_com	MS comment (optional)	



Communication workflow and instructions:

- You will get (or have already) an email coming from *@joanneum.at or *@GAF.de or *@sirs-fr.com
- Email contains:
 - **Link to quicklooks and shapefile** for pre-selection and password
 - Attached **simple step-by-step guidelines document** and (optional) more detailed technical guidelines document
- If you have **questions or feedback** please contact depending on the topic:
 - Specific contracts: EEA (Ana.Sousa@eea.europa.eu and procurement)
 - General issues on image support task: Tobias.Langanke@eea.europa.eu at EEA
 - Specific or technical question on image support: respond to the email you got from GAF or Joanneum

