Operational usage of NWC SAF Packages at IPMA and future requirements

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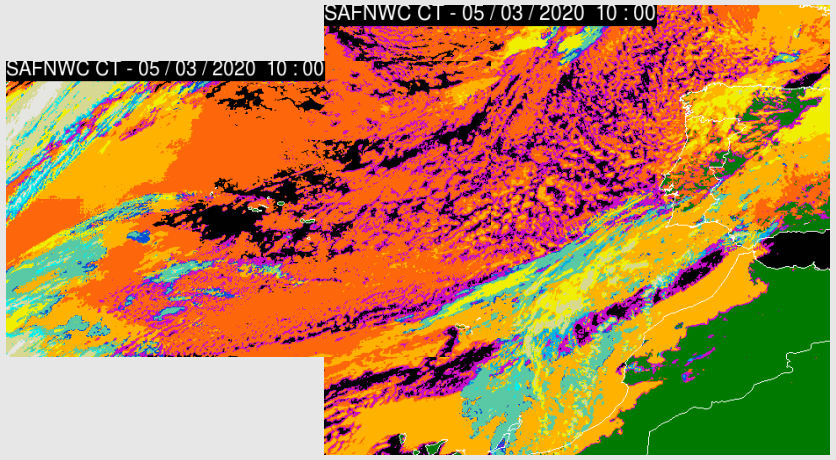
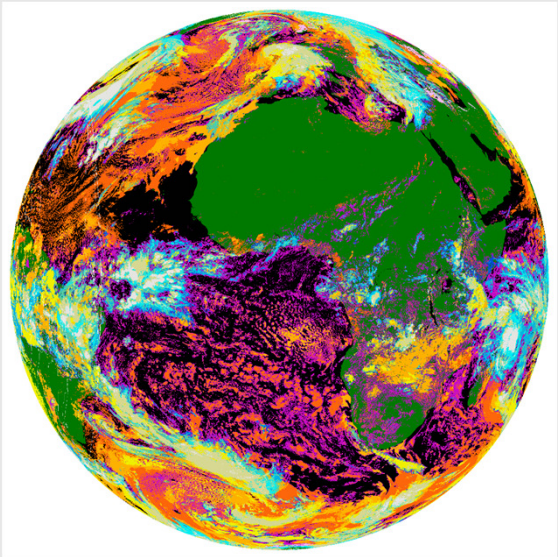
Nowcasting SAF users´ Workshop 2020

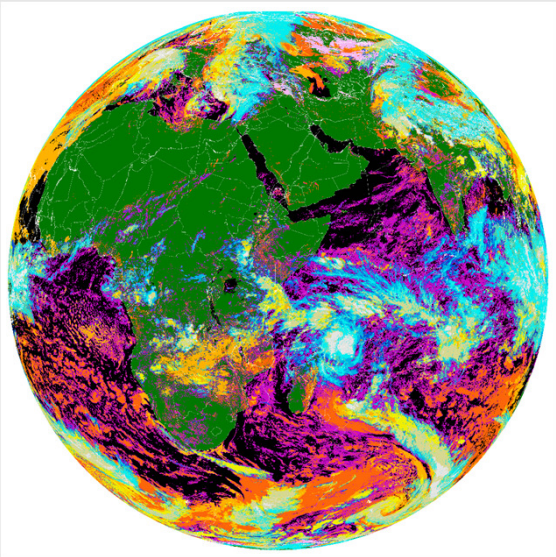
Madrid, AEMET HQ

10-12 March 2020

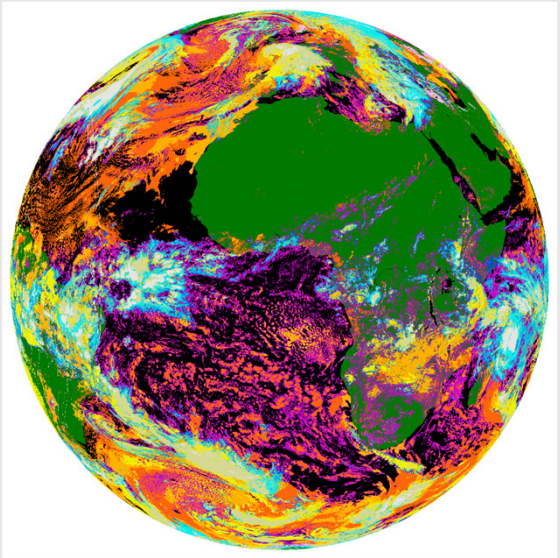
Users	Forecasting Centres	LSA SAF	
Version	v2016	**v2012**	v2016
Satellite	MSG (OPS)	MSG (OPS)	MSG IODC (>2017)
OS	CentOS Linux 7	Fedora Core 13	CentOS Linux 7
Products	CMa Dust, CT, CTTH, CMIC, CRR, PC, iSHAI, ASII-TF		CMa, CT
Areas			







GEO Package

Users	Forecasting Centres	LSA SAF
Version		V2018 (>Dec 2019)
Satellite		MSG (OPS)
OS		CentOS Linux 7
Products		CMa, CT
Areas		

Resampled to MTG grid until a beta version of NWC GEO for MTG becomes available.

GEO Package

Users	Forecasting Centres	LSA SAF
Version		V2014
Satellite		AVHRR (Metop)
OS		CentOS Linux 7
Products		CMa, CT
Areas		Each PDU (Product Dissemination Units in EPS native format, containing ~3 min. of data) is processed

PPS Package

- Why is Land SAF still using old versions of the GEO package?

NWCSAF/MSG v2012*	Cloud Mask Value
Product Algorithm Version: 3.2	*CMa v3.2*
Non-processed	0
Cloud-free	1
Cloud-contaminated	*2*
Cloud filled	3
Snow/Ice contaminated	4
Undefined	5

NWC/GEO v2016	Cloud Mask Value	Interpretation in LSA-SAF processing
Product Algorithm Version: 4.0	*GEO-CMA v4.0*	
Cloud-free	0	Clear sky
Cloudy	1	Overcast (partially cloudy ?)
No data or corrupted data	FillValue	These pixels are not processed.
GEO-CMA CLOUDSNOW		
Cloud-free	0	Clear sky
Cloud (except thin ice cloud over snow)	1	Cloudy or Clear + Snow identification
Thin ice cloud over snow/ice	2	Clear + Snow identification
Snow/Ice	3	Clear + Snow identification
No data or corrupted data	FillValue	These pixels are not processed.

- The content of the cloud mask product was modified for GEO packages > v2012

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- A number of LSA-SAF products aim the characterization of the surface radiation budget (DSSF, DSLF) and the energy balance (ET, turbulent fluxes). For these, the complete scene classification is relevant, and therefore it is important to **discriminate between overcast and partially cloudy cases**.

- Comparison between **Cloud Mask v2012** with **Cloud Mask v2016**:

All-Disk: CMa (v2012)	CMa v2016 (Number of pixels and %)		
	Cloud-Free	*Cloudy*	*FillValue*
Cloud Free	3377785 (99.74)	8561 (0.25 %)	-
Cloud Contaminated	48828 (1.83 %)	2619856 (98.17 %)	1
Cloud Filled	11435 (0.27 %)	4146629 (99.72 %)	7

- By contacts through the help desk, the NWC SAF suggested to use information contained in the Cloud Type product to recover information about **cloud contaminated pixels**.

Categories used by DSLF	*Categories from Cloud Mask (v2012)*
Cloud Free	*1.* Cloud Free *4.* Snow/Ice
Cloud Filled	*3.* Cloud Filled
Cloud Contaminated	*2.* Cloud Contaminated *5.* Undefined

Categories used by DSLF	*Categories from Cloud Type (GEO-CT v3.0) - v2016*
Cloud Free	*1.* cloud free land *2.* cloud free sea *3.* snow over land *4.* sea ice
Cloud Filled	*5.* very low clouds *6.* low clouds *7.* midlevel clouds *8.* high opaque clouds *9.* very high opaque clouds *12.* high semitransparent meanly thick clouds *13.* high semitransparent thick clouds *14.* high semitransparent above low/medium clouds *15.* high semitransparent above snow/ice
Cloud Contaminated	*10.* fractional clouds *11.* high semitransparent thin clouds

- Cloud contaminated class is reconstructed from Cloud Type classes 10 &11

- Approach: convert the classification from GEO v2016 CT into the previous CMa scene classification

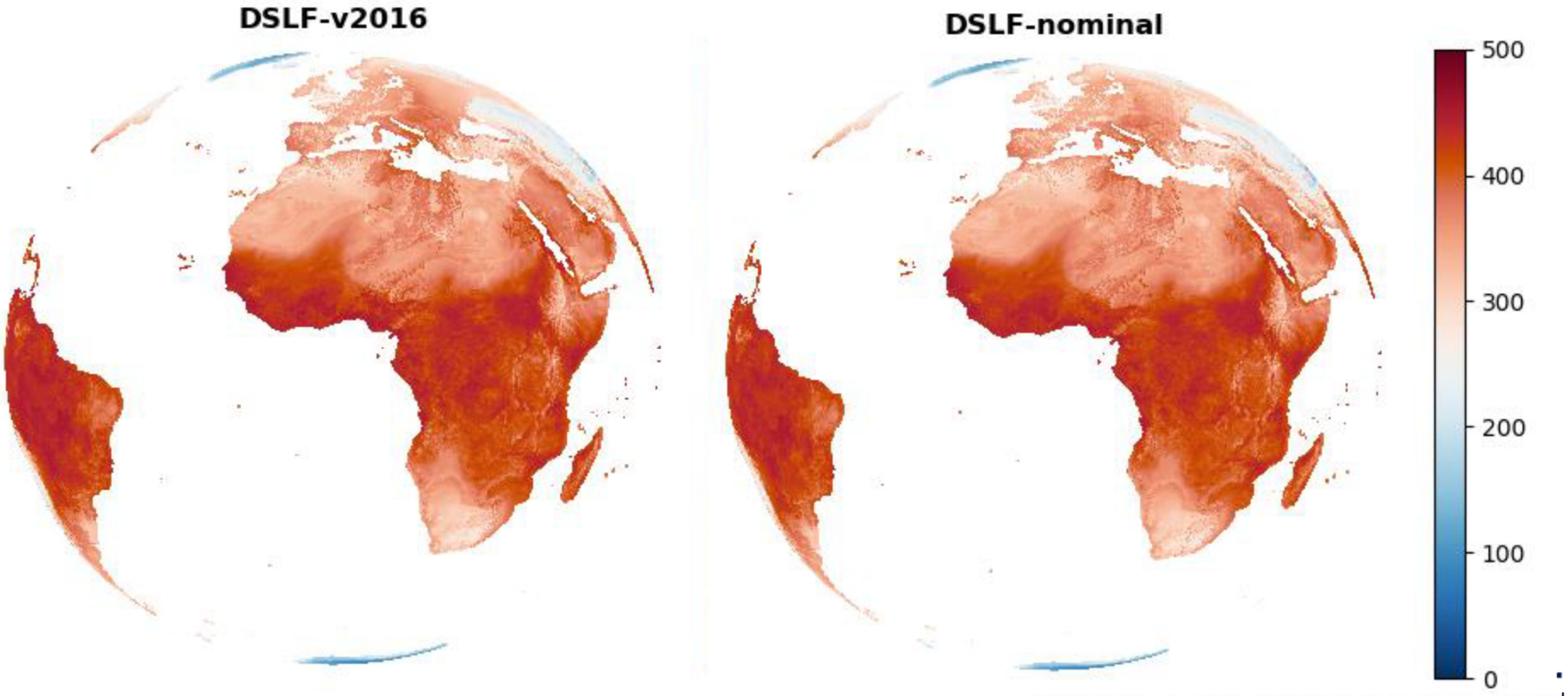
- Approach: convert the new classification from GEO v2016 CT into the previous CMa scene classification
- The effort had to be done to avoid that the algorithms that use the “cloud contaminated” information would be changed

- Comparison between **CMa from CT v2016** with **CMa v2012**:

All-Disk: CMa from CT (v2016)	CMa v2012 (Number of pixels and %)					
	Non-Proc	*Cloud-Free*	*Cloud Contaminated*	*Cloud Filled*	*Snow/Ice*	*Undef.*
Cloud Free (CT: 1,2,3,4)	8	3364757 (97.87%)	48828 (1.41%)	11435 (0.33%)	13028 (0.38%)	-
Cloud Contaminated (CT: 10, 11)	2	4844 (0.24%)	1419290 (70.63%)	585395 (29.13%)	3	-
Cloud Filled (CT: 5,6,7,8,9, 12,13,14,15)	31	3705 (0.08%)	1200566 (25.19%)	3561234 (74.73%)	9	-

DSLF Comparisons

DSLF -v2016 and DSLF nominal @2018-11-02 13:00 UTC



DSLF Comparisons

DSLF (v2016) - DSLF nominal (v2012)	Bias	RMSD
All Pixels	1.86 Wm^{-2} (0.49 %)	6.89 Wm^{-2}
Clear Sky from DSLF nominal	0.07 Wm^{-2} (0.02 %)	1.55 Wm^{-2}
Cloudy from DSLF nominal	-1.14 Wm^{-2} (-0.3 %)	5.93 Wm^{-2}
Cloud Contaminated from DSLF nominal	6.55 Wm^{-2} (1.63 %)	11.11 Wm^{-2}

- In the case of one of the most affected products the overall bias is < 0.5% and the RMSD < 2%.

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- In the case of one of the most affected products the overall bias is < 0.5% and the RMSD < 2%.

- Although there will be pixels where the product values are significantly different, the overall statistics point towards a reasonable product continuity.

Reprocessing Activities

GEO Package

- CMa and CT products have been reprocessed:
  - Using GEO v2012 for the period 2012-2015 for the prime MSG satellite – for LSA SAF CDRs;
  - Using GEO v2016 for the period 2017-2019 for MSG IODC;

Requests

PPS Package

- The LSA SAF needs to reprocess PPS since 2007 (CMa and Ctype products)
  - Data needs to be obtained through EUMETSAT data center
    - Not ready to be ingested into PPS!
      - Full orbits are available – needs to be “sliced” to 3 min. files

Requests

- In the framework of **Copernicus services** IPMA is also processing land surface products, such as land surface temperature and fire detection and radiative power for the **GEO-ring area**;

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- Cloud Mask and Cloud type products provided by the NWC GEO software for NASA's GOESR and the JMA's Himawari missions are needed;

- GEO Package v2018 is able to produce Cloud products based on:
    - GOES 16 – but data disseminated via Eumetcast has degraded resolution
    - Himawari 8 – but the LRIT data disseminated via Eumetcast has missing coefficients. To allow the use of this data by the NMSs EUMETSAT would need to include the information that is missing in the currently disseminated data

Requirements

- LSA SAF will use Cloud Mask and Cloud type products from **NWC SAF GEO** and from **NWC SAF PPS** packages for **operational Day-1 products** derived from MTG-1/FCI and from Metop-SG/MetImage

  - software packages with corresponding configuration files must be ready beforehand **to test production timeliness**
    - LSA-SAF Processing times requirements:
      - MTG: 4 min
      - EPS – SG: 1 min

  - it is also important to know the output format and content at the development phase of the downstream products

Requirements

- For **LSA SAF fire products** it would be important that smoke is not classified as cloud
  - a "smoke flag“ is needed

EUMETSAT LSA SAF

Thank You!

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http://lsa-saf.eumetsat.int