An overview of EUMETSAT's IASI Climate Data Records

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SCAN me

Climate data record definition from CEOS-CGMS Joint Working Group on Climate, 2020

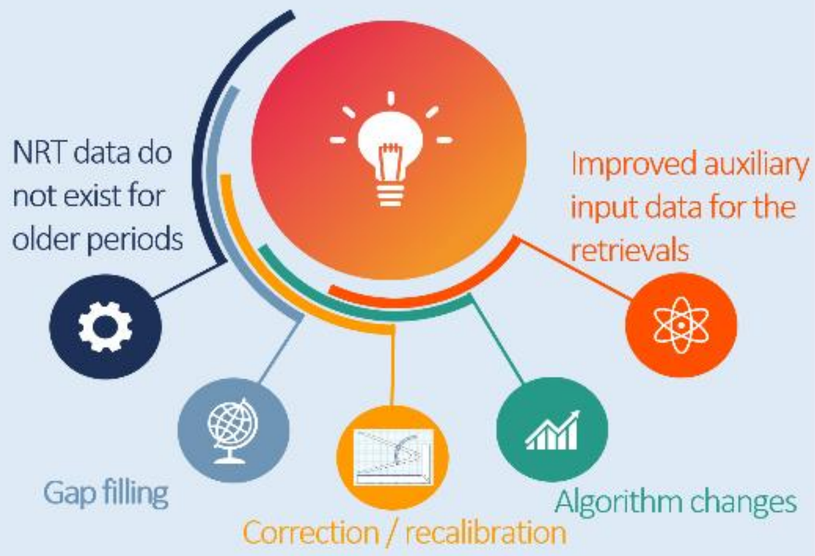
Fundamental Climate Data Records (**FCDR**s) consist of a consistently-processed time series of uncertainty-quantified sensor observations calibrated to physical units, located in time and space, and of sufficient length and quality to be useful for climate science or applications. FCDRs are typically calibrated radiances, backscatter of active instruments, or radio occultation bending-angles, and include the ancillary data used to calibrate them.

Climate Data Records (**CDR**s) consist of a consistently processed time series of uncertainty-quantified retrieved values of a geophysical variable or related indicator, located in time and space, and of sufficient length and quality to be useful for climate science or applications.

Interim Climate Data Records (**ICDR**s) are consistently processed times series of uncertainty-quantified estimates of CDR values produced with better timeliness than, but otherwise minimizing differences with, the estimated CDR values.

EUMETSAT produces climate data records (both FCDRs and CDRs) by applying state-of-art data processors, which have advanced significantly during the last decade, to historical and present-day satellite data. EUMETSAT uses in addition the term **Fundamental Data Record** (**FDR**) that is similar to a FCDR but contains only a best possible calibrated single-sensor series. This is often the first step to create multi-sensor cross-calibrated FCDRs. Our climate data records are operationally generated and are routinely checked on quality (***https://www.eumetsat.int/what-we-monitor/climate***)

Why do we need to reprocess real time satellite observations to create a CDR?



Climate data record production at EUMETSAT, a schematic view

FDR production

Direct observation/ level 0

Best suitable algorithm

It must be fast: the processing requirement is 1 year worth of data per day

FCDR/Level 1

CDR production

Auxiliary / reanalysis data – ERA5 or ERA interim

Best suitable algorithm

CDR/Level 2

Verification/Validation

Comparison with **homogenised** radiosonde observations, e.g. IGRA or RAOBS collocated with IASI CDR

Num of matches IASI-A/IGRA 2008 – 2017

Comparison with model reanalysis or other independent observations

Daily global average of IASI-A T profile difference IASI - ERA-Interim

Surface/air temperature

Archive – User acess

CDR can be access via

EUMETSAT product navigator

https://navigator.eumetsat.int/start

EUMETSAT datastore (new service)

https://www.eumetsat.int/eumetsat-data-store

http://data.eumetsat.int

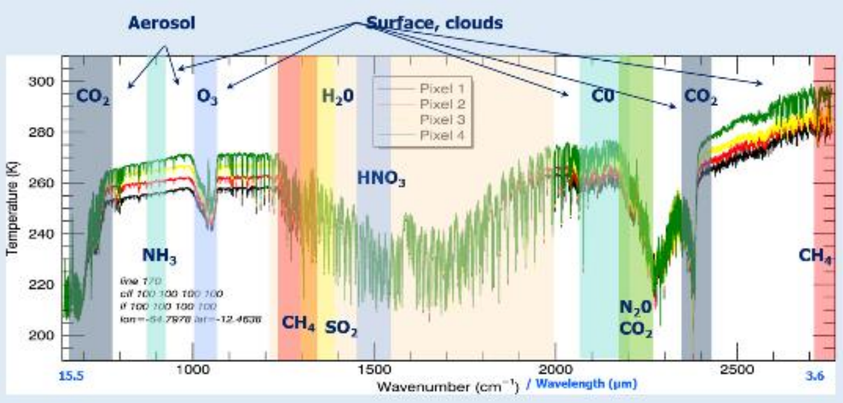
Contact helpdesk: ops@eumetsat.int

New release if needed !

User feedback

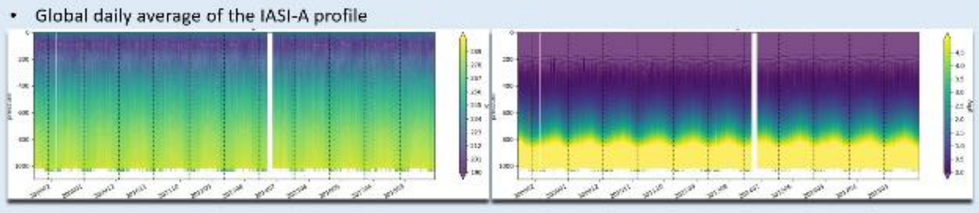
IASI climate data record production at EUMETSAT

CDRs of temperature profiles and IASI trace gases for Metop-A and -B from the start of both missions have been produced at EUMETSAT

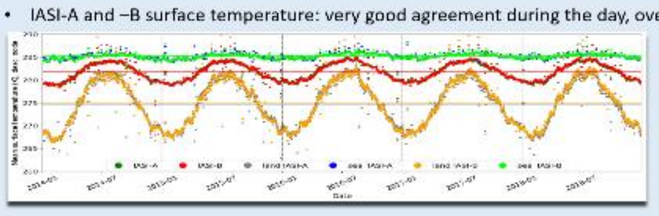


Example of EUMETSAT/AC-SAF geophysical CDR

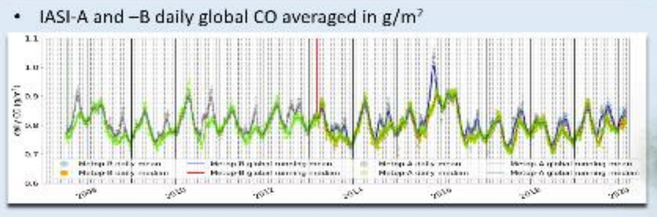
- IASI CDR processed and to be released: FORLI V6.5 CO, BRESCIA V6.5 SO_2
- IASI CDR released: all-sky temperature and humidity profiles PWLR[3] V6.5.4
- Global daily average of the IASI-A profile

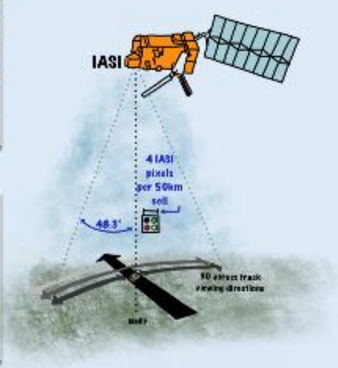


- IASI-A and –B surface temperature: very good agreement during the day, over both land and ocean surfaces



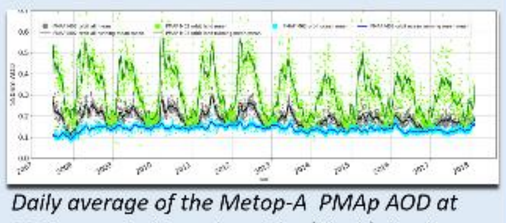
- IASI-A and –B daily global CO averaged in g/m^2





IASI FCDR as input for retrieval from other instruments

PMAp: Aerosol CDR using GOME-2+ IASI FDR as inputs



Daily average of the Metop-A PMAp AOD at 550 nm over the entire globe (black), land (green) and ocean (blue). Plain dark lines are the running mean over 30 days.

IASI CDRs at EUMETSAT and future plan

	Satellite	Product description	http://doi.org/10.15770/	Period	Version	Released	Comment
FDR	IASI-A	FDR - Level 1c / Radiance spectra infrared sounder	EUM_SEC_CLM_0014	2007- 2016	1	Mar 2018	From January 2017 archived NRT L1c should be used
	IASI-A and -B	FDR - Level 1c		2007/2013 – 2022	2	Q4 2022	Include post non linearity correction (TBD)
CDR	IASI-A and -B	CDR - all sky temperature and humidity profiles	EUM_SEC_CLM_0027	2007/2013 – 2018	1	Dec 2020	The Metop-A IASI L2 night-time land surface temperature values are incorrect.
	IASI-A and -B	CDR - all sky temperature and humidity profiles		2007/2013 – 2018	1a	Q1 2022	Metop-A surface temperature over land at night corrected
	IASI-A and -B	CDR - CO			1	Q1 2022	to be released by AC-SAF
	IASI-A and -B	CDR - SO_2		2007/2013 – Mar. 2020	1	Q1 2022	to be released by AC-SAF
	IASI-A, -B and -C	CDR – temperature and humidity profiles all sky + OE		2007/2013/2018 - present	2 and 1	Q4 2022	to be released by EUM-CF