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Scientific news of PPS-v2018 and in CDOP-4

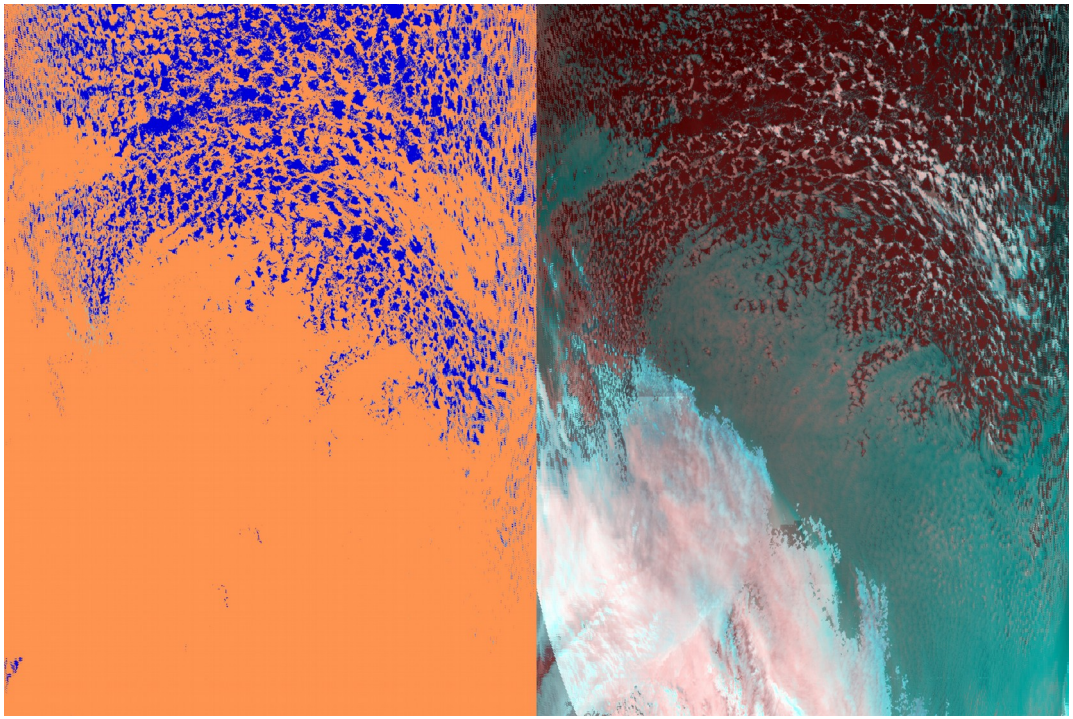
EUMETSAT

NWC SAF

SUPPORT TO NOWCASTING AND VERY SHORT RANGE FORECASTING

Cloud products for Imager Instruments

- PPS v2018
  - AVHRR
  - VIIRS
  - MODIS
  - MERSI-2
- Comming in CDOP-4
  - MetImage
  - Possibly SLSTR



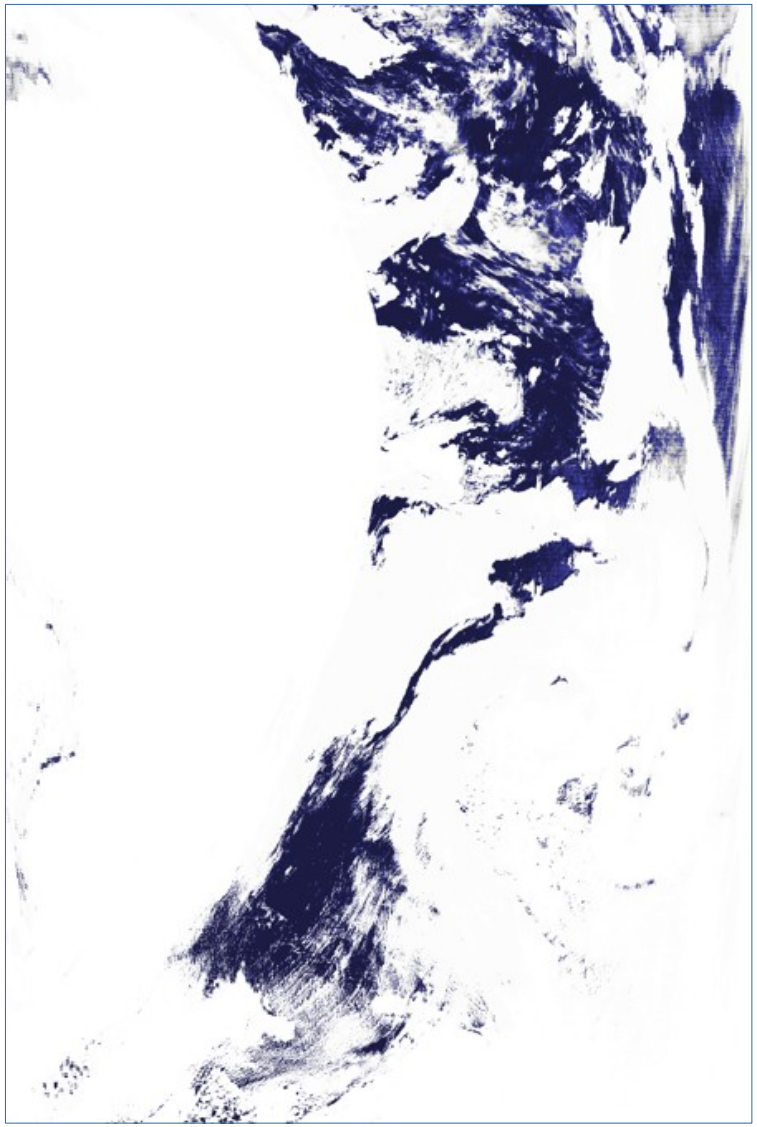
PPS cloudmask applied to **simulated** EPS-SG data. Hitrate=0.96 and False alarm rate < 0.1 compared to truth used for simulations.

Products

- Cloud mask
- Cloud type
- Cloud probabilities
- Cloud top temperature and height
- High resolution winds (beta planned for next release)
- Precipitating clouds (to be removed)
- Cloud Microphysics

New product in PPS v2018: Cloud probabilities

- Developed in CMSAF for
  - CLARA-A3
  - CLAAS-3
- Gives probability of cloud for each pixel.
- Can be input to CTTH and CPP
- Minimum cloudy probability limit is configurable.



Reference:

Karlsson K.G et al 2020:
https://www.mdpi.com/2072-4292/12/4/713

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v2018 CMA and Cloud probabilities validation

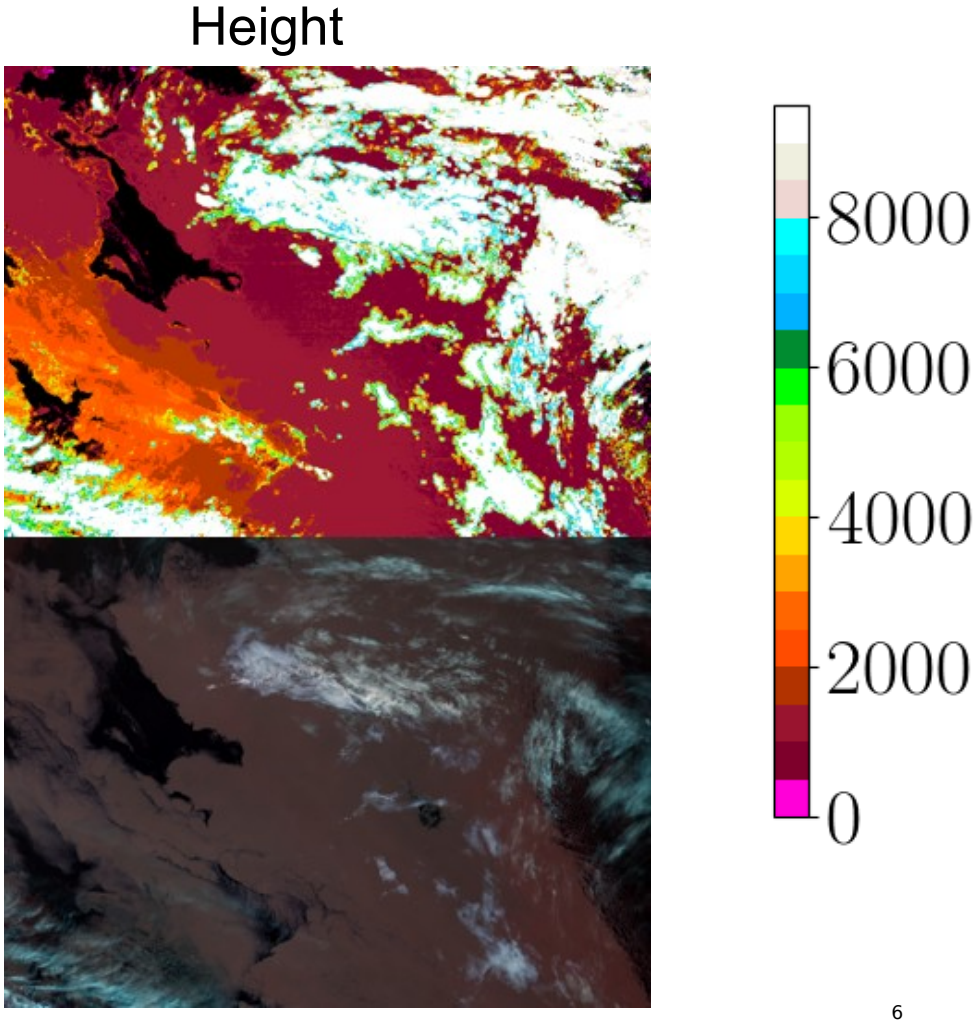
- 15 orbits NPP-data is used.
- Possible to get cloud or clear conservative cloud mask

	POD cloudy	POD clear
CMA	88	83
CMAPROB-10	91	73
CMAPROB-50	82	89
CMAPROB-90	80	91

Cloud Top Temperatur (Pressure) and Height

- New neural nework algorithm in version 2018
- http://www.atmos-meas-tech.net/11/3177/2018/amt-11-3177-2018.html

- Input one of:
  - CMA
  - Cloud Probability



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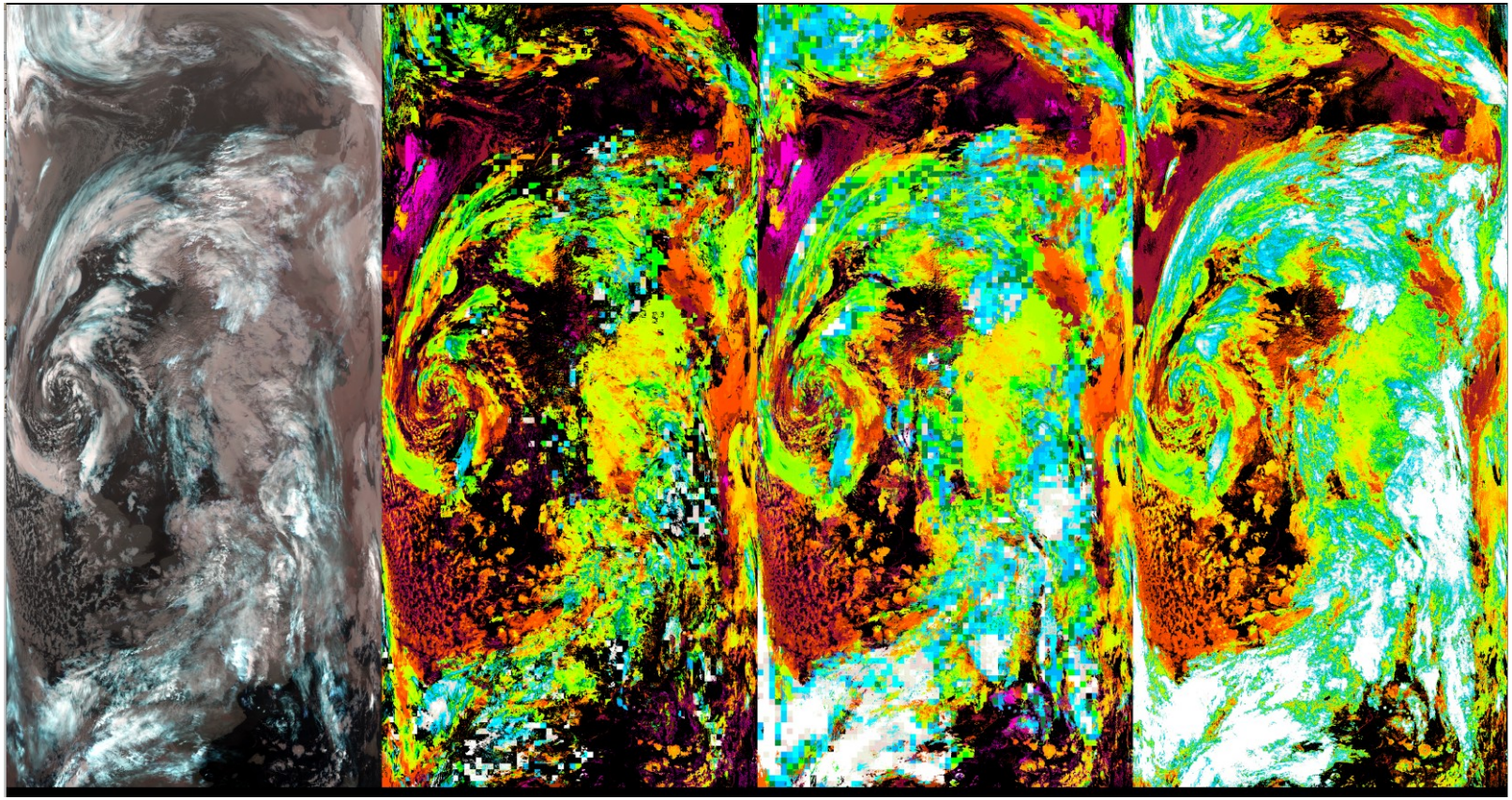
CTTH major development in last releases

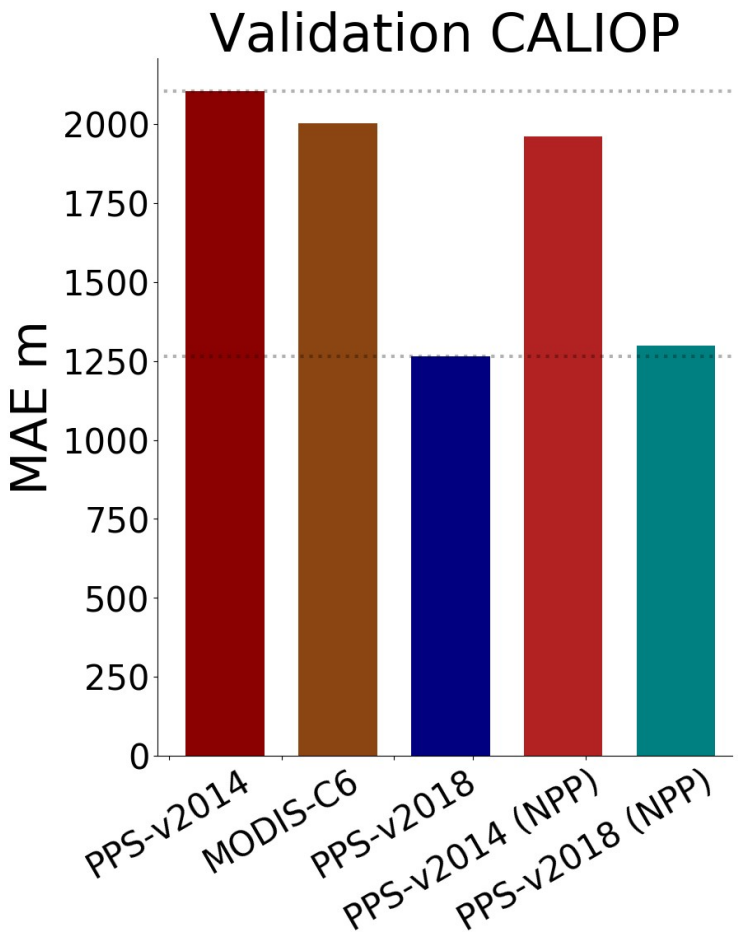


RGB v2012 v2014 v2018

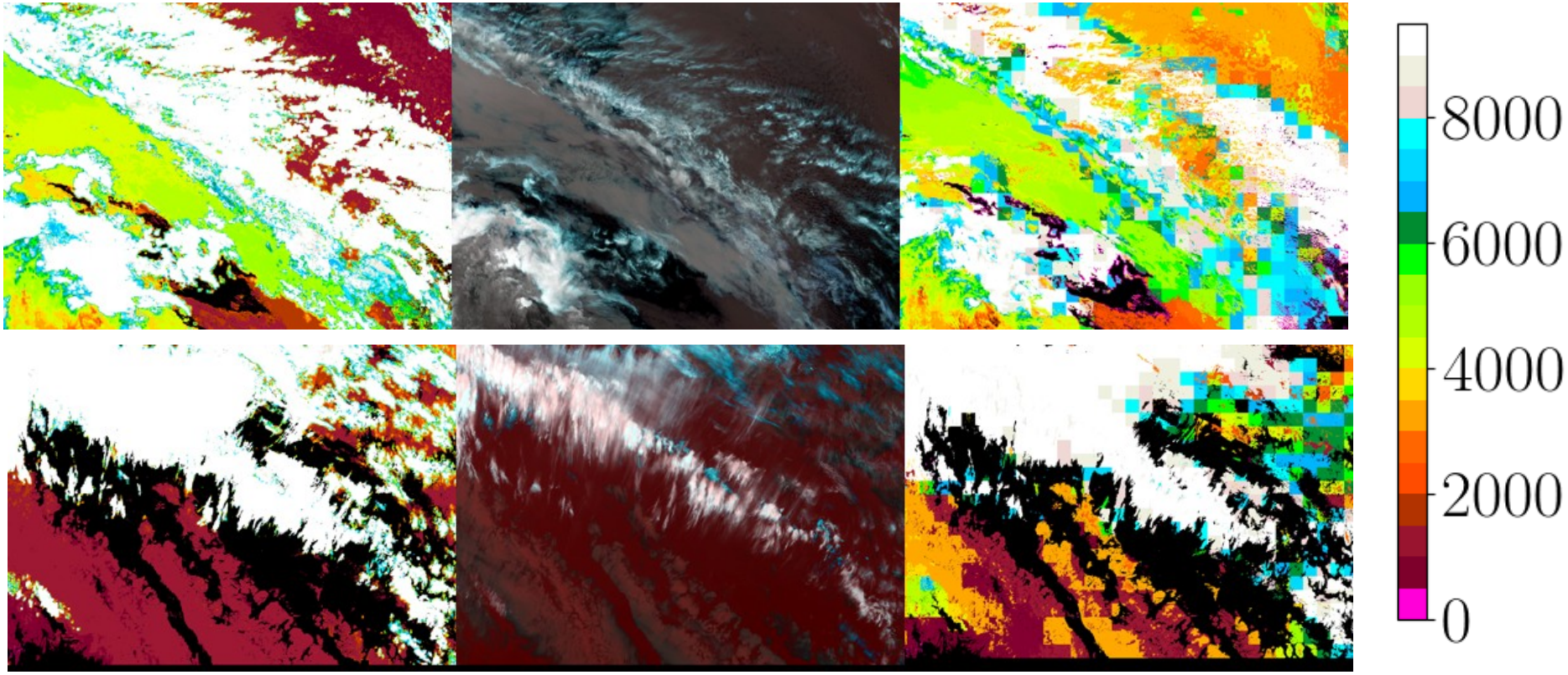
CTTH news in v2018

- Algorithm replaced with neural network trained approach.
- Significantly improved results compared to v2014!
- Mean absolute error is reduced ~40%.

- Note: performance significantly better than MODIS Collection 6



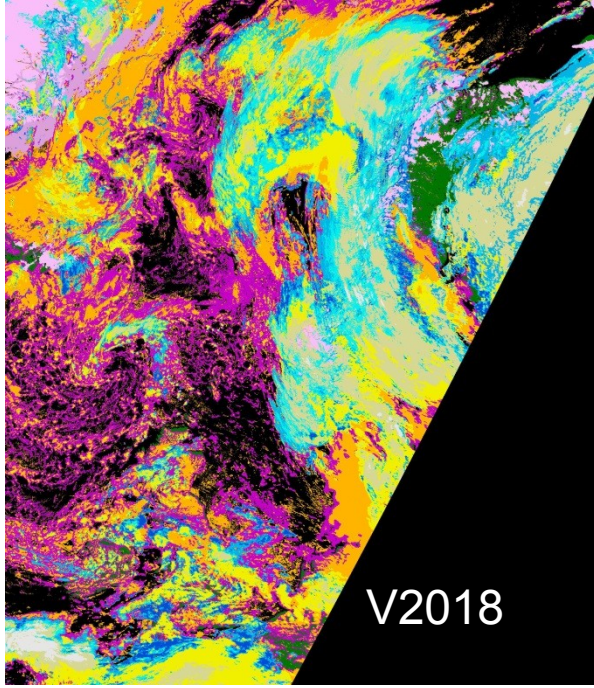
v2018 RGB v2014

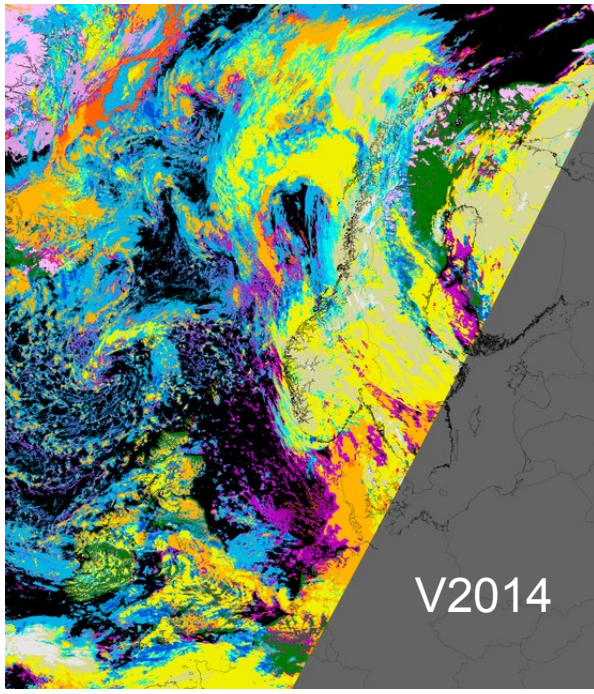


- PPS-2018 low clouds placed lower, high cloud higher.
- Larger segment size for semi-transparent clouds no longer needed. =>Less large squares with same height.

CT news in v2018

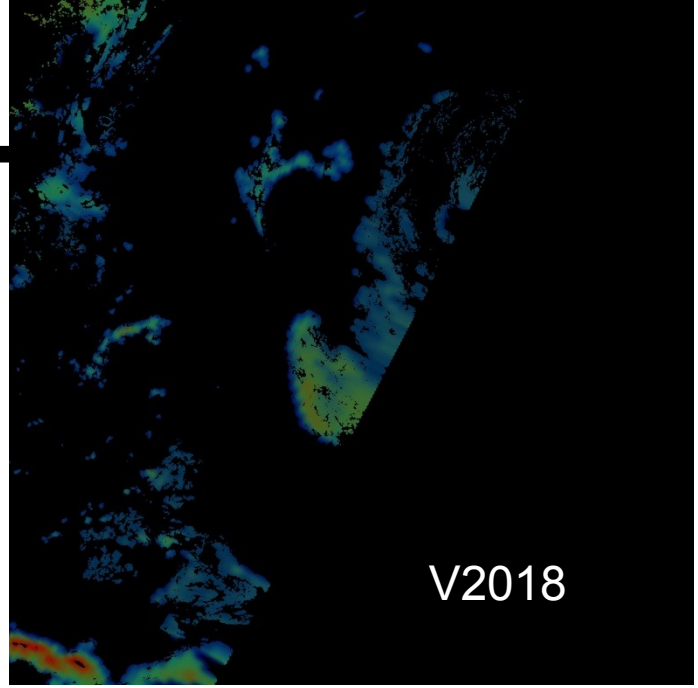
- Uses CTTH as input
- Very Low clouds defined as:
  - Clouds within 500m from ground
- Better separates fractional from cirrus.

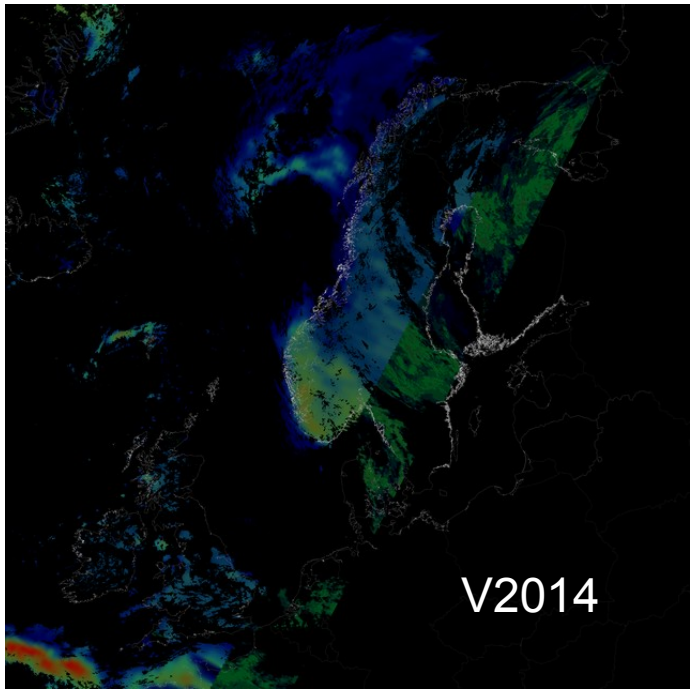




Precipitating clouds

- To be removed in future versionsion during CDOP-4



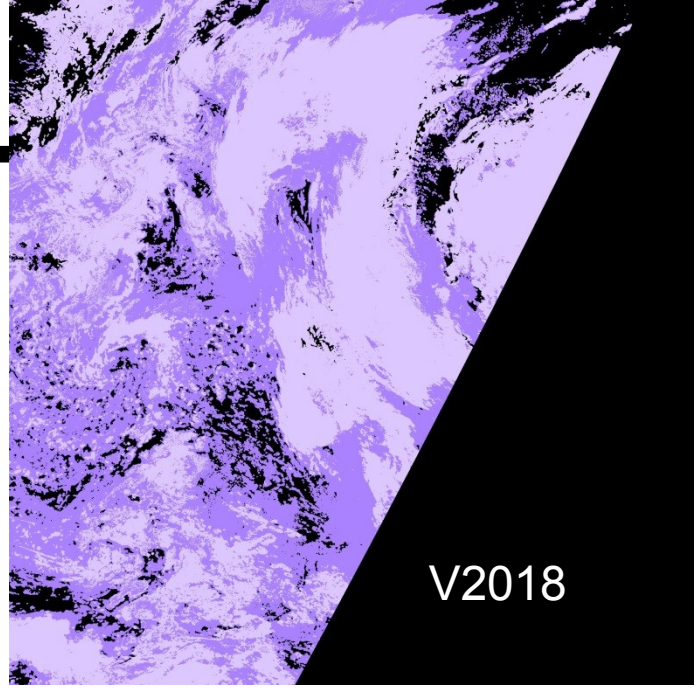


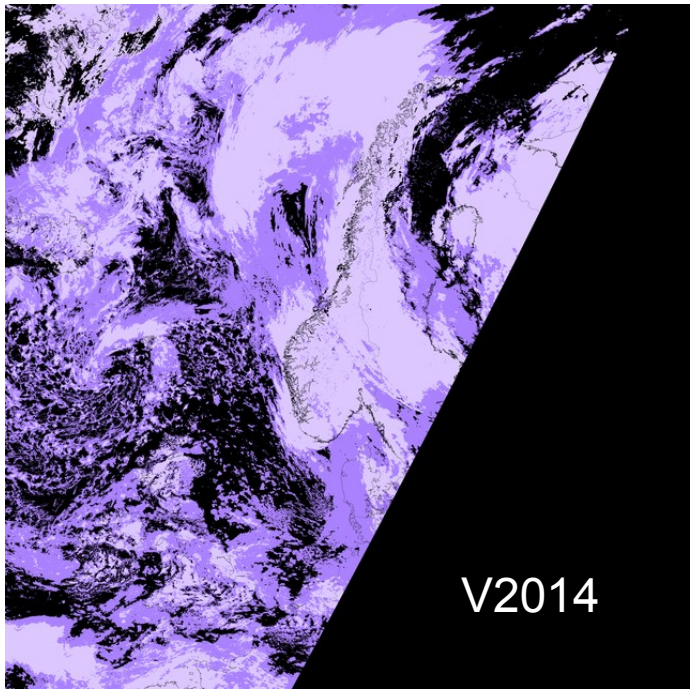
Cloud microphysics (CMIC)

- Developed by CMSAF: KNMI
- Validated products:
  - Cloud phase
  - Liquid water path
- Extra products:
  - Effective radius
  - Ice water path
  - Cloud optical thickness
  - Cloud geometrical thickness (coming)
  - Cloud droplet number concentration (coming)
- Products to be renamed CMIC in coming releases. Algorithm will still be CPP.

CMIC/CPP v2018 (phase)

- Phase also benefits from improved CTTH
  - If configured to use CTTH as input!
- Most changes visible is due to changed CMA.

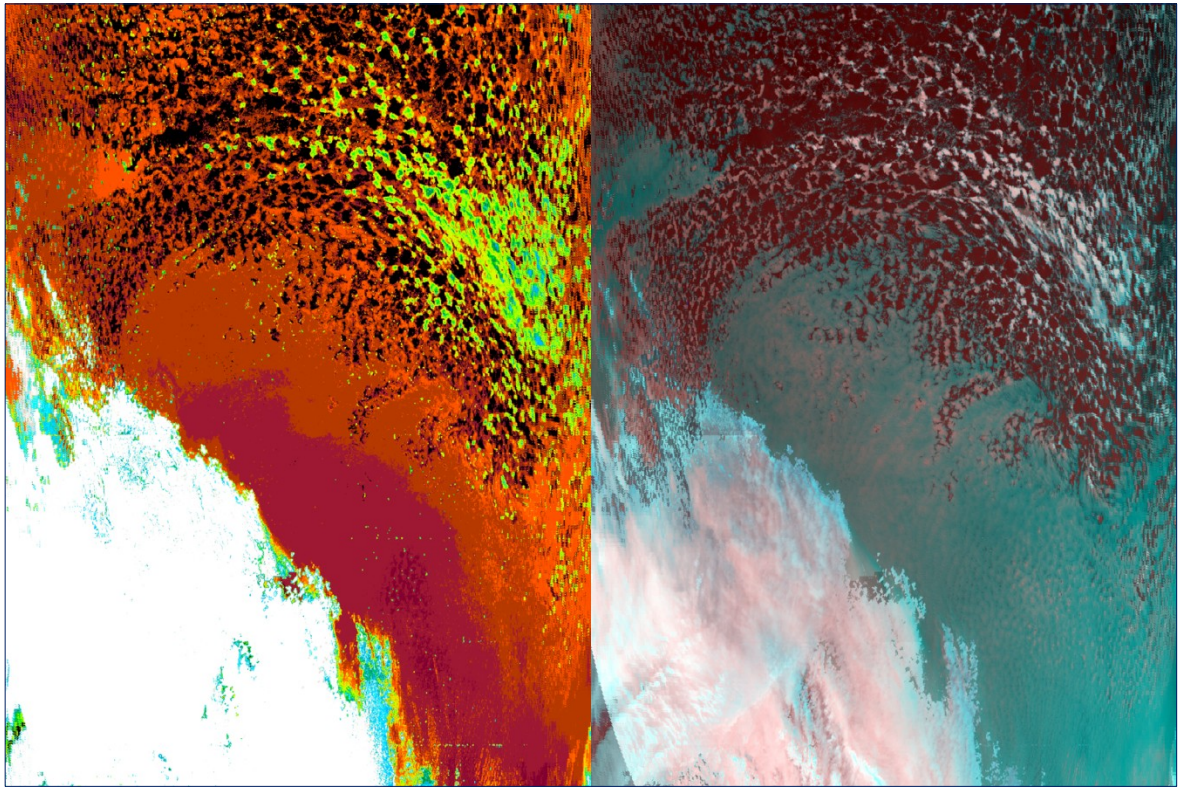




Additional plans for end of CDOP-3 and CDOP-4

- Scientific updates to CPP and CMAPROB after CMSAF CLAARA-A3 preparations are finished.
- High resolution winds planned for end of CDOP-3
- Make use of successful neural network setup:
  - Improve cloud free snow predictions (in CMA)
  - New optical depth beta product
    - for day and night
    - Focus on separating very thin clouds from the rest.

Thanks for listening!



CTTH applied to EPS-SG **simulated** data.