SENTINEL-2 LEVEL-2A PRODUCTION DURING COMMISSIONING

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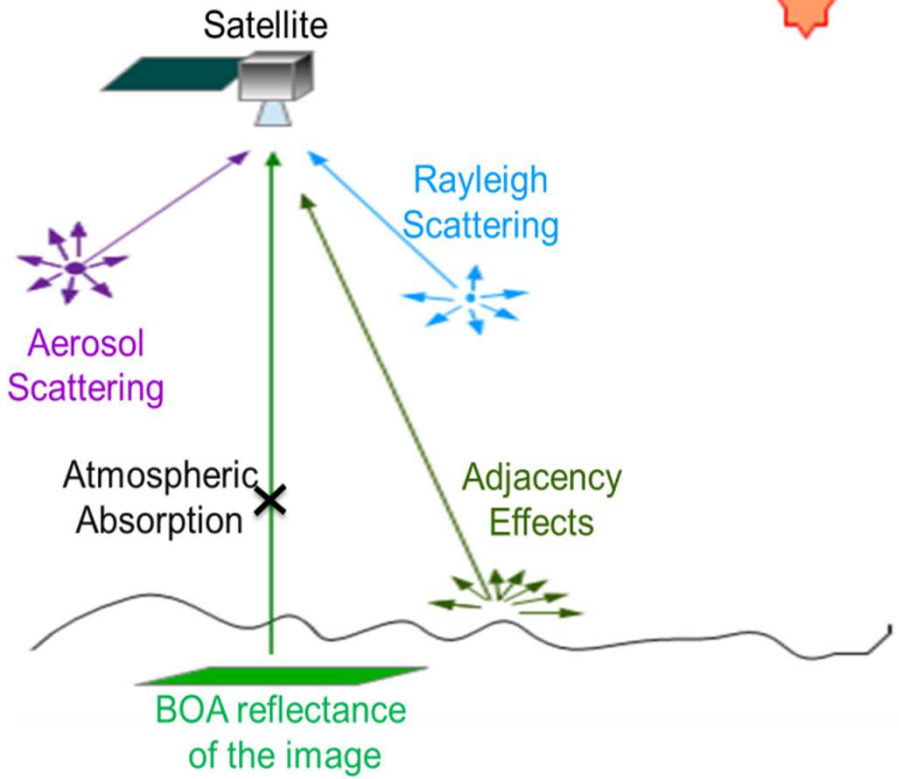
1-CNES 2-CESBIO CNES 3-CESBIO CNRS

MACCS PROCESSING

MACCS (Multi-Mission Atmospheric Correction and Cloud Screening) is a software to generate BOA reflectance images from TOA reflectance images combining several processing steps:



- Mask estimation :
  - Cloud cover and cloud shadows
  - Water
  - Snow
  - Relief shadows
- Water vapour content estimation.
- Aerosol optical thickness estimation.
- Atmospheric correction using exogeneous data (METEO, MNT, …) and aerosol optical thickness. It may include also environment correction.
- Correction of lightening variations due to relief using MNT and considering a bidirectional reflectance distribution function.
- Temporal syntheses creation (actually for Venμs only).

PROCESSING MULTI-TEMPORAL SERIES

MACCS algorithms have been conceived to process multi-temporal series of products:

at high resolution and high revisit

acquired under constant viewing angles

- **minimize directional effects**
- **maximize stability of surface reflectance**

having exactly the same footprint

Indeed, the implemented recurrent method relies on the following assumptions:

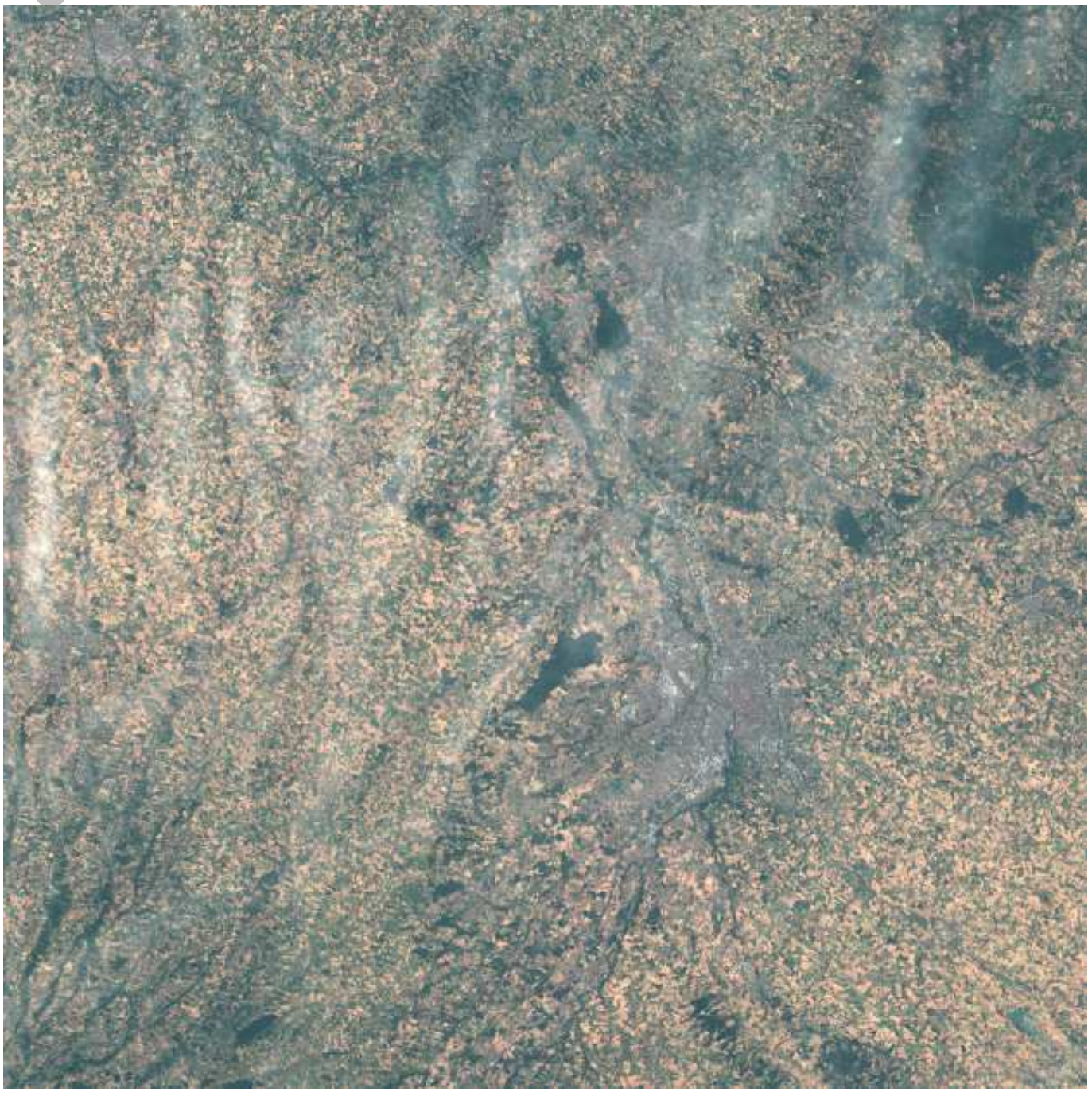
Surface reflectance varies slowly with time, contrarily to clouds and aerosols

→ Changes between 2 consecutive acquisitions are most probably related to clouds, clouds shadows and aerosols

CNES 1ST SENTINEL-2A TEMPORAL SERIES

- Sentinel-2A has been launched in June 23rd
- CNES was in charge of the Cal/Val activities during IOC phase
- MACCS has been integrated in S2 Technical Expertise Centre with the scope of processing GPP L1C products and generating demonstration Level-2A products to assess end-to-end system performances
- The Look Up Tables used in MACCS processing have been generated taking into account the spectral response measured during Sentinel-2A On Ground Validation
- Ground Image Processing Parameters (GIPP) have been tuned according to the experience acquired processing Level-1C products issued by other missions like Landsat8

LEVEL-1C TILE31TCJ OVER TOULOUSE AREA



06/07/2015

LEVEL-1C TILE31TCJ OVER TOULOUSE AREA

16/07/2015

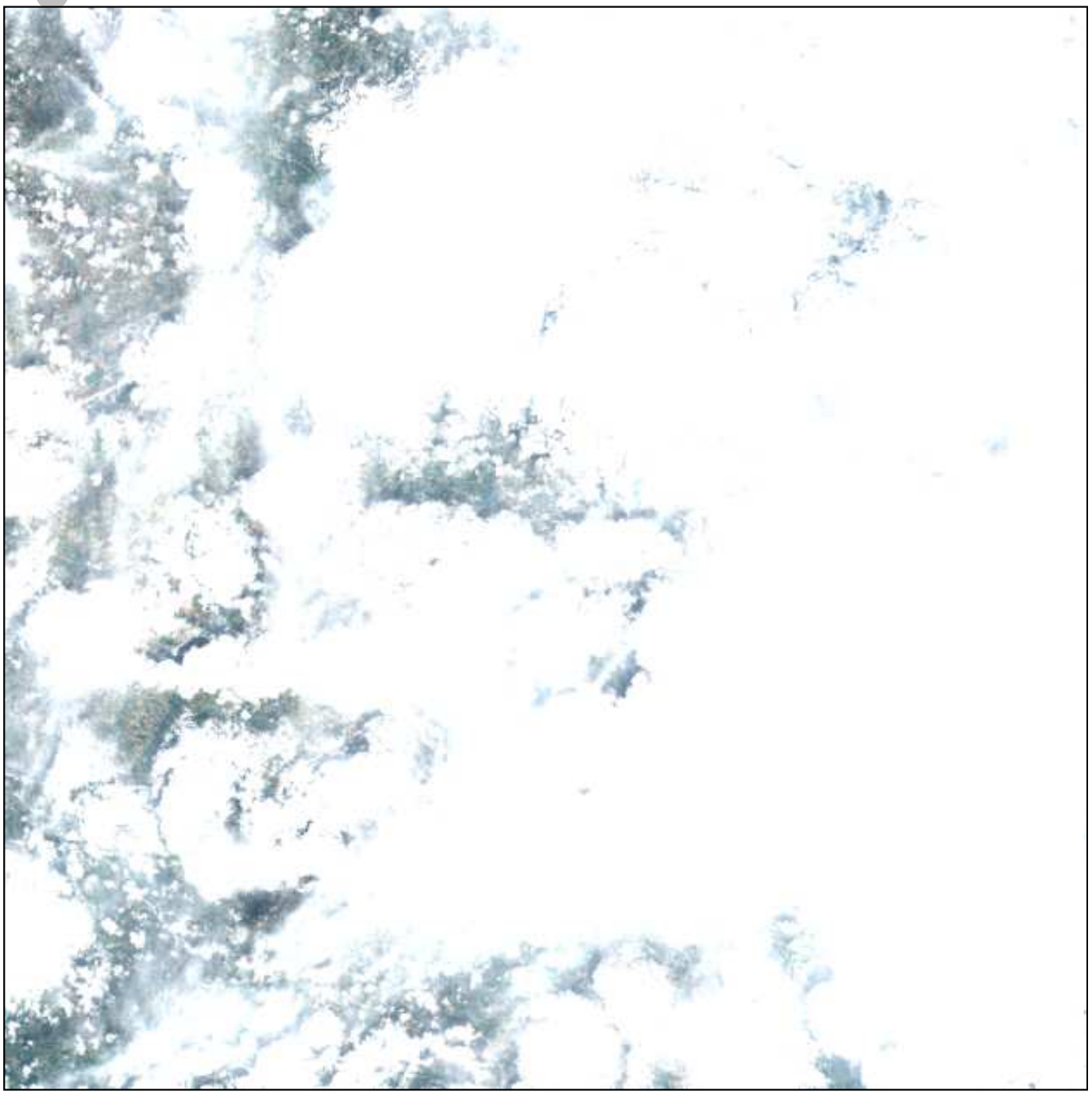
LEVEL-1C TILE31TCJ OVER TOULOUSE AREA

26/07/2015

LEVEL-1C TILE31TCJ OVER TOULOUSE AREA

05/08/2015

LEVEL-1C TILE31TCJ OVER TOULOUSE AREA

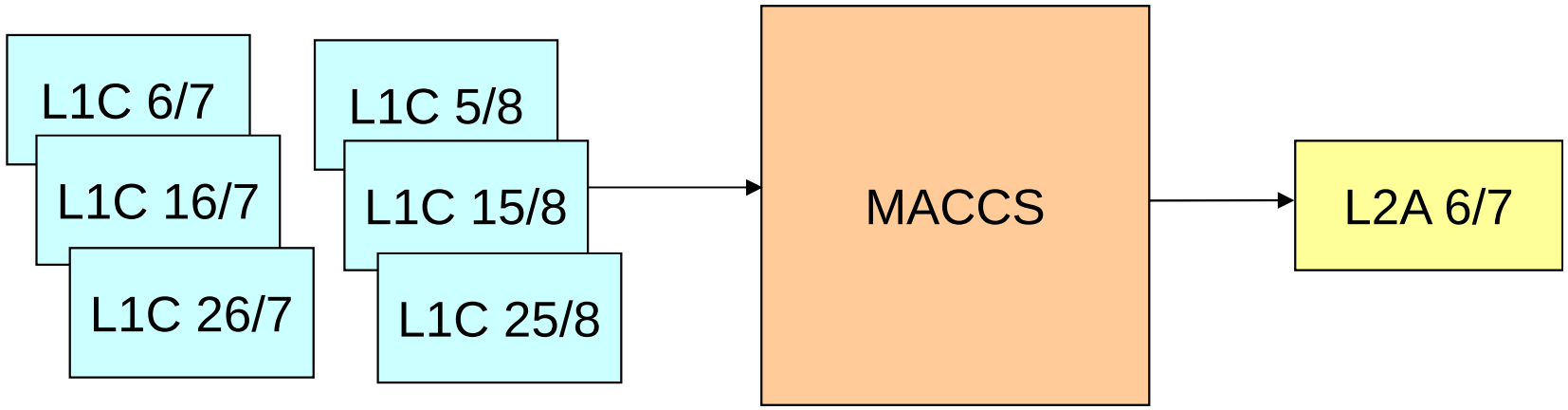


15/08/2015

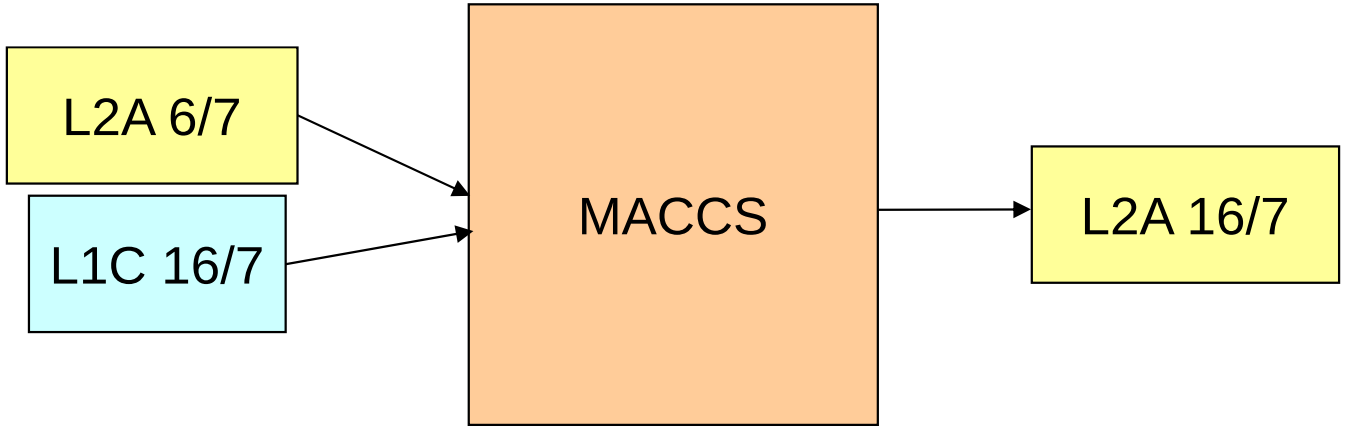
LEVEL-1C TILE31TCJ OVER TOULOUSE AREA

25/08/2015

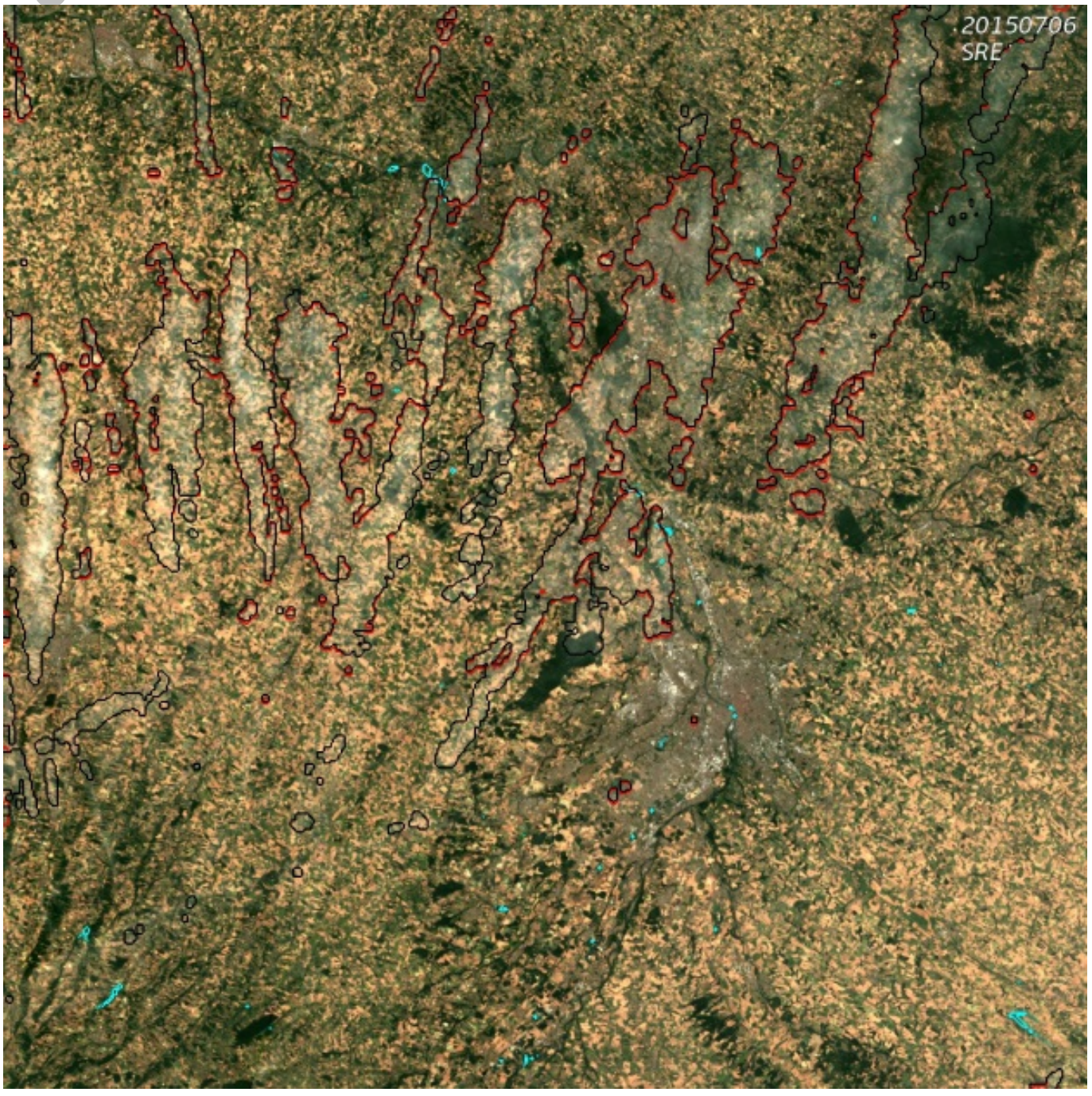
COMPUTING MODES AND INTERFACES: L2BACKWARD



1 Backward mode + 4 Nominal modes (L1C of 15/8 too cloudy to be processed up to Level-2A)

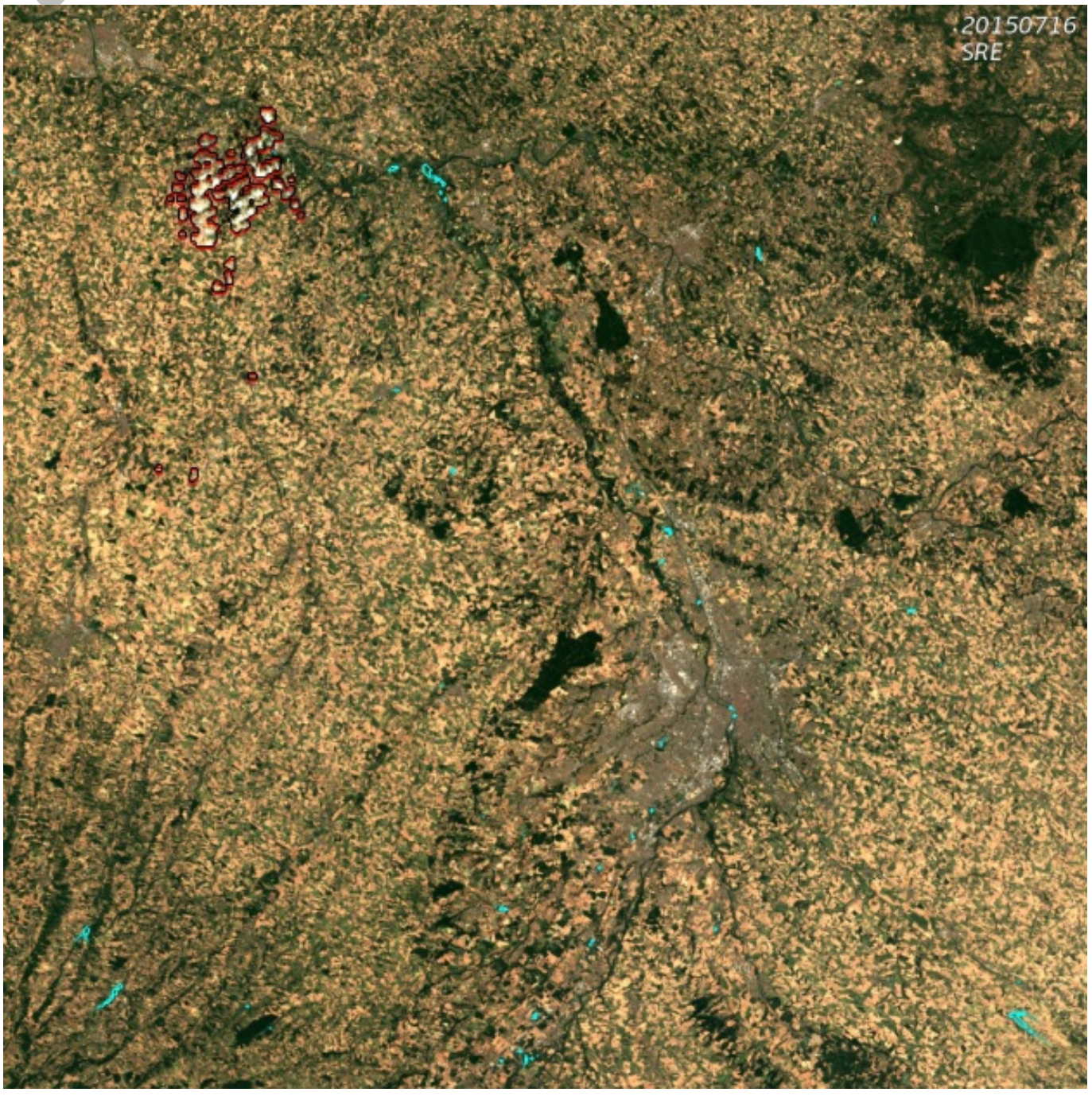


LEVEL-2ATILE31TCJ OVER TOULOUSE AREA



06/07/2015

LEVEL-2A TILE31TCJ OVER TOULOUSE AREA



16/07/2015

LEVEL-2A TILE31TCJ OVER TOULOUSE AREA

26/07/2015

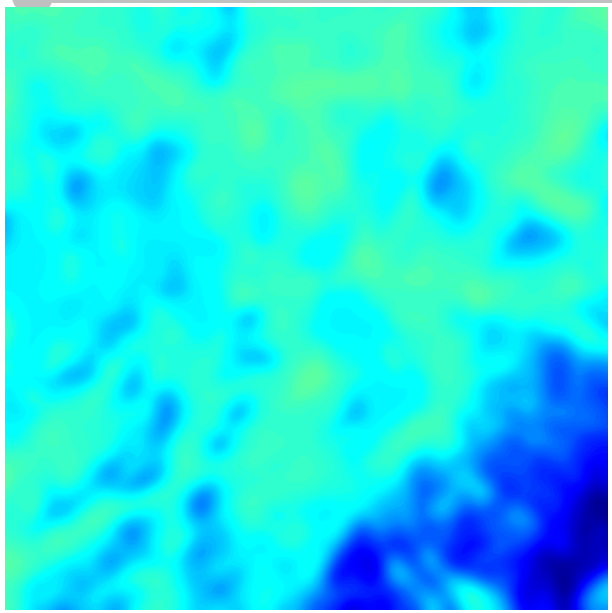
LEVEL-2A TILE31TCJ OVER TOULOUSE AREA

05/08/2015

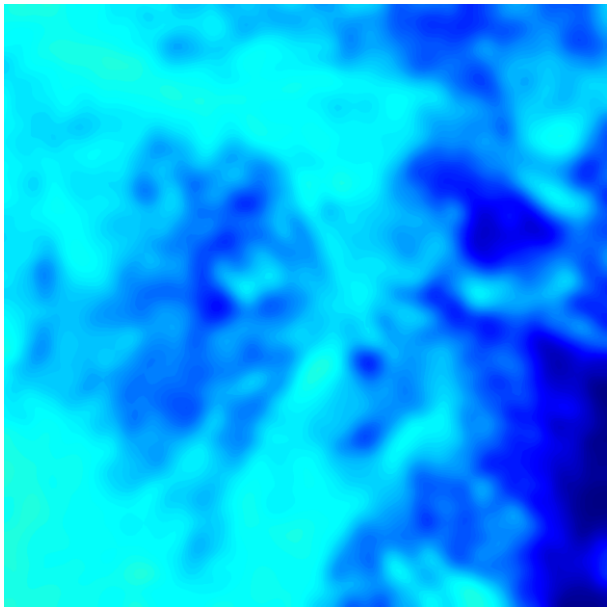
LEVEL-2A TILE31TCJ OVER TOULOUSE AREA

25/08/2015

AOT ESTIMATION TILE 31TCJ



(a)



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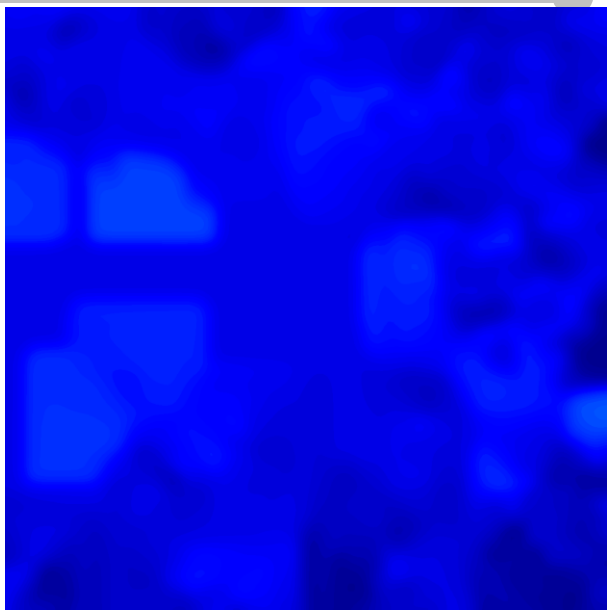
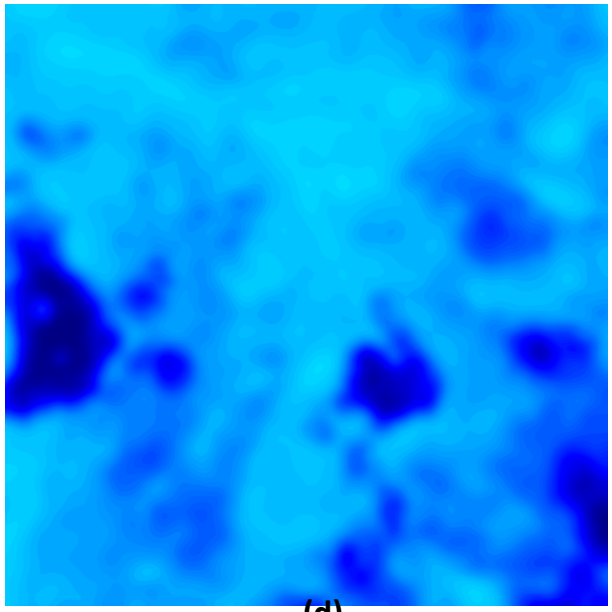


(c)



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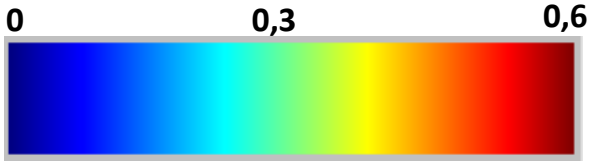
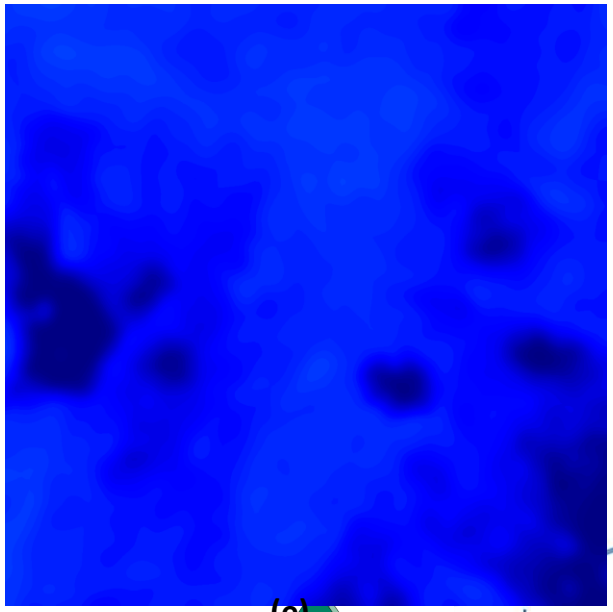


AOT estimation on tile 31TCJ over Toulouse area:

(a) 06/07/2015
(b) 16/07/2015
(c) 26/07/2015
(d) 05/08/2015
(e) 25/08/2015



(e)