The use of NWC SAF products in the scope of the LSA SAF & as a nowcasting tool at IPMA (Portuguese Met Service): strengths and caveats

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NWC SAF 2015 Users´ Workshop

24-26 February 2015, Madrid

Instituto Português do Mar e da Atmosfera, I.P.
Rua C - Aeroporto de Lisboa
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Outline

- Background Information
- NWC SAF production regions at IPMA
- Detected problems/unexplained issues
- Remarks/Suggestions

Background Information

IPMA is a user of NWC SAF products:

- ✓ Beta–user since end of 2002;
- ✓ Licensee since June 2004.

Much easier to install nowadays (MSG and PPS software packages)!

Excelent Help desk tool.

Background Information

NWC SAF software packages currently run:

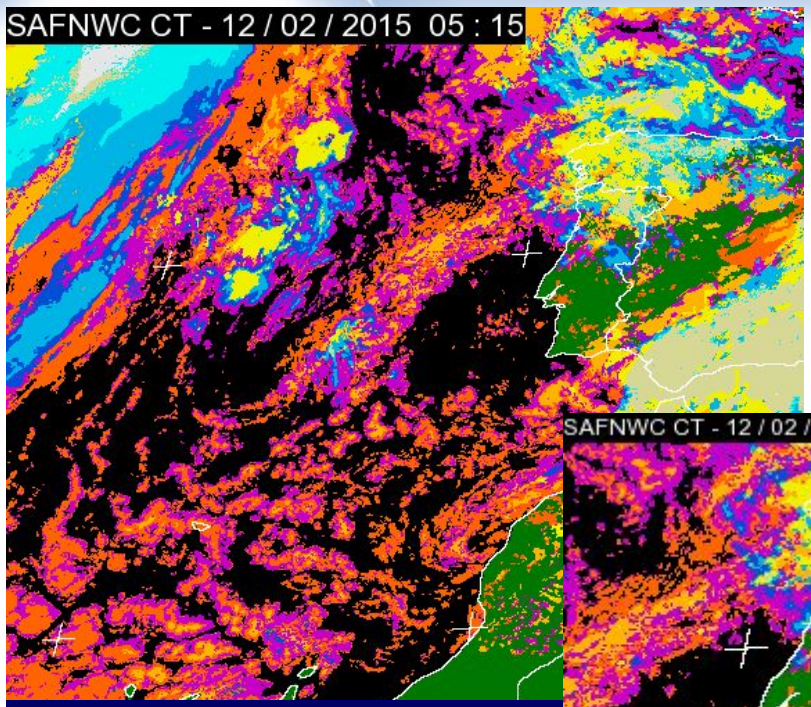
- **MSG**: LSA SAF & Forecasting Centres

  v2012; OS: Fedora Core 13

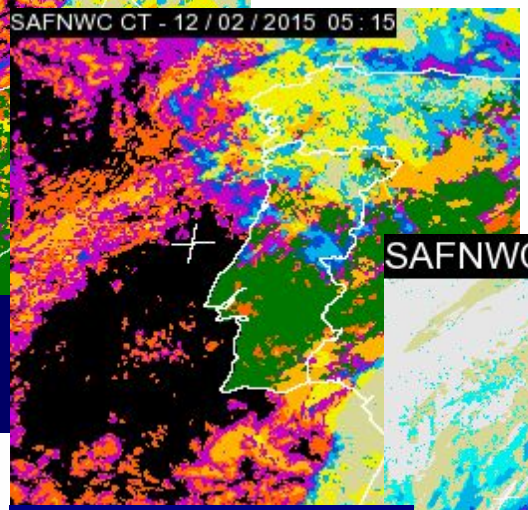
- **PPS**: LSA SAF & Forecasting Centres

  v2014; OS: CentOS 6.4 (64 bits)

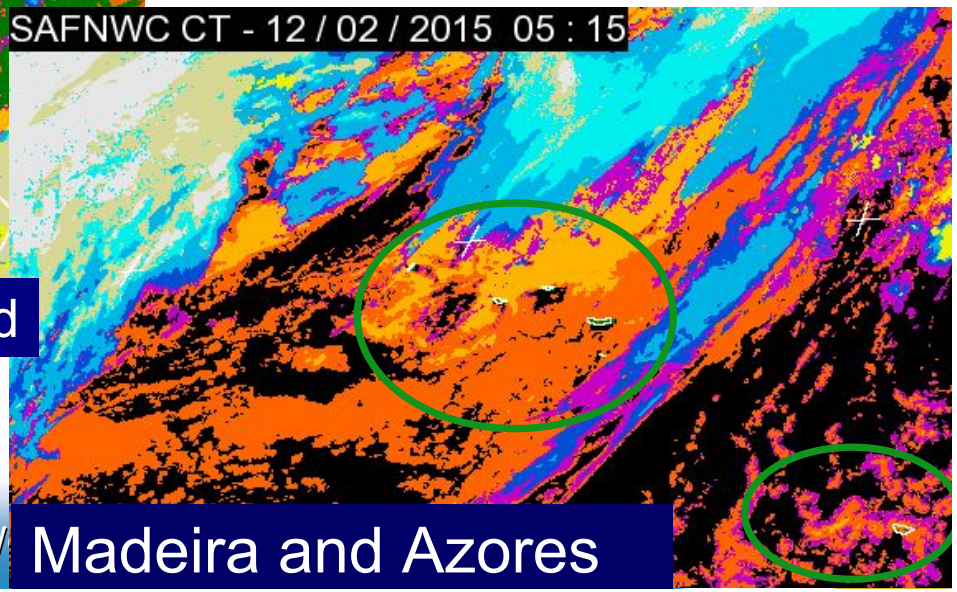
Production Areas - MSG package



Mainland and Madeira



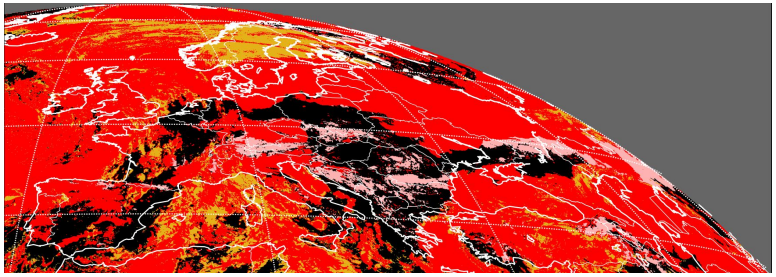
Zoom mainland

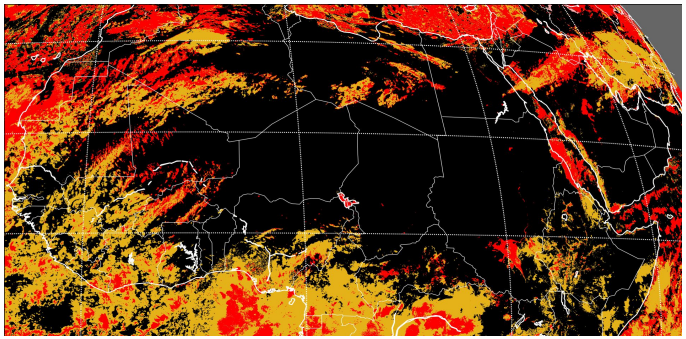


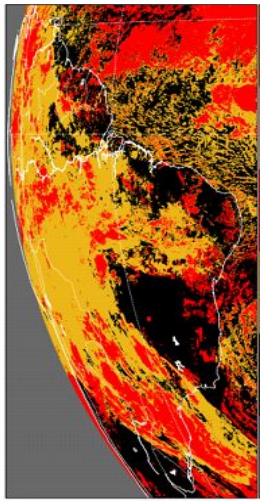
Madeira and Azores

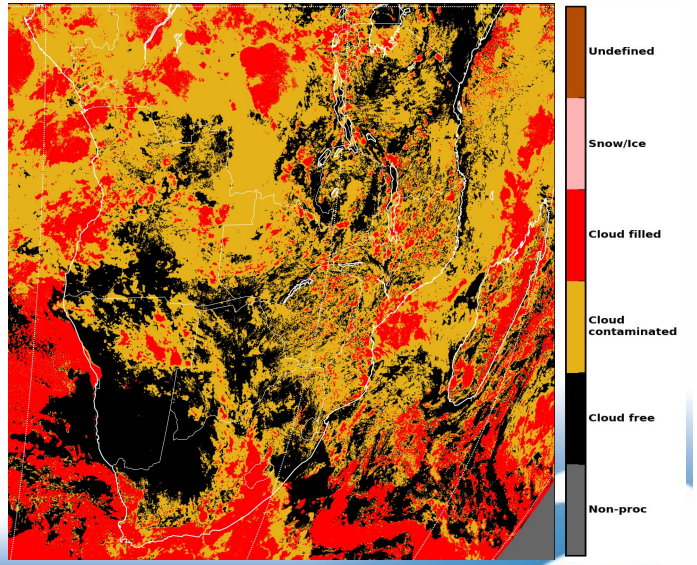
Forecasting Centres – 3 regions

Production Areas - MSG package



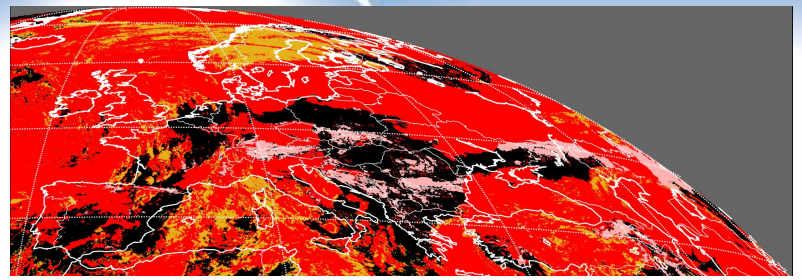


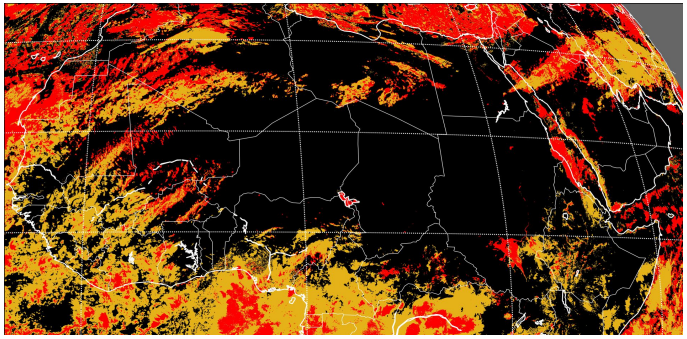


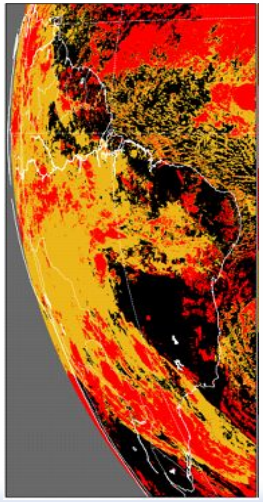


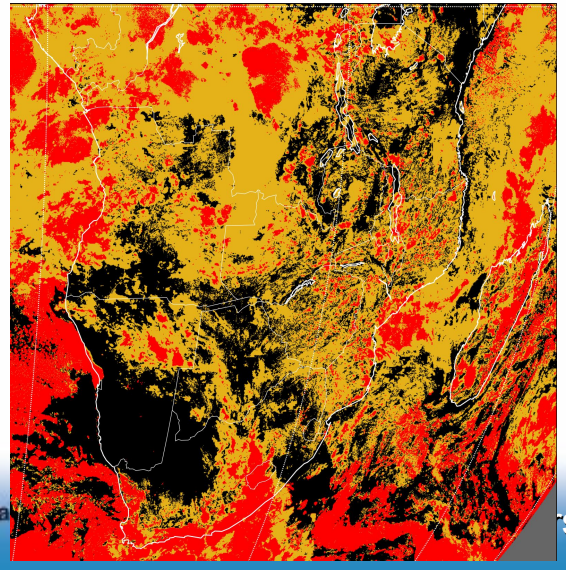
LSA SAF – 4 areas (until 2014)
(former production system)

Production Areas - MSG package



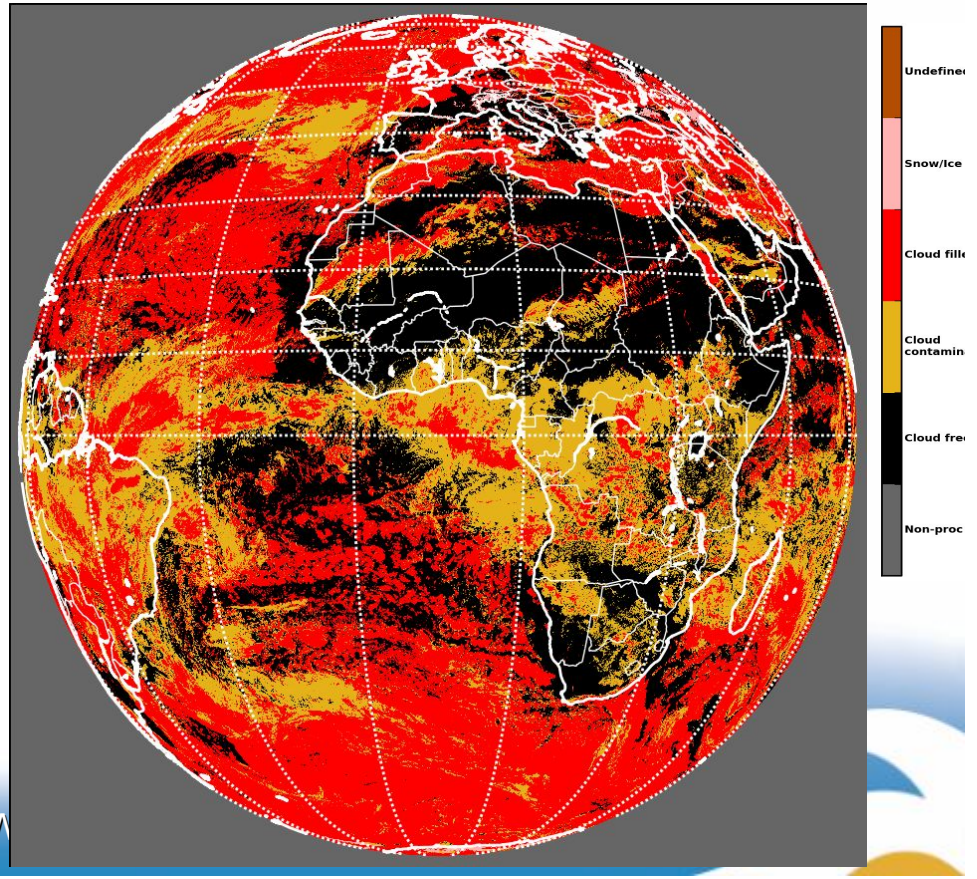






LSA SAF >2014

+ 1 area: FULL Disk
(new processing system)



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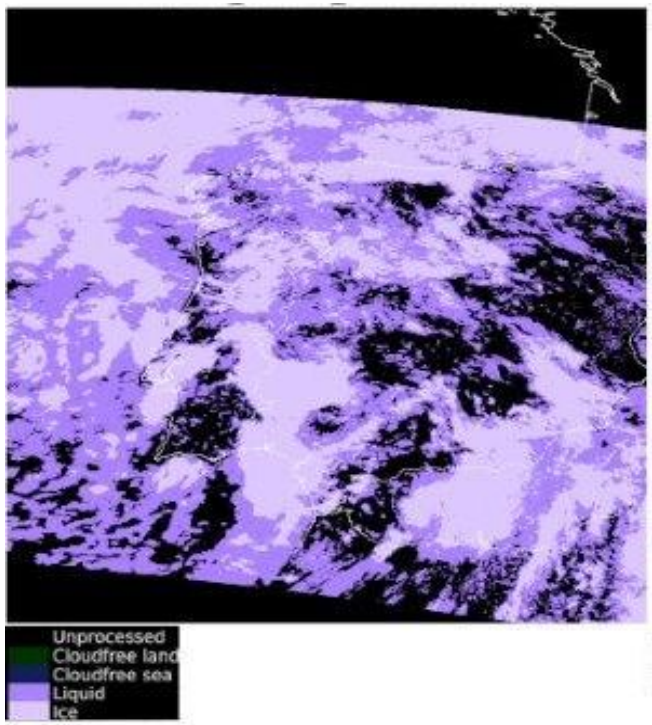
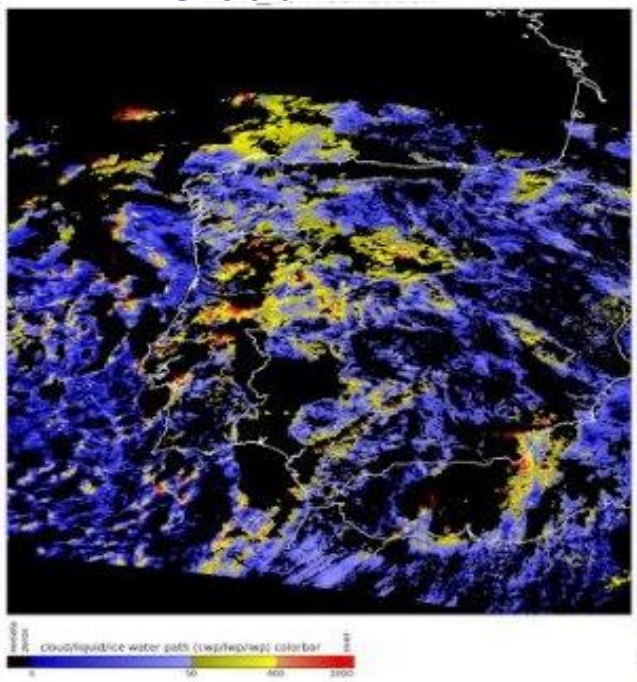
Production Areas - PPS package

• Forecasting centres: Global metop data reprojected into a region (metop A & B)

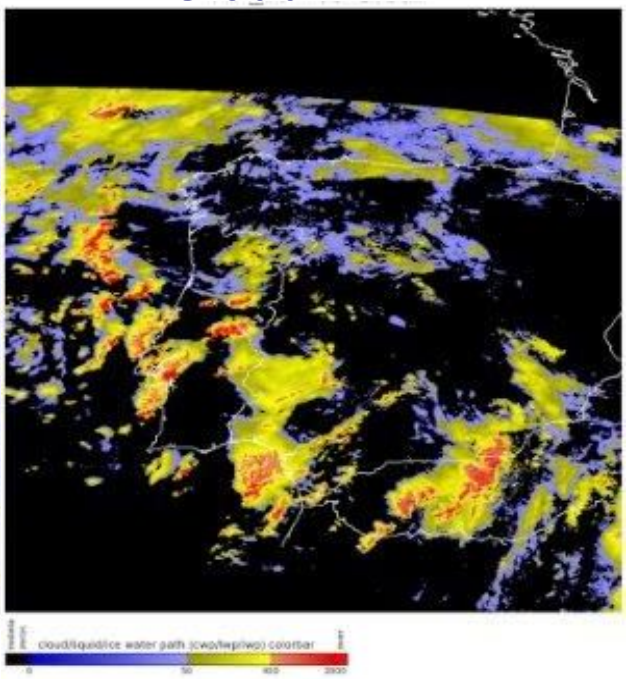
Cloud Phase



Cloud LWP

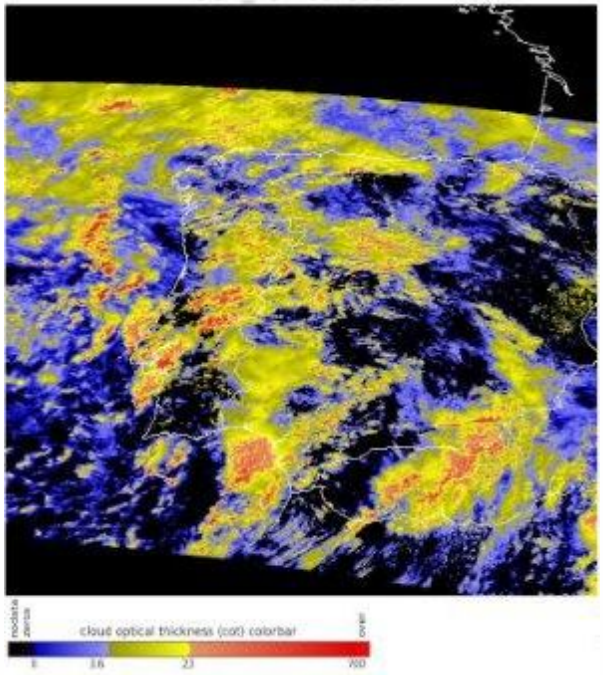


Cloud IWP

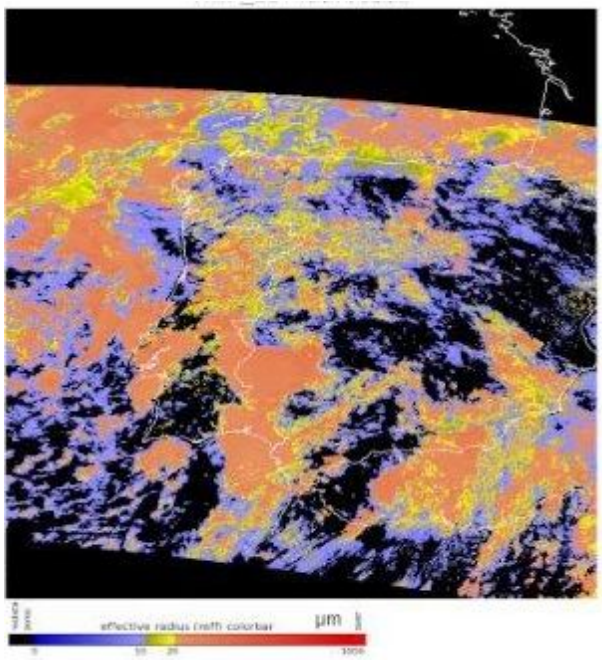


Production Areas - PPS package

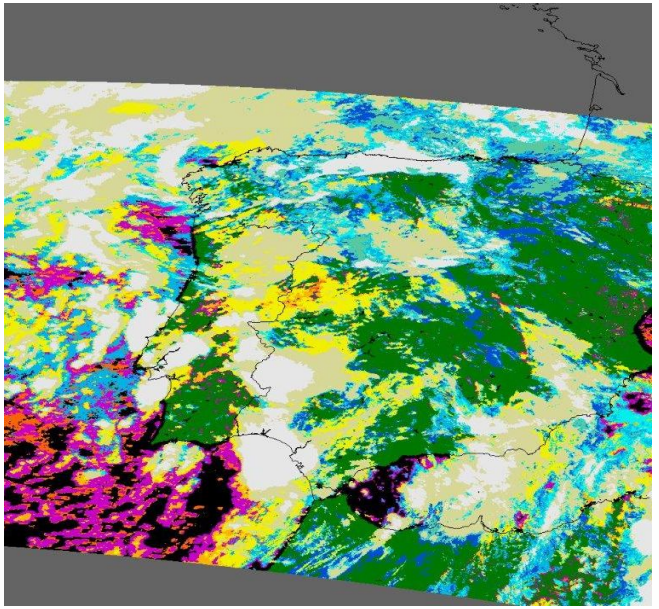
Cloud Opt Thickness



Effective Radius



Cloud Type

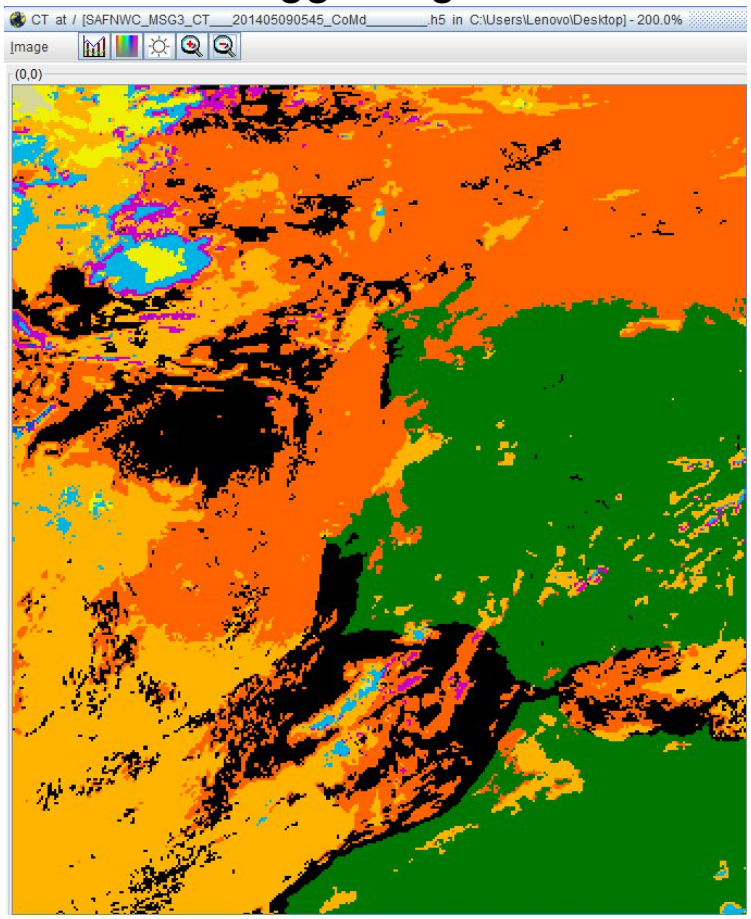


LSA SAF: Global metop data to generate **cloud mask** each 3 min. (metop B)

Detected Problems/Unexplained issues

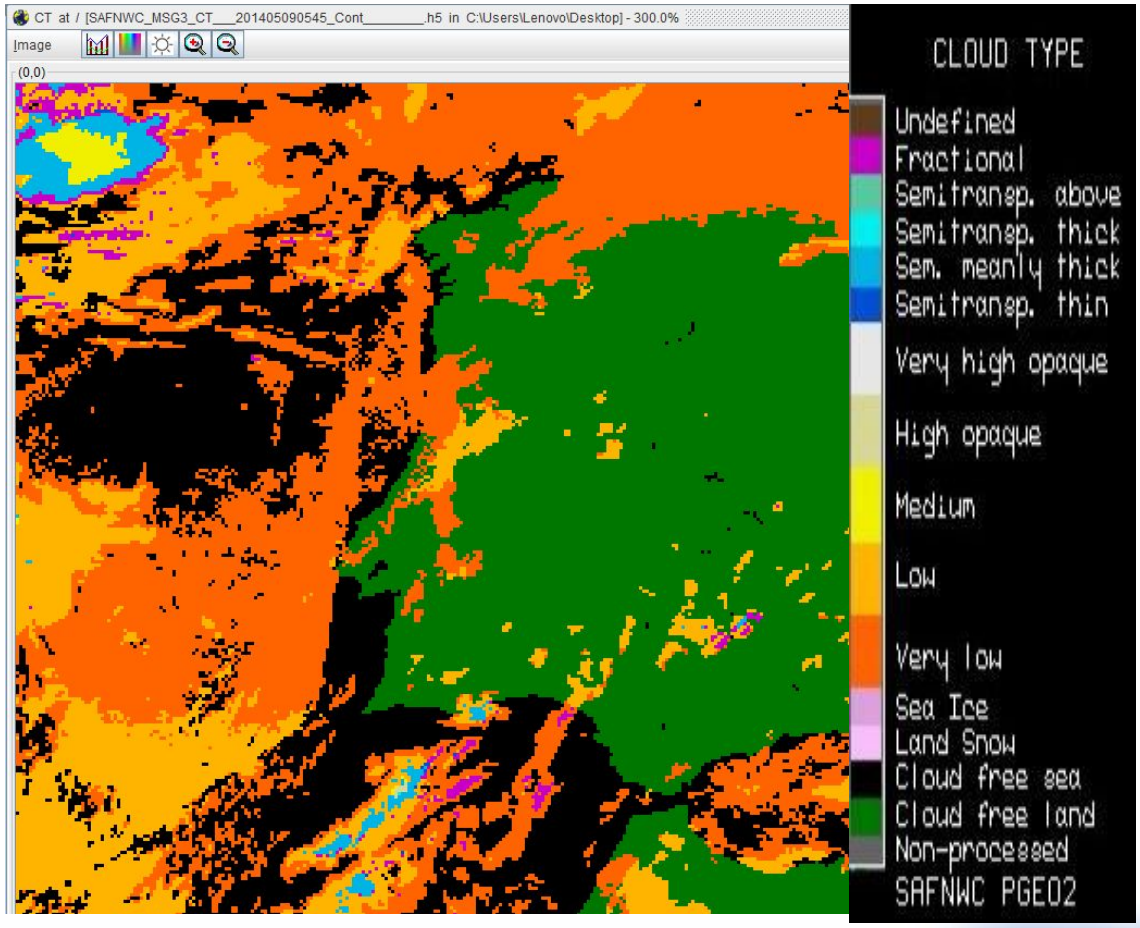
Different areas = Different masking

Bigger region



05:45 UTC

Smaller region - zoom mainland

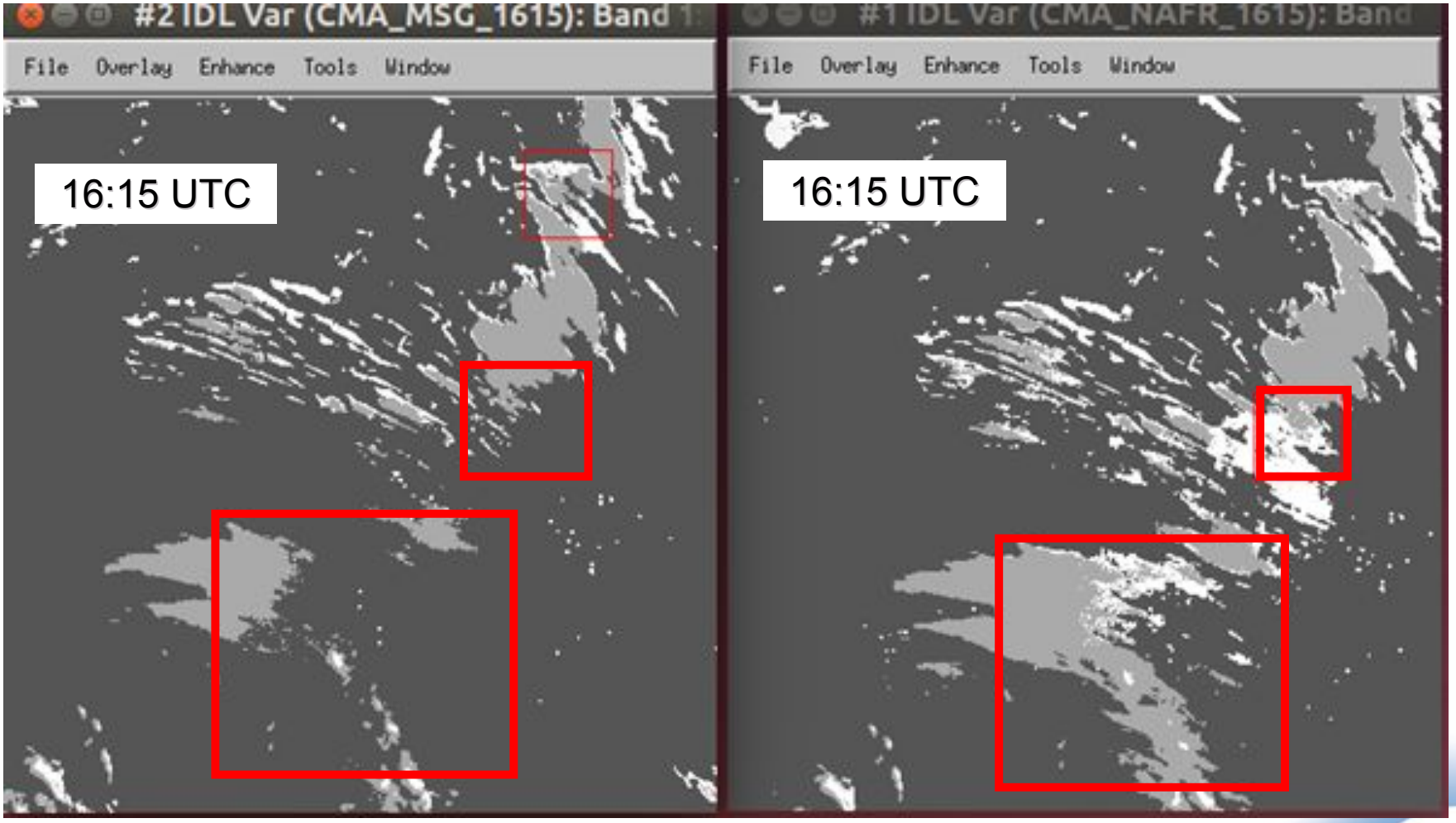


05:45 UTC

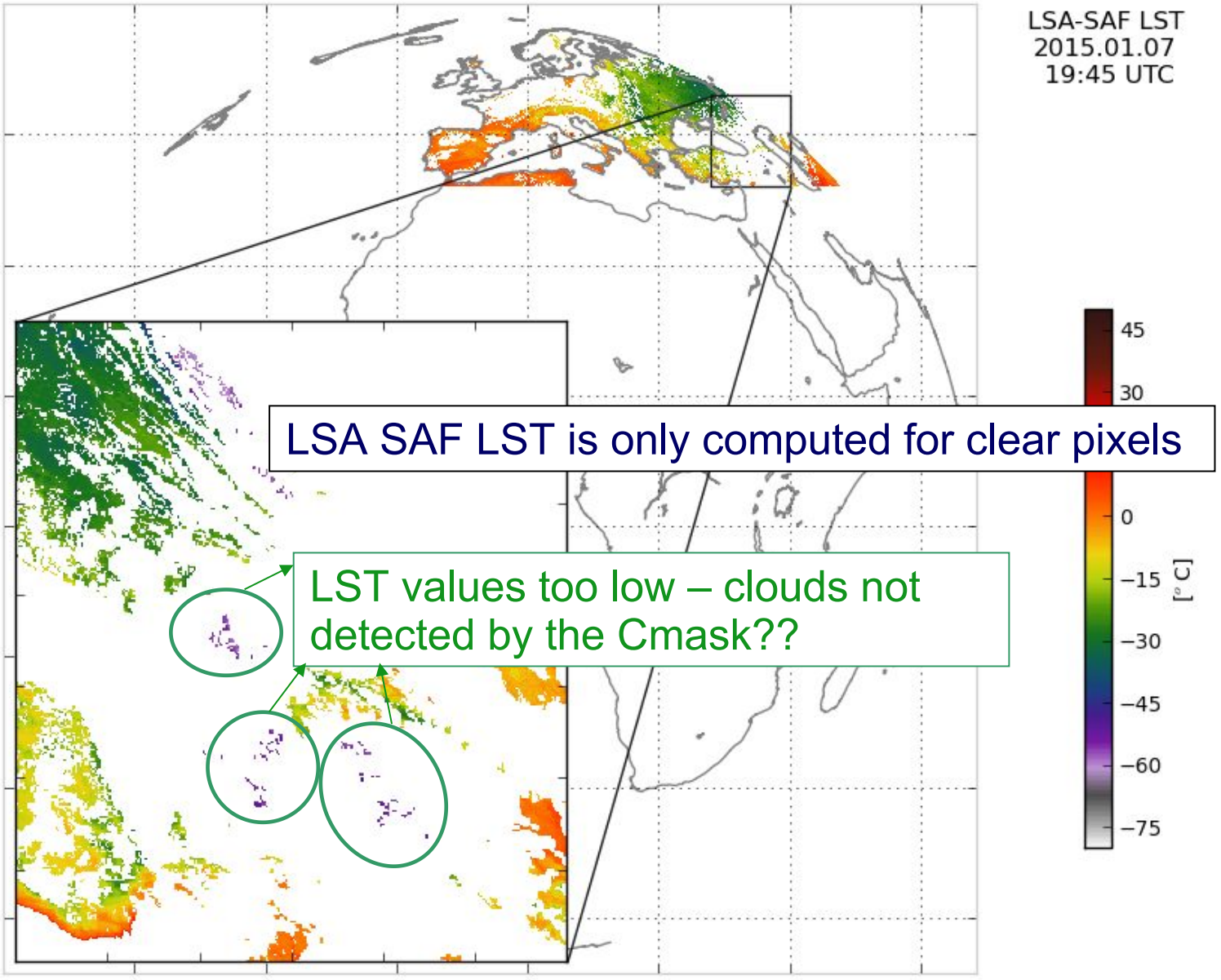
Different areas = Different masking

Full Disk Region

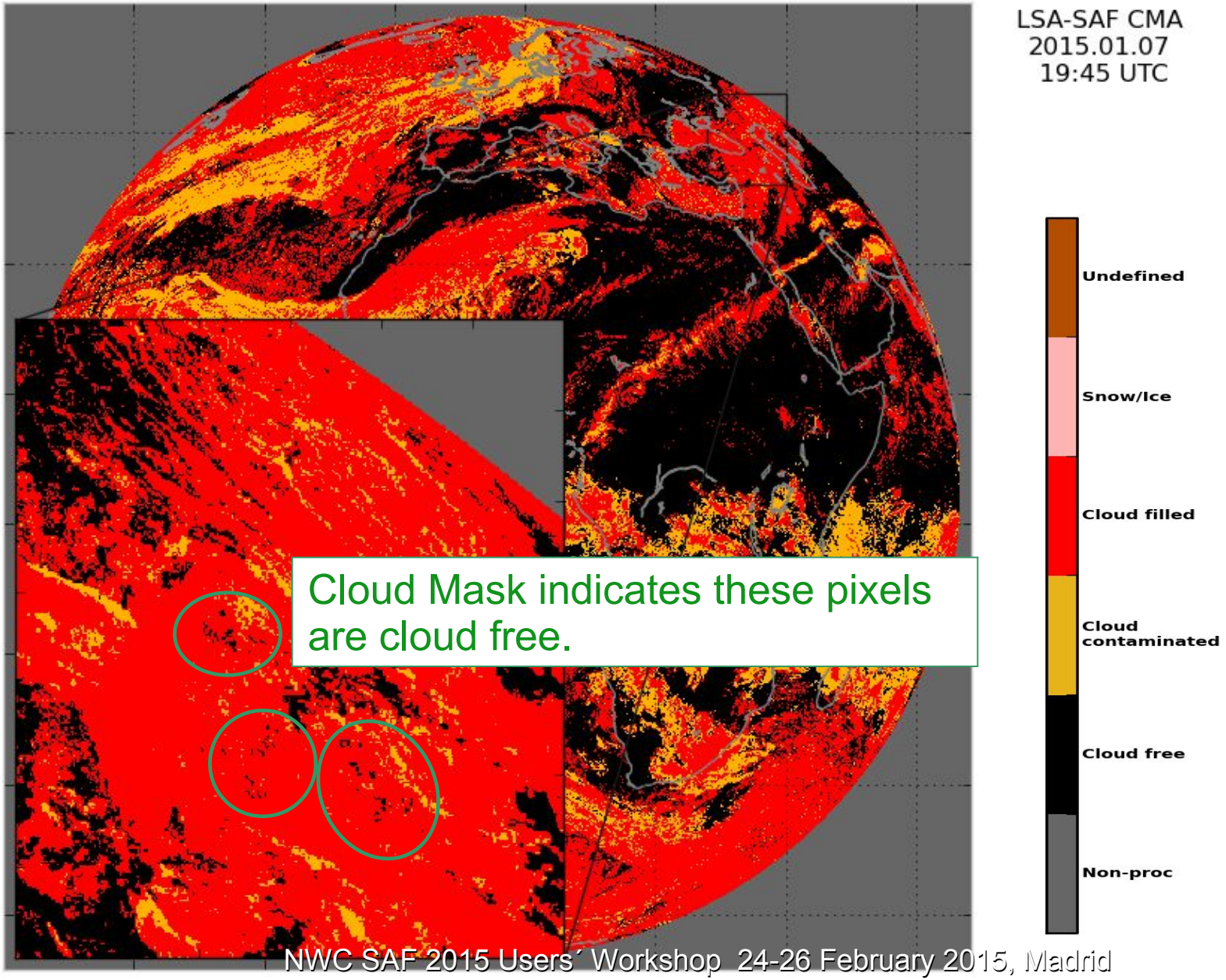
North Africa Region



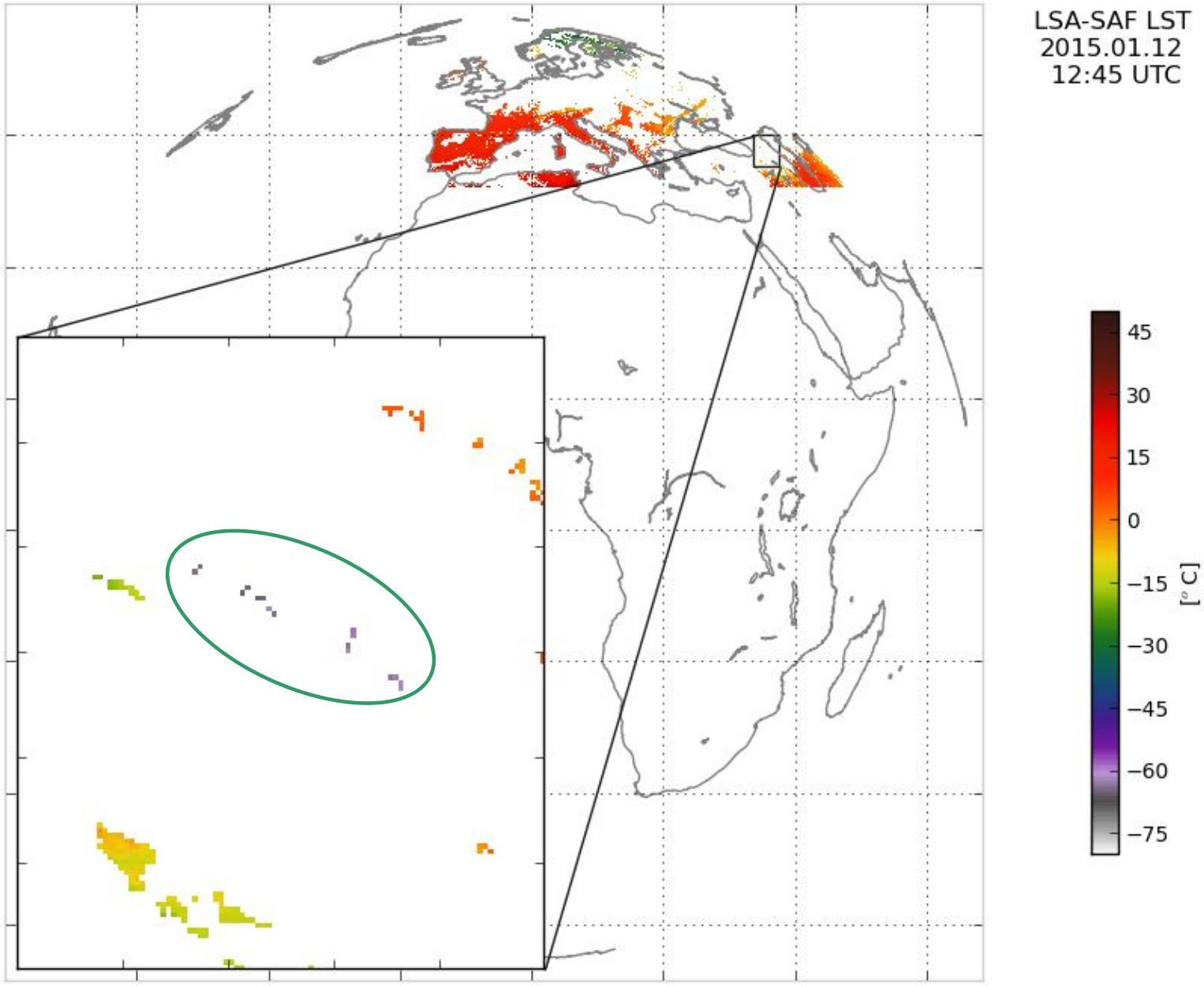
Errors in LSA SAF LST product:Nighttime



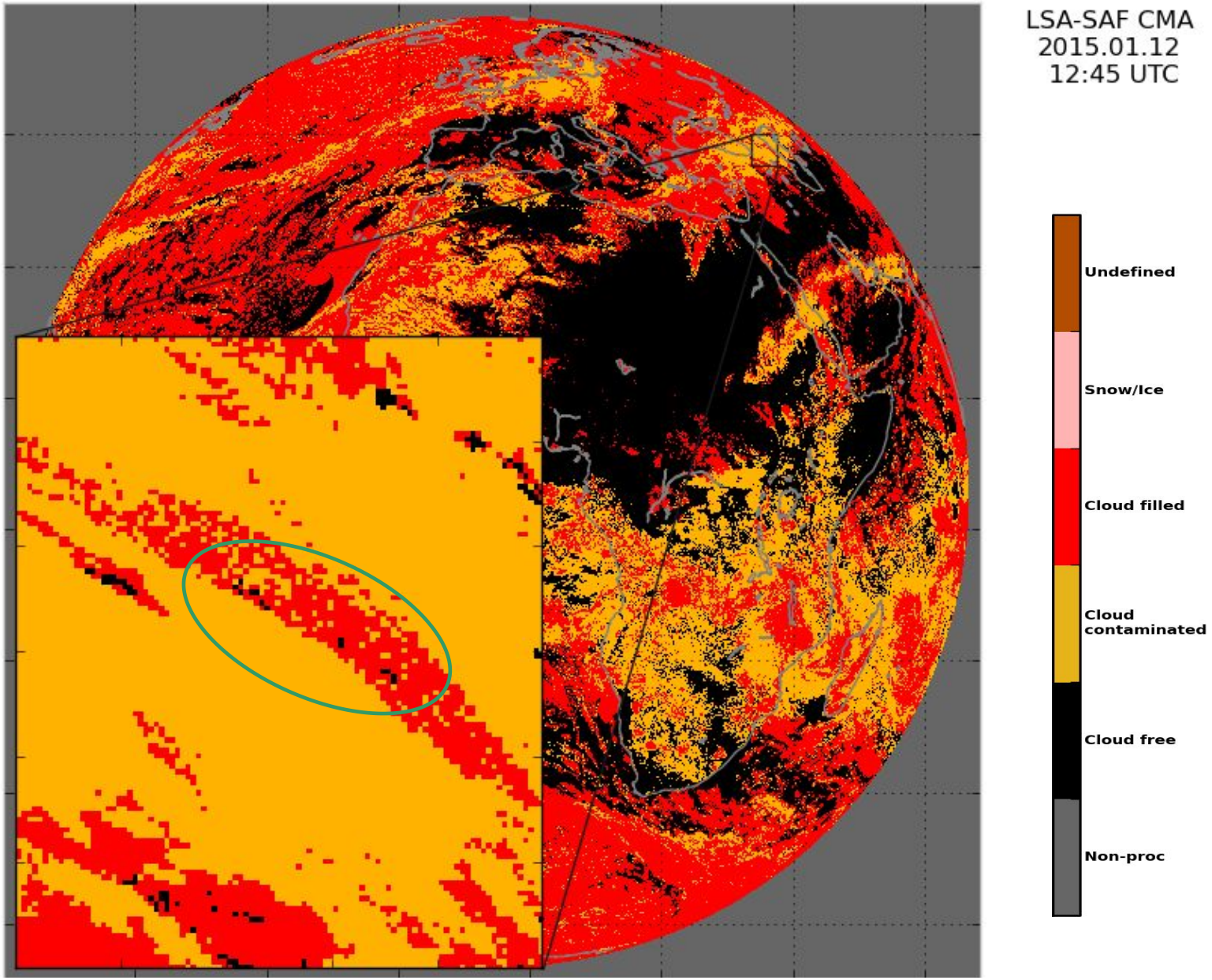
Errors in LSA SAF LST product:Nighttime



Errors in LSA SAF LST product:Daytime



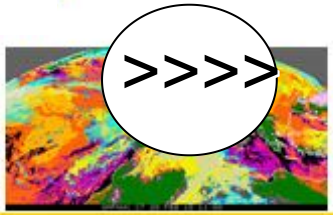
Errors in LSA SAF LST product:Daytime



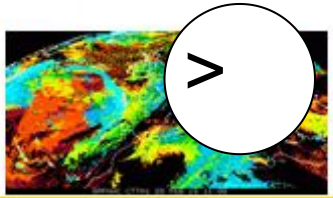
NWC SAF-MSG products usage at IPMA´s forecasting centres

Cloud Mask

Cloud Type



Cloud Top Temperature and Height

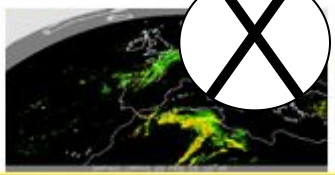


MSG Precipitation Products

Precipitating Clouds

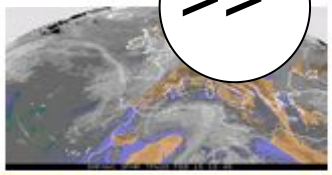
Convective Rainfall Rate

Prec. Prod. Cloud Physical Properties

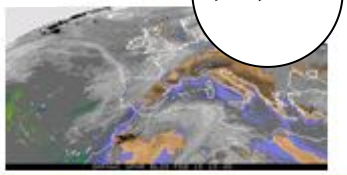


MSG Clear Air Products Physical Retrieval

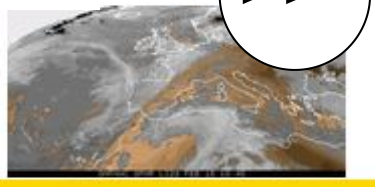
Total Precipitable Wat
(Description)



Layer Precipitable Wate
(Description)



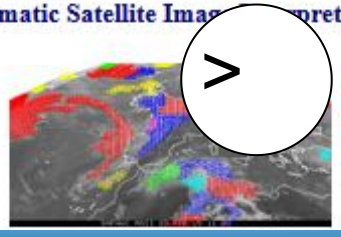
Stability Analysis Image



MSG Winds, Conceptual Model and Convection Products

High Resolution Winds

Automatic Satellite Imag pretation Rapid Development Th ms



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NWC SAF-MSG products usage in the forecasting centres

Fog is a very common weather event affecting the Portuguese territory:

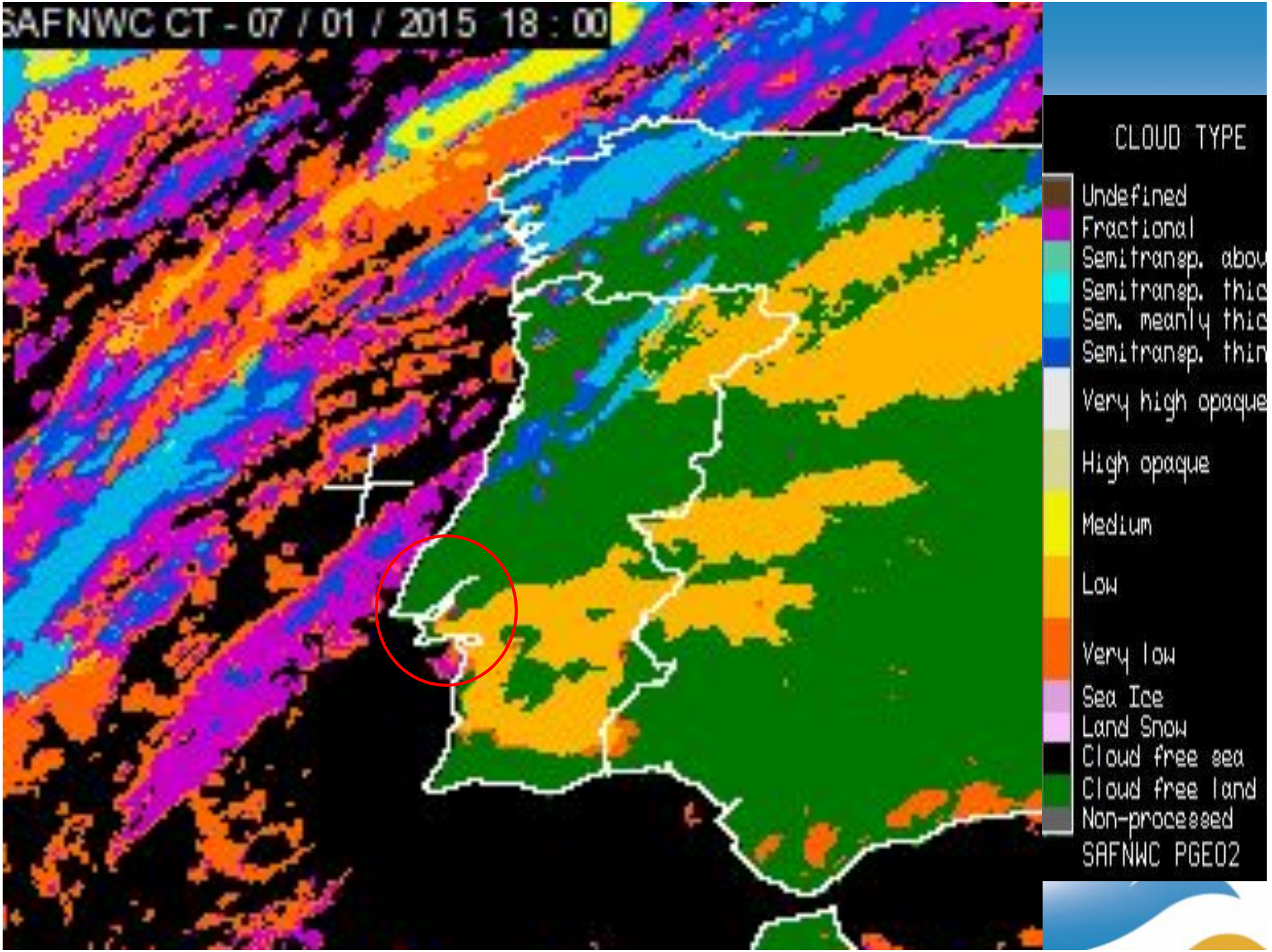
During summer, fogs are more frequent along the coast (west);

Winter fog in Portugal occurs mostly inland, in particular at river valleys (Tejo and Douro rivers).

NWC SAF Cloud Type product is intensively used both during summer and winter to identify very low cloud/fog regions.

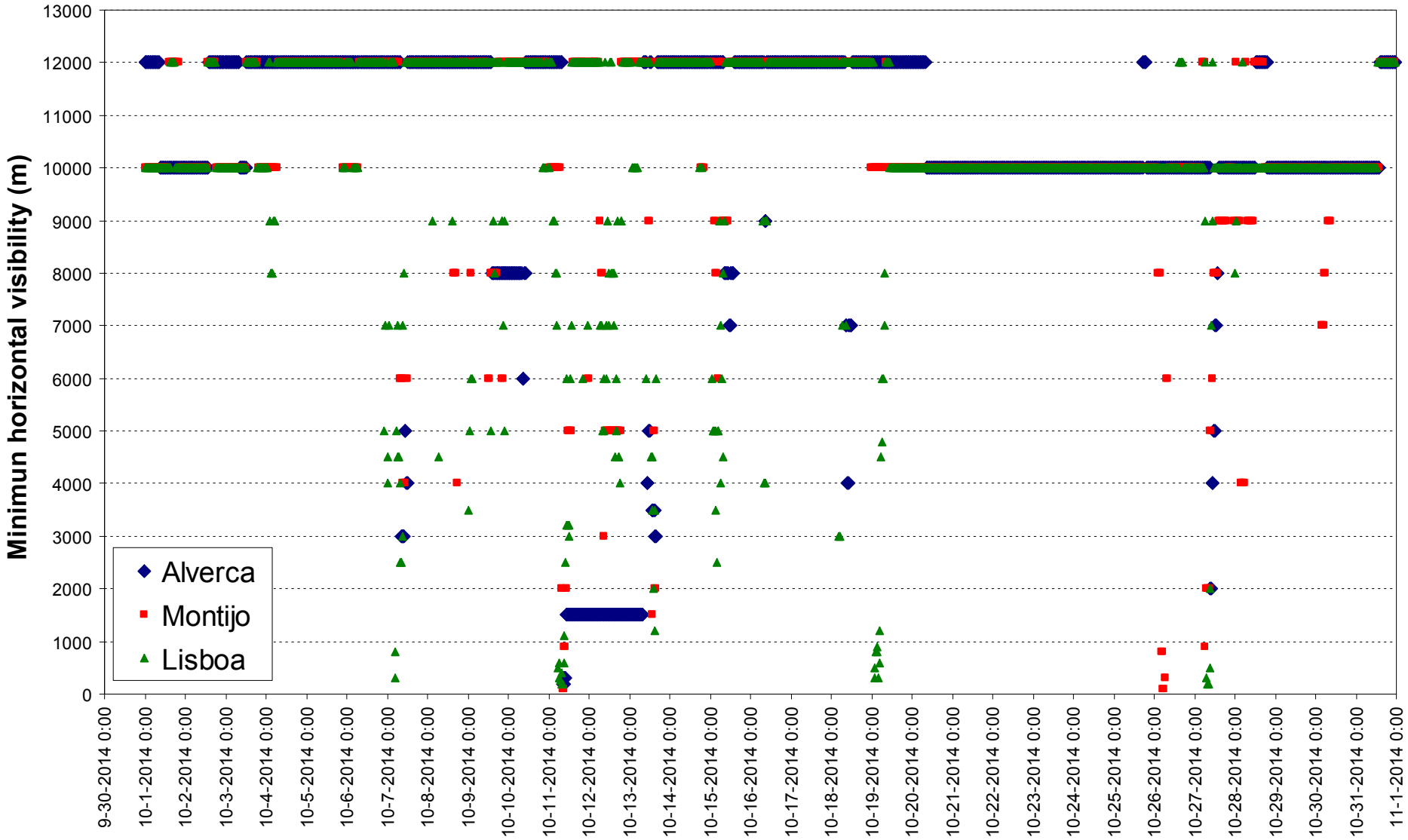
Bridge over tagus river, Lisbon.
Source: *http://boas-ofertas.blogspot.pt*

Since December 2014, 2 yelllow warnings (> 48 h) and 1 orange warning (> 72h) for fog were issued.

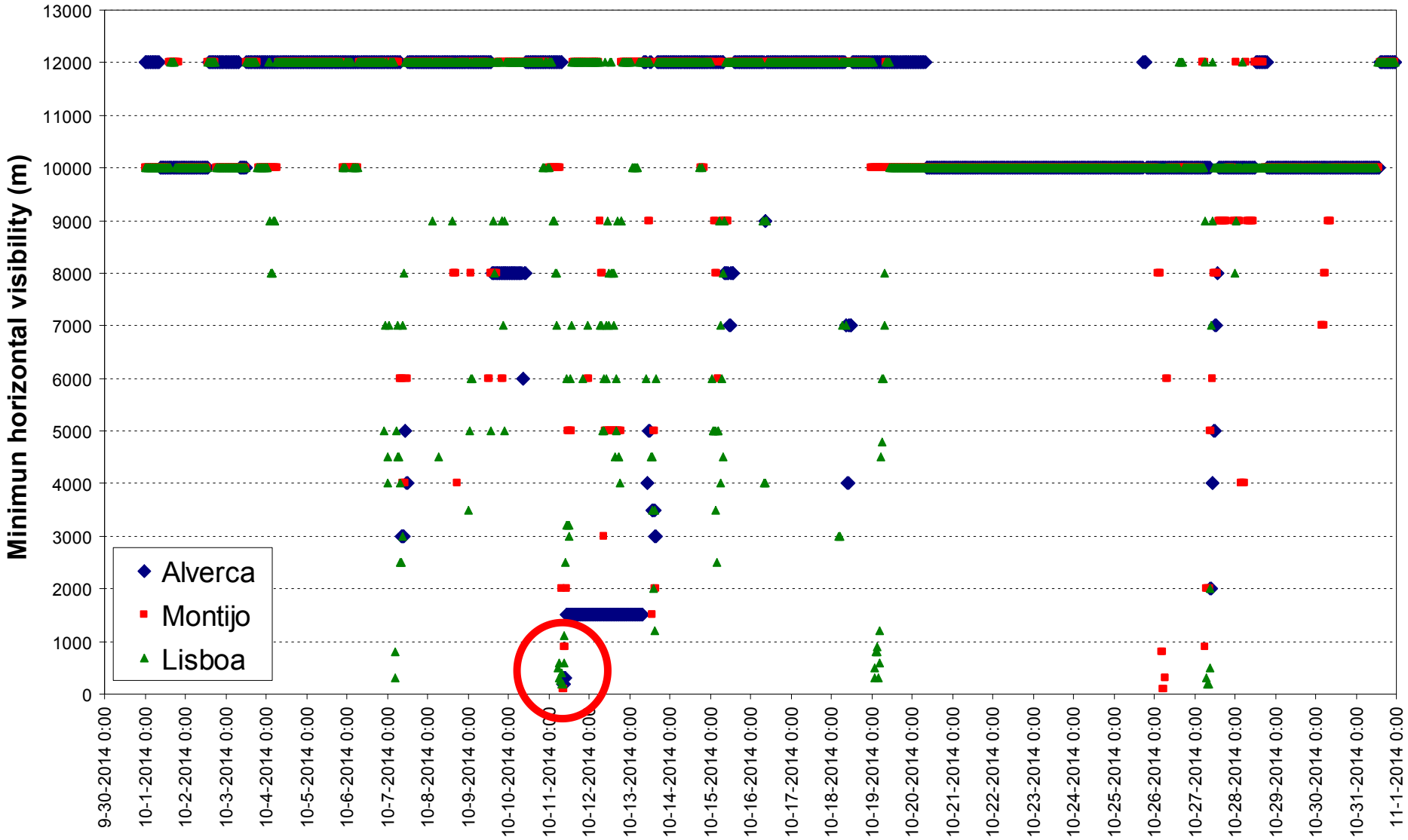

SAFNWC CT - 07 / 01 / 2015 18 : 00
CLOUD TYPE
Undefined
Fractional
Semitransp. abov
Semitransp. thic
Sem. mearly thic
Semitransp. thin
Very high opaque
High opaque
Medium
Low
Very low
Sea Ice
Land Snow
Cloud free sea
Cloud free land
Non-processed
SAFNWC PGE02

3 close aerodromes: Lisboa, Alverca and Montijo

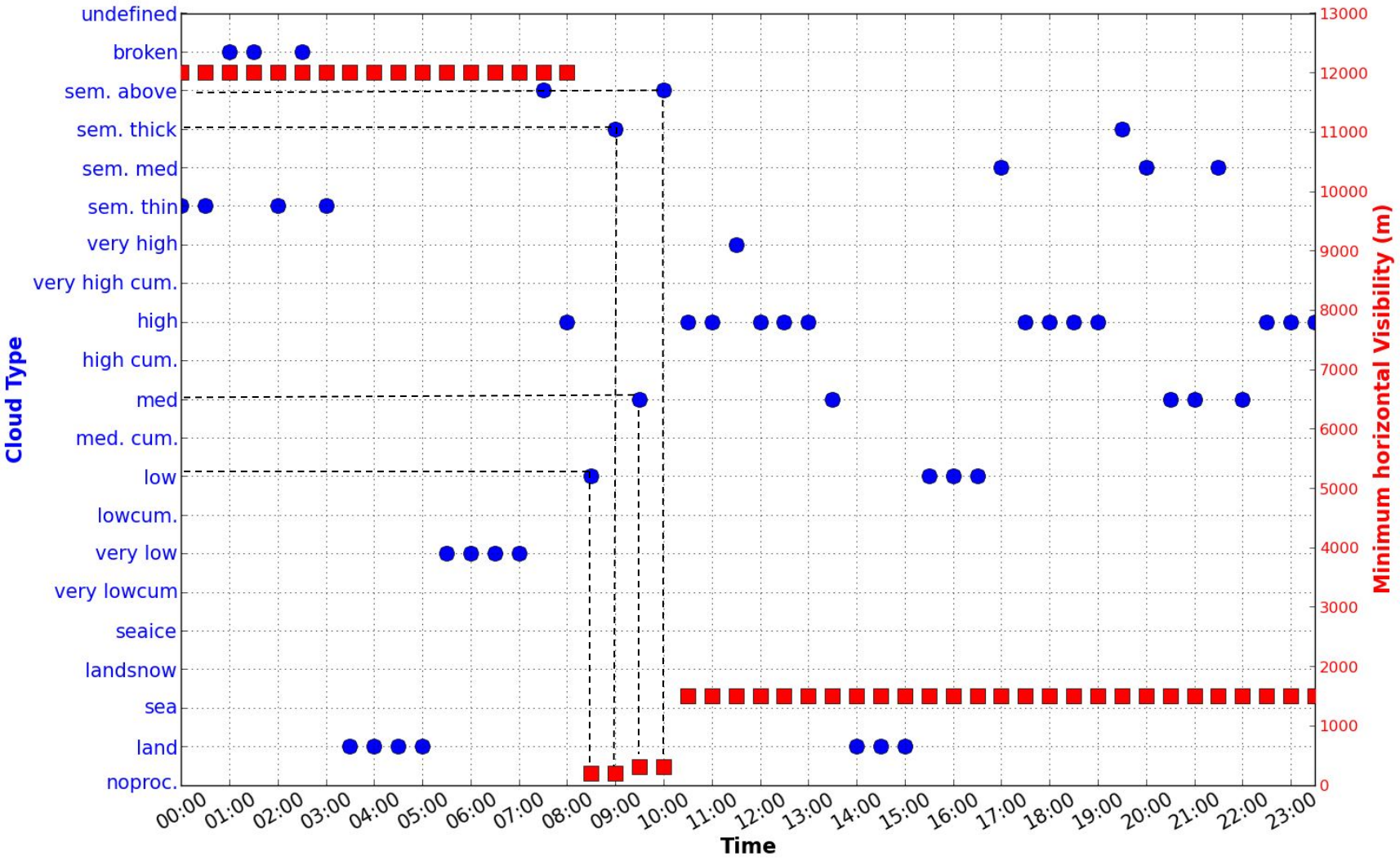
Possible fog conditions: October 2014



Possible fog conditions: October 2014



Alverca


undefined
broken
sem. above
sem. thick
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very high
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low
lowcum.
very low
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seaice
landsnow
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Cloud Type
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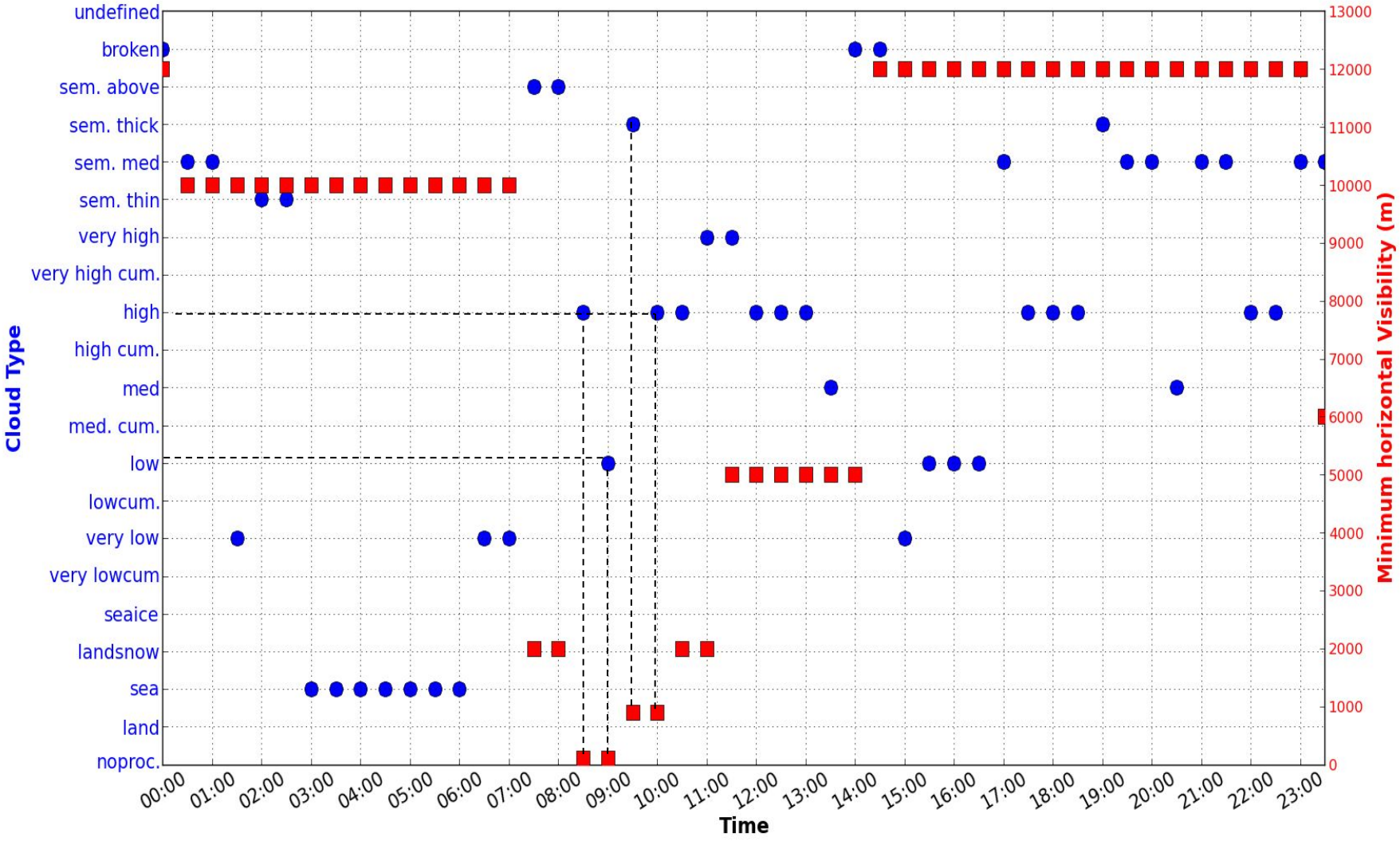
0
Minimum horizontal Visibility (m)

Montijo


undefined
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sem. above
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very high
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low
lowcum.
very low
very lowcum
seaice
landsnow
sea
land
noproc.
Cloud Type
13000
12000
11000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Minimum horizontal Visibility (m)
00:00
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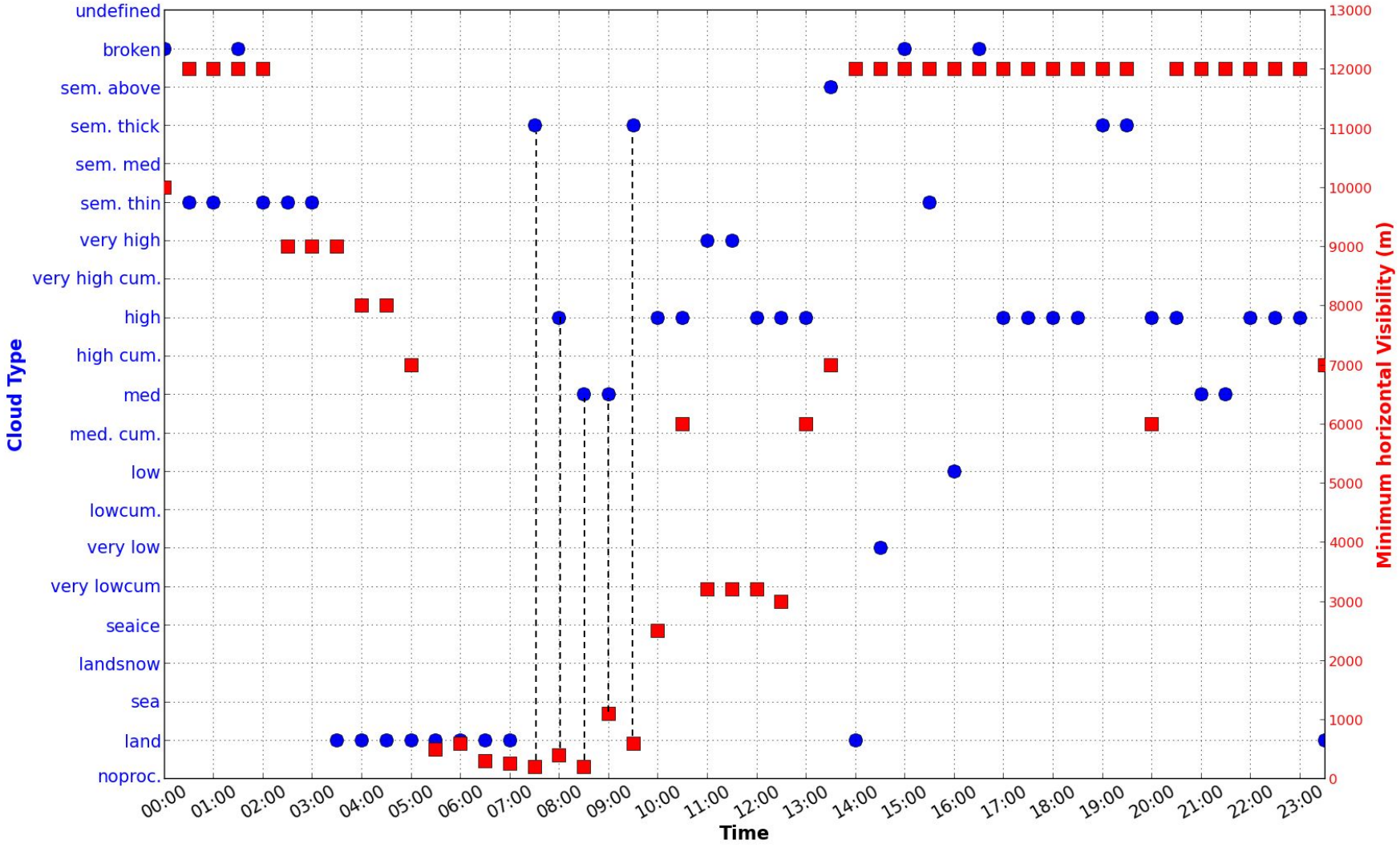
Time

Lisboa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lowcum.
very low
very lowcum
seaice
landsnow
sea
land
noproc.
Cloud Type
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02:00
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06:00
07:00
08:00
09:00
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Time
13000
12000
11000
10000
9000
8000
7000
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3000
2000
1000
0
Minimum horizontal Visibility (m)

Summary

NWC SAF Cloud Type product helps to identify regions of very low cloud/ fog regions;

However for the studied period (one-month) no matching between surface observations at 3 locations and cloud type product classification was found.

Possible reasons:

- accuracy of MSG images retification?
- need to use NWP data at higher resolution (currently ECMWF)?
- NWC SAF Land/Water MASK?
  - inland water/big lakes need to be better represented?

Remarks and suggestions

CMa & Ctype

- cloud screening improvement (in particular over very cold surfaces);
- better identification of very low clouds/fogs;
- better identification of thin cirrus clouds;
- What size of region should be used to ensure the best/more realistic results?

Remarks and suggestions

PPS Cloud Physical Properties (CPP)

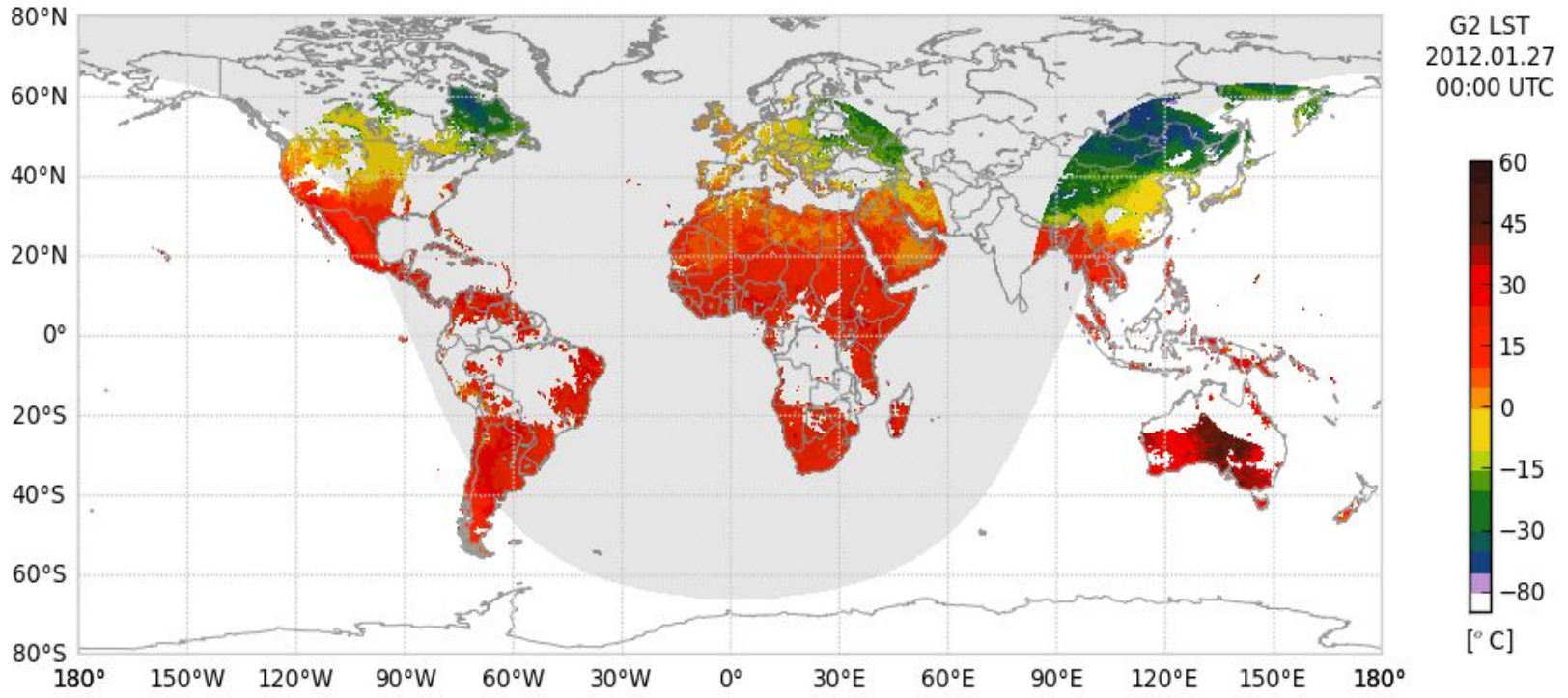
- More training material/case studies on CPP products;
- ex: include better explanations of the colorbars (very important for new users)
- homogeneity of the colorbars between GEO and PPS products for CPP products;

RDT product:

- include information about cloud microphysics (v2016);
- Convective patterns (U-shape, v-shape, cold ring);
- Looking forward for the Convective Initiation product.

Copernicus Global Land & MACC

GOES - R and Himawari



NWC SAF version 2016

Thank you!

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NWC SAF 2015 Users´ Workshop

24-26 February 2015, Madrid