



ECA

European Cockpit Association

The urgent need for weather in ATM

Klaus Sievers

VC Germany

13/11/2018

Klaus.Sievers@Vcockpit.de

Thematic challenge 3

Efficient provision and use of meteorological
information in ATM

A word about pilots' organizations.....



IFALPA, Montreal < > ICAO (observer status)

ECA, Brussels < > European institutions

VC, Frankfurt < > national issues



ECA

European Cockpit Association

Weather for ATM: Overview

> issues

>Case Studies



>Elements of a solution



>Conclusion

Weather for ATM: path to improvement

1. Step > modern, tailored weather information to be made available to Eurocontrol NM, Centers, controllers and pilots.
2. Step > Wx cell at Eurocontrol, with meteorologists integrated in enhanced decision making, including flow measures due to weather
3. Step > build an appropriate, accessible European aviation weather platform with science, ATM and cockpit focus

1 + 2 + 3 = investment is needed !

Thematic challenge 3

Efficient provision and use of meteorological
information in ATM



ECA

European Cockpit Association

Weather for ATM: apparent issues

1. Problem > **No** modern, tailored weather information is available to Eurocontrol NM, Centers, controllers and pilots:
2. Problem > **No** Wx cell at Eurocontrol, with real meteorologists providing science-based WX guidance to ATM
3. Problem > **No** appropriate, accessible European aviation weather platform with science and ATM focus

1 + 2 + 3 contribute to excessive delays and disruptions of air traffic in Europe.

SHORT CASE STUDIES

Title event – Date, Place



ECA

European Cockpit Association

23/10/2018
12:09 26 UTC

TARGET DATE: 23/10/2018
23/10/2018 SET
D (TACTICAL)

SEARCH
Username: guest

Resources & Services
Post-Operations
Tactical
PreTactical
Strategic

Initial Network Plan
Network Plan
Map of Europe showing flight paths and network status.

Network Static Map
Network Static Map (IE7/8)
ATFCM Measures (Scenarios)
Scenarios aim at the optimisation of capacity across the European Network of ACCs.

Scenario List
Network Axis Management
Involvement of ACCs in the axes processes

Network Headline News
Latest News
23OCT 12:00 Tactical update
16OCT 12:26 "Show Forecast" update from NM22.5 in CHMI / NOP PREDICT interface
15OCT 08:23 NM22.5 Release migration planned to start on 13/11/2018 CHMI Software is available
09OCT 15:21 Istanbul New Airport - Update 09/10/18

Network Events
Tuesday, 23 October 2018
Month Day
Show only starting events
Select Types
LPPC
MADEIRA- Porto Santo radar replacement, 18/10/2018 00:00 - 19/04/2019 23:59
LIMMUIR, LDZOFIR, LIBBFIR, LIRRFIR, LIMMFIR, LIBBUIR, LIRRUIR
NATO CROSS-SERVICING Exercise, 22/10/2018 11:30 - 25/10/2018 10:00
LIRF
Apron block 800 expansion, 17/09/2018 07:00 - 27/10/2018 14:00
GCTS
Apron surface renovation, 29/08/2017 00:00 - 31/12/2019 23:59
EGLL

TeleWebEx conferences
Customers will be invited via AIM or Headline News to join a Tactical Briefing targeted towards adhoc situations as they occur.
These conferences may be in the form of a web conference via WebEx or a teleconference via InterCall.
* For the WebEx conference click here
* For the teleconference dial +32 2801 0103. This required PIN will be published via AIM and/or Headline News.

Claims
Central Claim Management System (CCMS) Log in
CCMS Web

Contacts
Depending on the nature of your enquiry you can get direct contact with the NM or make a search on the Agency Contacts page
Network Operations & NM - All Contacts
EUROCONTROL Contacts
Portal Assistance

Current Network Situation
Last update: 23/10/2018 12:00
Map of Europe showing current network status.

ATFCM Network Situation Data
Last update: 23/10/2018 12:08
Flights
Total: 29,064
Landed: 11,535 (40%)
Airborne: 4,943 (17%)
Expected: 12,586 (43%)
Delays (in minutes)
Cumulated: 33,246.0
Average/Flight: 1.1
En-route: 12,578 (38%)
Airport: 20,668 (62%)
>= 30 min: 333

Delay Causes
Reason Delay Delay (%)
Aerodrome Capacity 16571 51%
ATC Capacity 7823 24%
Airspace Management 2555 8%
ATC Staffing 2388 7%
ATC Equipment 2041 4%
Weather 1343 4%
Special Event 144 0%
Accident / Incident 0 0%
De-icing 0 0%
Aerodrome Services 0 0%
ATC Ind Action 0 0%

Network Operations Weather Assessment
Network Operations Weather Assessment objective
To support ANSPs and AOs in anticipating, identifying, monitoring and planning for potential severe weather events that may impact ATM capacity.

Daily Update (click here)

delay information

daily weather briefing

Thematic challenge 3

Efficient provision and use of meteorological information in ATM

<https://tinyurl.com/k2yx6gy>



ECA

European Cockpit Association

Daily Eurocontrol Network Weather Assessment

Date : 13 / 05 / 2018

Updated : 13/05, 0430 utc

Ref : AOLO

NM.aolo@eurocontrol.int



General Outlook

WX ALERTS.



Azores **High pressure** system ridging until western Europe and another one W of Scandinavia.

Low pressure system west of Eire with front crossing UK , France and Benelux. ISOL to OCNL CB's expected in Benelux ,Germany, Austria, N-Italy, the Balkans .

EN ROUTE

CONVECTION:

ISOL to OCNL CB's Tops 320
EBBU EHAA EDYY EDUU

ISOL Tops FL350
LFMM

OCNL Tops FL350
LYBB LDZO LOVV

SEVERE CAT >FL290

FL300: 03-21z slight risk NW Britain - S France.
FL350: 00-09z moderate risk Scotland
FL350: 00-21z slight risk Ireland/Britain
N Spain/W France

AIRPORTS:

ENGM 13-18 TSRA
EHAM 08-23 CB's
EDDF 10-23 CB's / TSRA
EDDM 18-02 TSRA
EDDL 17-20 TSRA
LFMN 12-17 TSRA
LSZH 15-20 TSRA
LOWW 11-18 CB's
Milano TMA 12-02 TSRA
GCTS 08-22 G37KTS

May 13, 2018

Daily Eurocontrol Network Weather Assessment

Thematic challenge 3

Efficient provision and use of meteorological
information in ATM

CASE: 13 May



ECA

European Cockpit Association

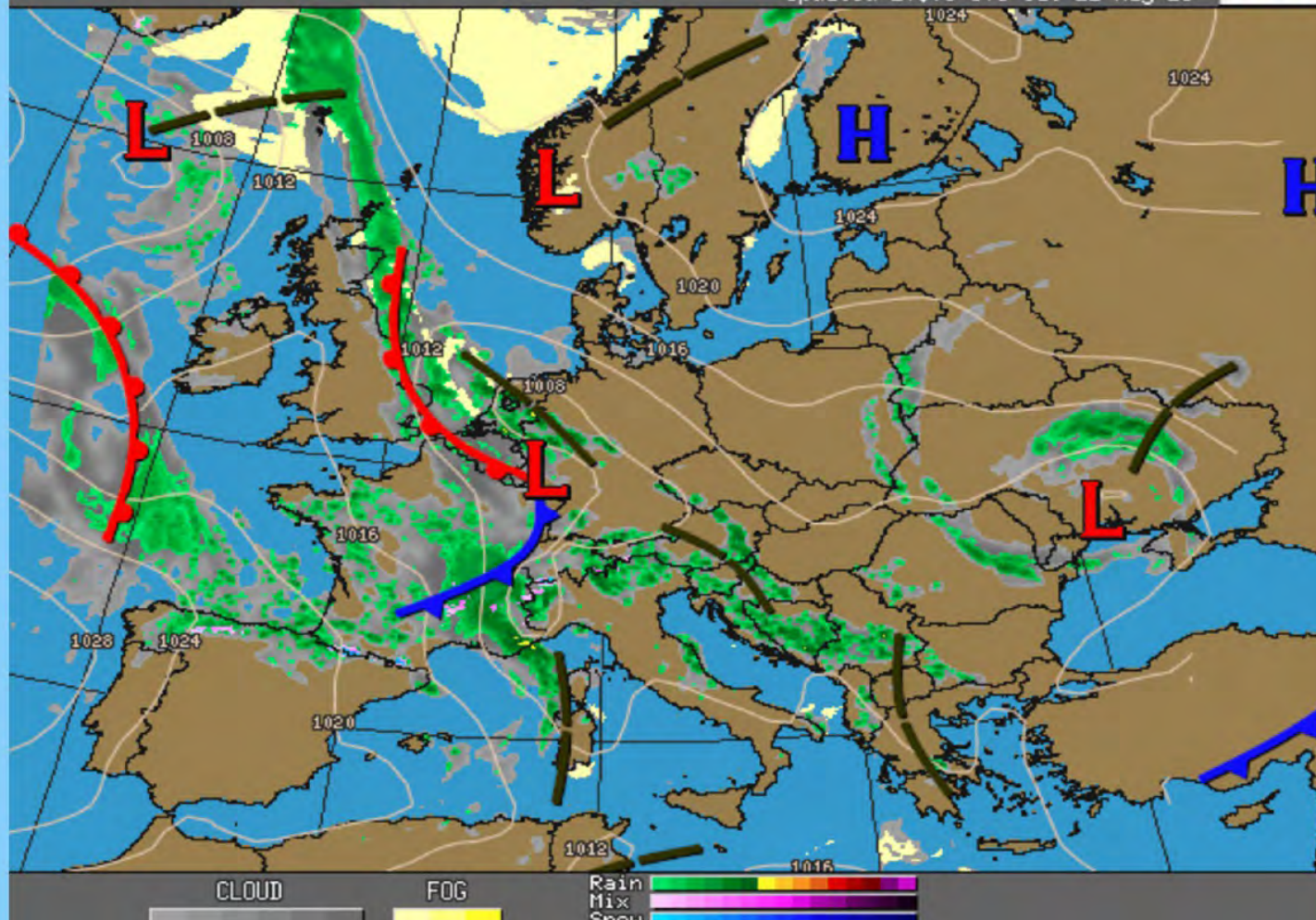
Surface Pressure 12z Next Day

Surface Forecast

Valid: 12:00 UTC Sun 13-May-2018

Updated 10:05 UTC Sat 12-May-18

WSI®



Thematic challenge 3

Efficient provision and use of meteorological
information in ATM

Daily Eurocontrol Network Weather Assessment

Date: 13/05/2018

Updated: 13/05/0430 utc

Ref: AOLO

NM.aolo@eurocontrol.int



ECA

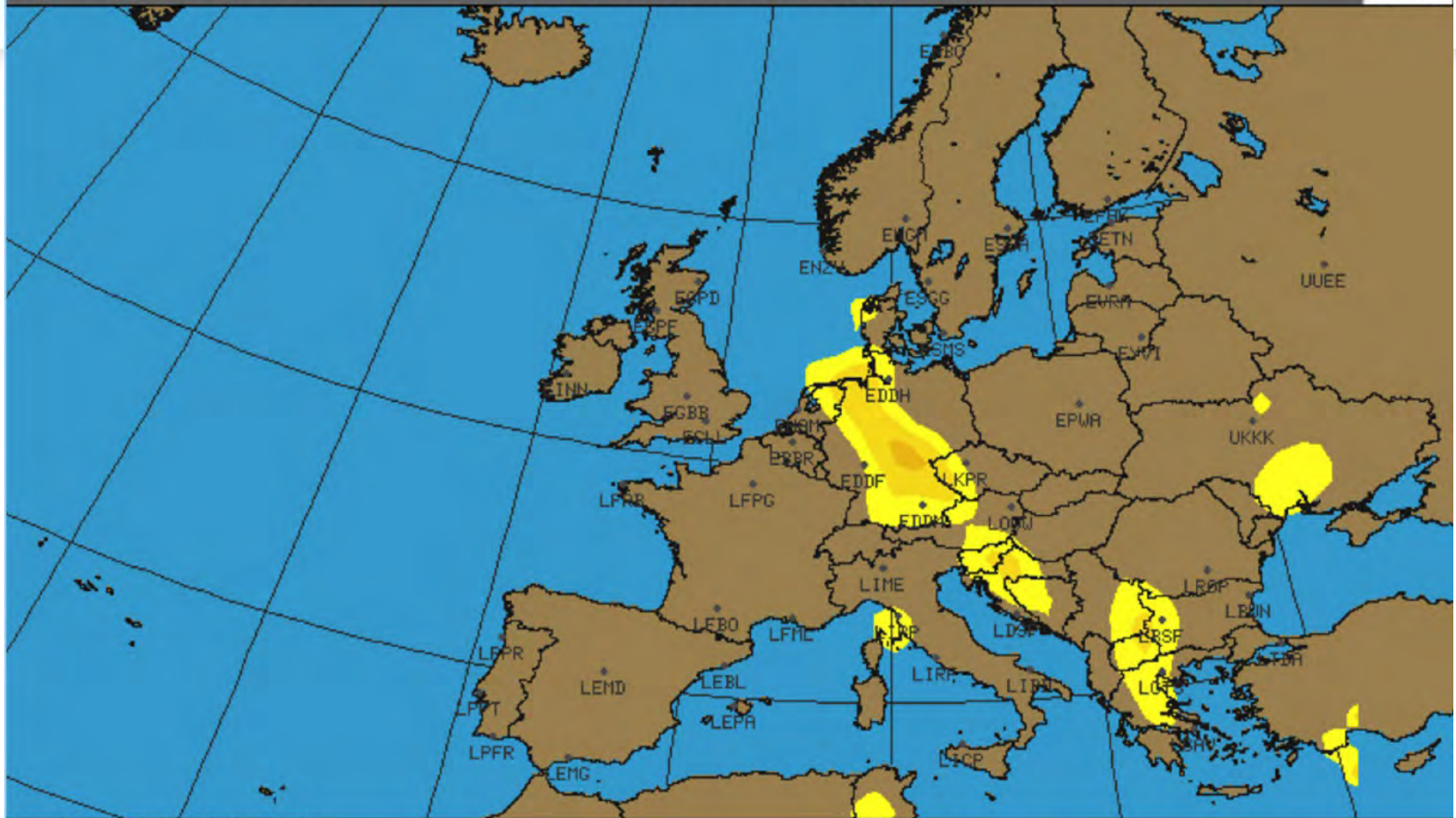
European Cockpit Association

TS Activity Risk 15z Next Day

Forecast Thunder Risk

Valid: 15:00 UTC Sun 13-May-2018

WSI[®]



Updated: 07:02 UTC 12-May-2018
Data: RPM 00 UTC 12-May-2018

Risk of Thunder Low Moderate High

Thematic challenge 3

Efficient provision and use of meteorological
information in ATM

Daily Eurocontrol Network Weather Assessment

Date : 13 / 05 / 2018

Updated : 13/05, 0430 utc

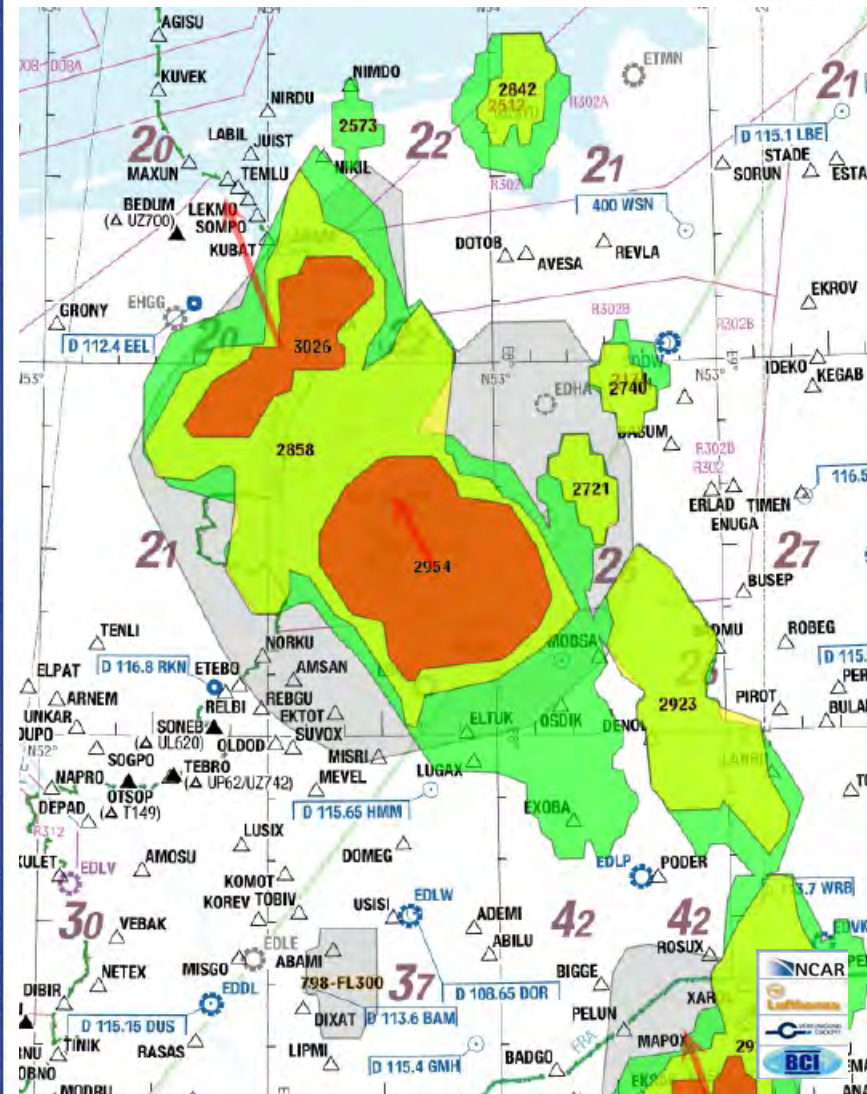
Ref : AOLO

NM.aolo@eurocontrol.int

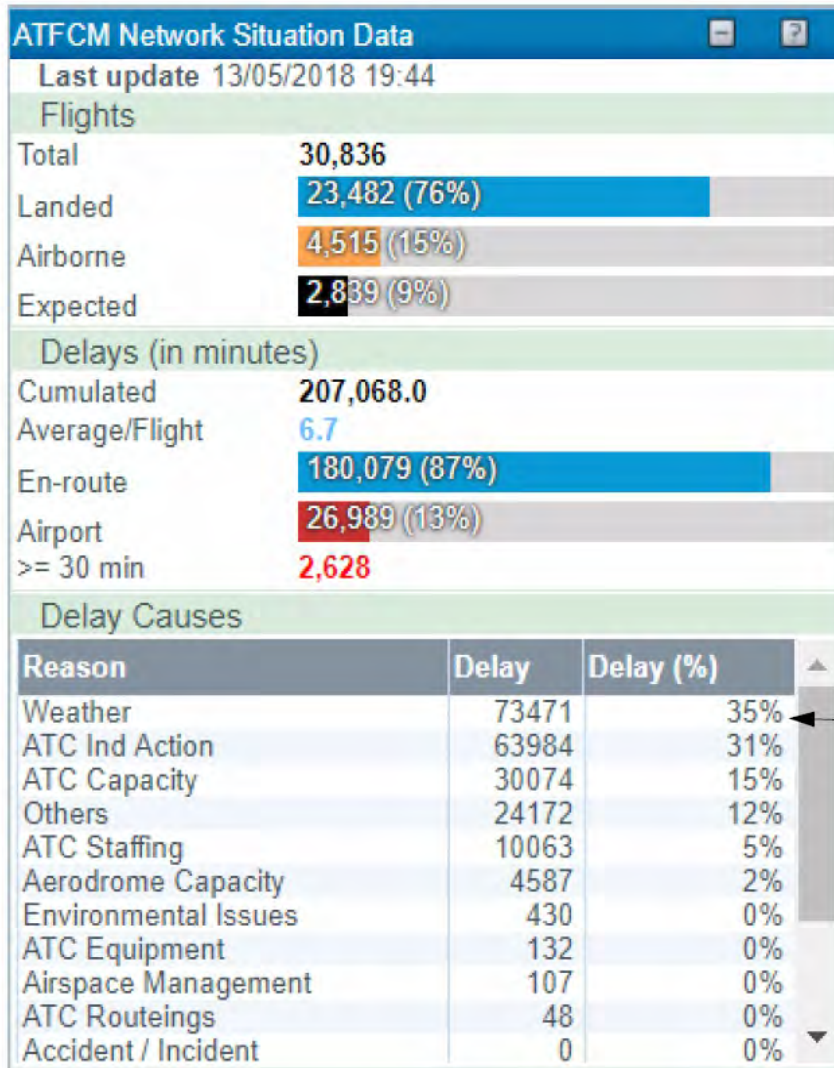


ECA

European Cockpit Association



European Cockpit Association

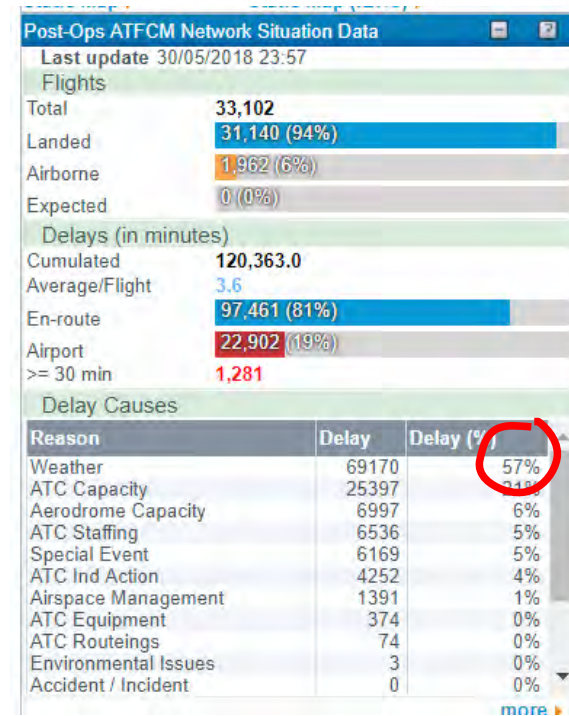
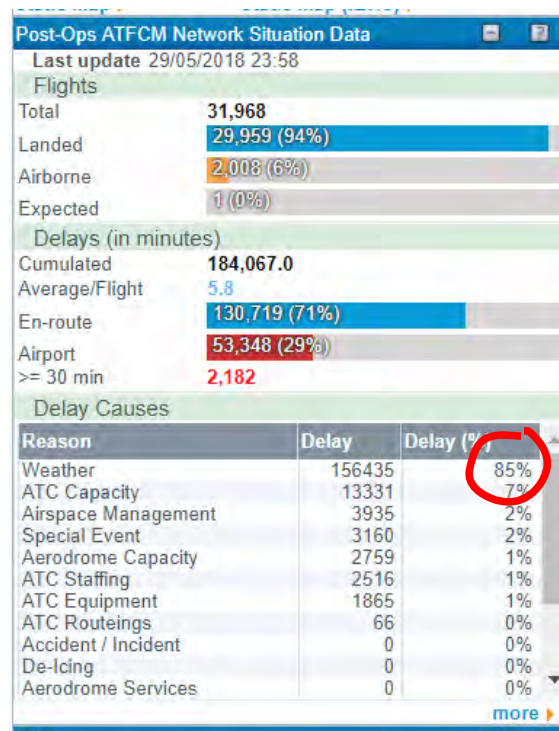
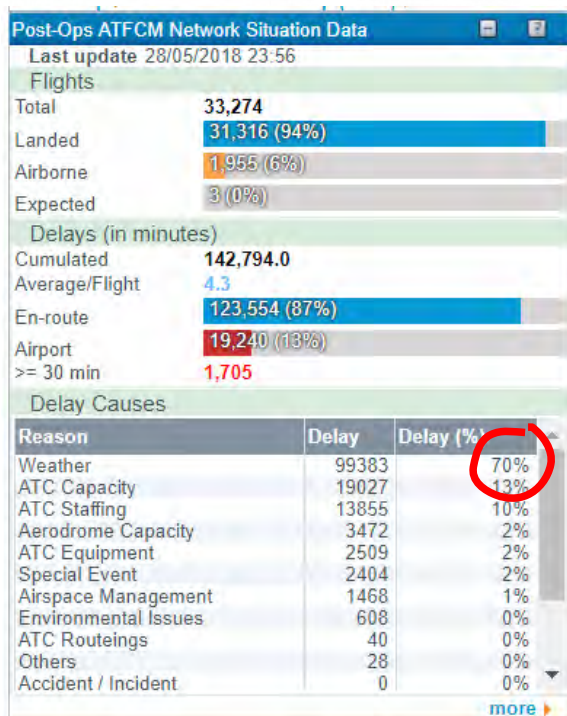


delay
attributed
to

Weather **35 %**

... and after two weeks, it's a new game !





28 May:

70 %

29 May:

85 %

30 May:

57%

Thematic challenge 3

Efficient provision and use of meteorological
information in ATM



ECA

European Cockpit Association

Analysis of 31 MAY 2018

Thematic challenge 3

Efficient provision and use of meteorological
information in ATM



ECA

European Cockpit Association

Daily Eurocontrol Network Weather Assessment

Thunderstorms mainly over Germany

Thunderstorms over UK and France, NOT over Germany

Forecasts are not identical.....



ECA

European Cockpit Association

PGDE14 EGRR 301200

ISSUED BY WAFC LONDON
PROVIDED BY WAFC LONDON
FIXED TIME PROGNOSTIC CHART
ICAO AREA EURO SIGWX
FL 100-450
VALID 12 UTC 31 MAY 2018

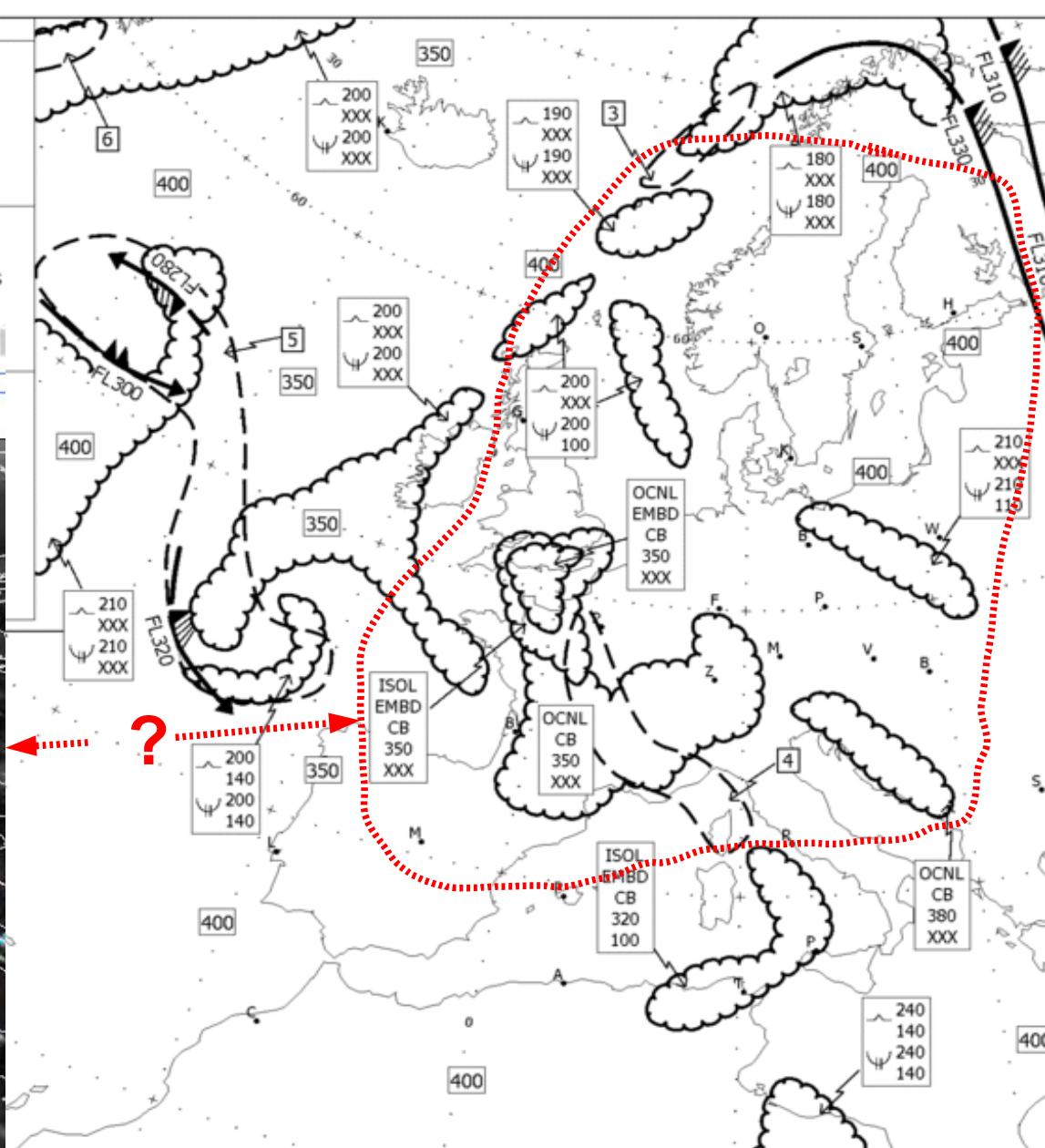
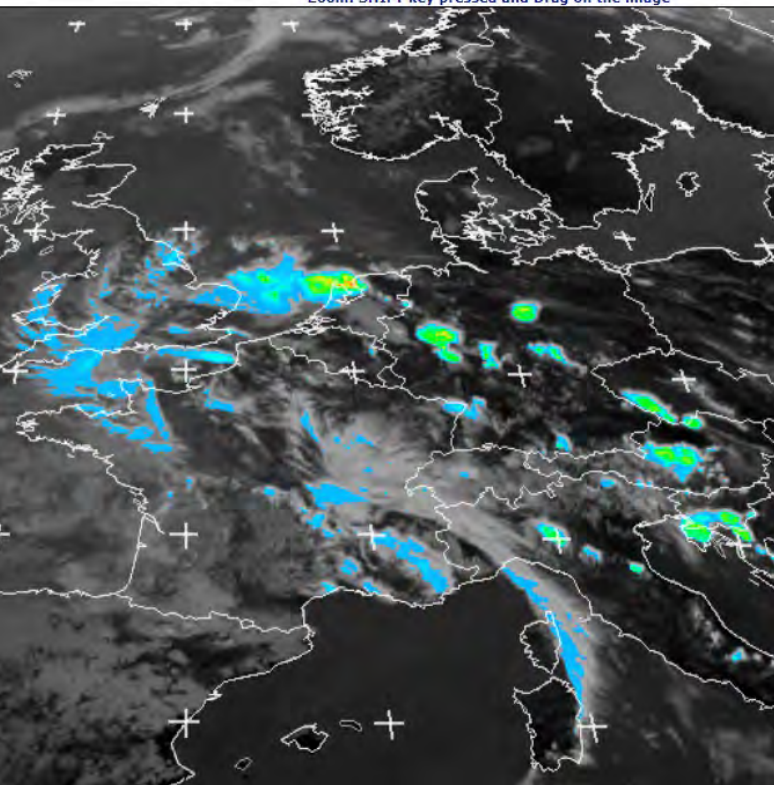
CB IMPLIES TS, GR
MOD OR SEV TURB AND ICE

UNITS USED: HEIGHTS IN FLIGHT LEVELS
CHECK SIGMET, ADVISORIES FOR

Frames in Animation: 2 4 6 9 12 24 Speed: + -

Delay Last Image < Play Stop Play > 31/05/18 12:00 UTC

Zoom: SHIFT key pressed and Drag on the image



Thematic challenge 3

Efficient provision and use of meteorological information in ATM

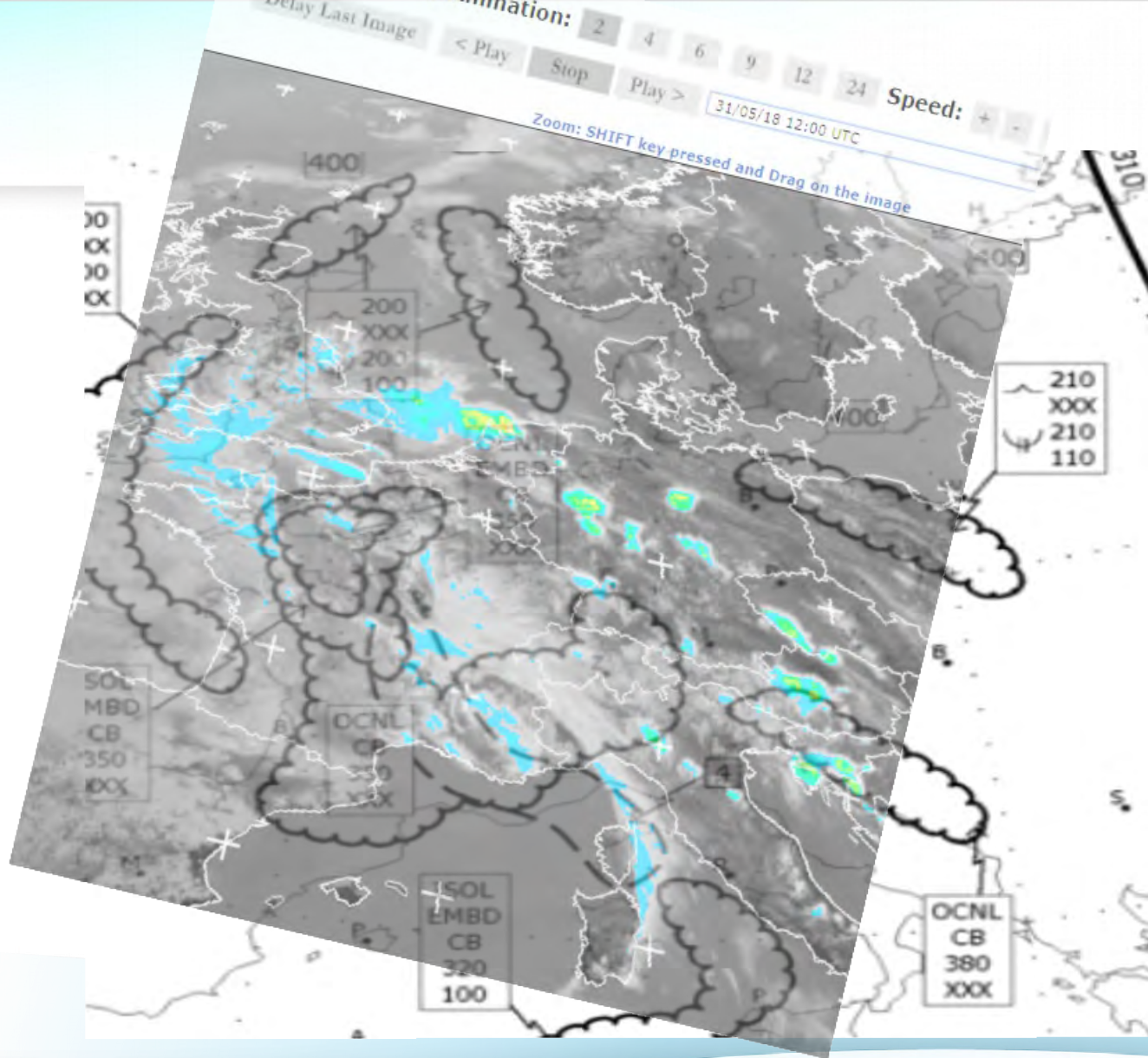
Satellite and forecast differ



ECA

European Cockpit Association

**Skill of
forecast
is not
sufficient
today...**



Thematic challenge 3

Efficient provision and use of meteorological
information in ATM

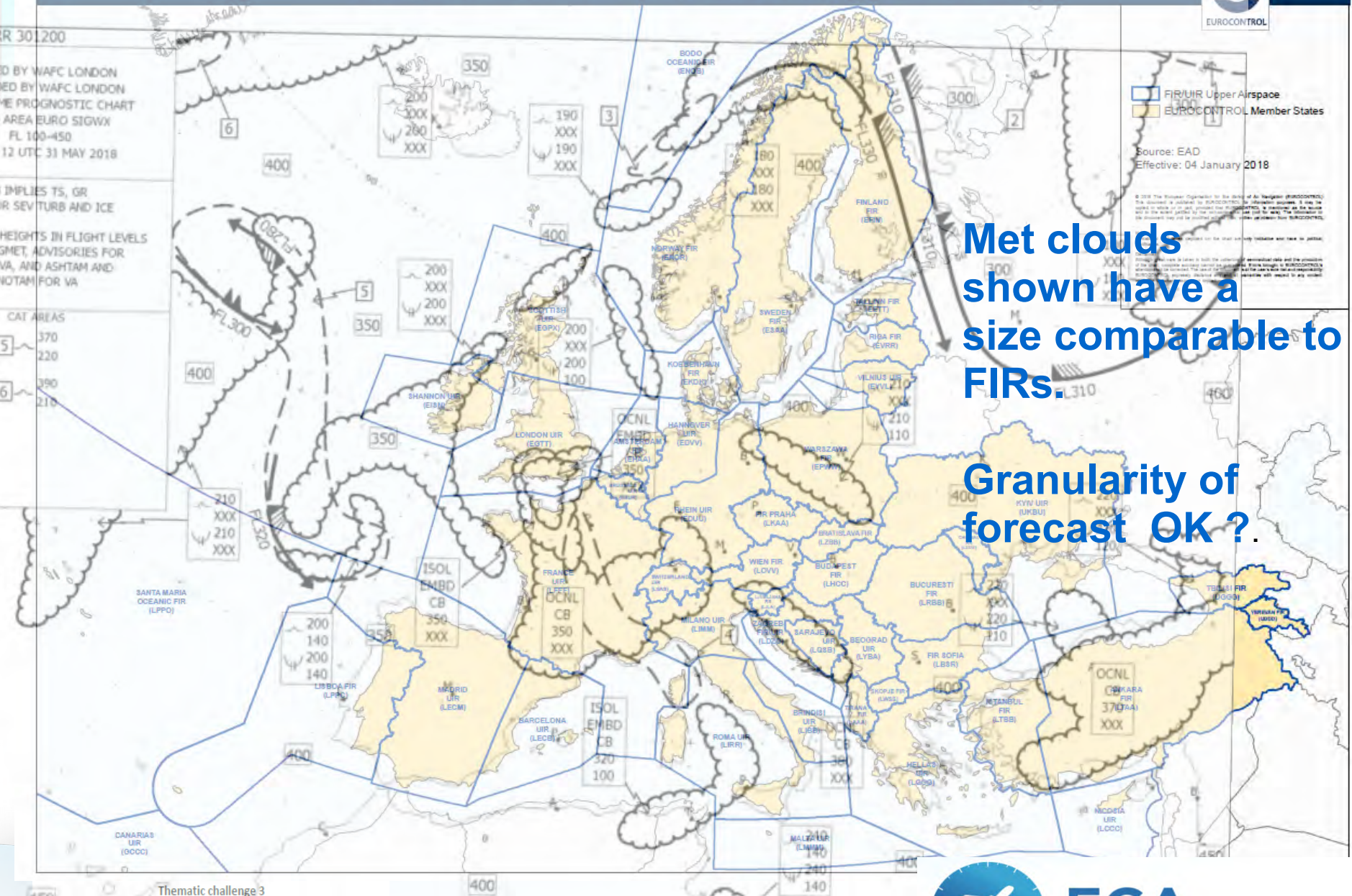
Satellite and forecast differ



ECA

European Cockpit Association

FIR/UIR in the Upper Airspace (EUROCONTROL Member States)



Met clouds shown have a size comparable to FIRs.

Granularity of forecast OK ?

Thematic challenge 3

Efficient provision and use of meteorological information in ATM

Overlay approximate



ECA

European Cockpit Association



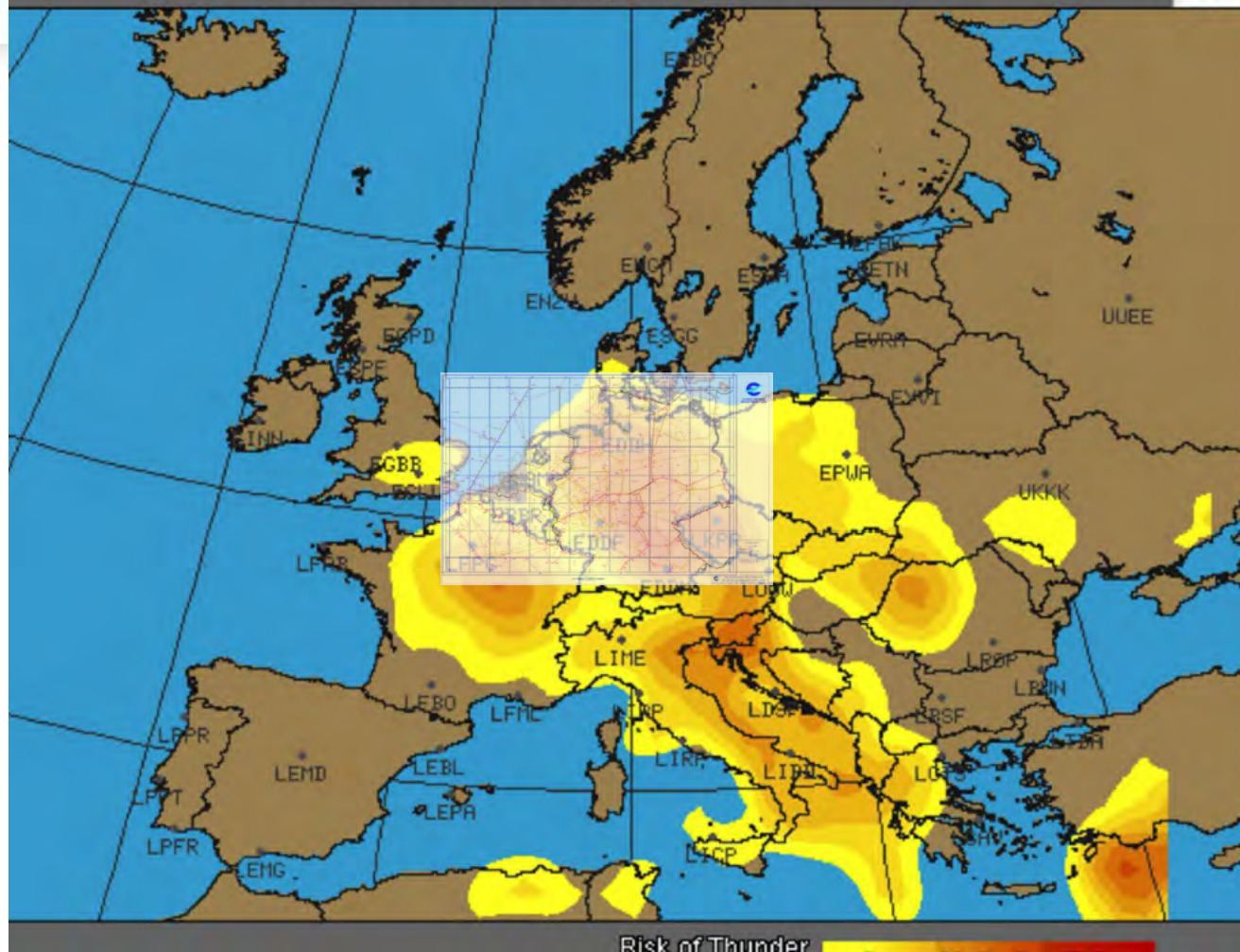
Met clouds are larger than many control sectors.

Granularity of forecast not OK.

TS Activity Risk 12z Today

Valid: 12:00 UTC Thu 31-May-2018

WSI



Size matters.

Broad forecasts do not give much actionable information to ATM.

Thematic challenge 3

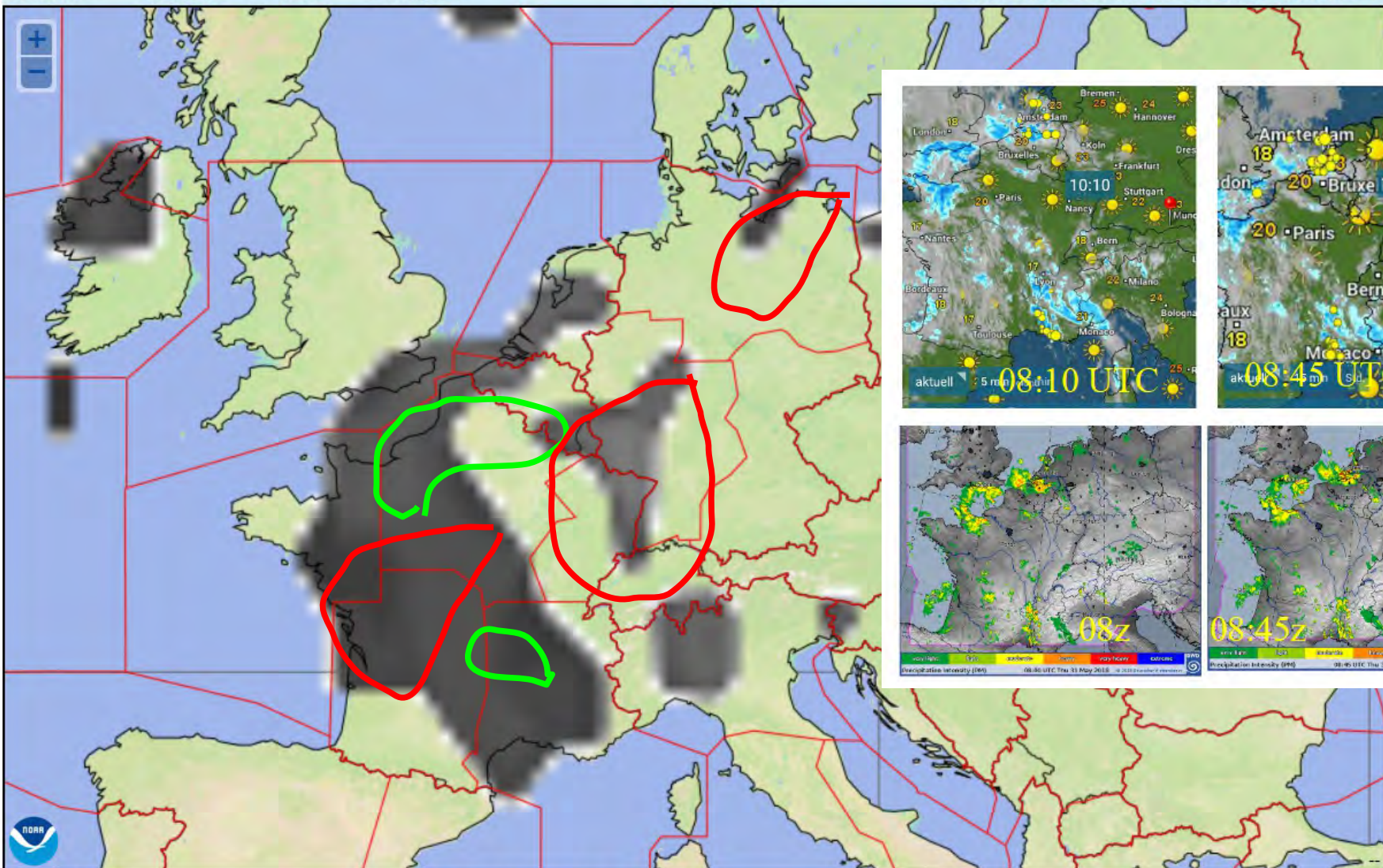
Daily Eurocontrol Network Weather Assessment

Efficient provision and use of meteorological information in ATM

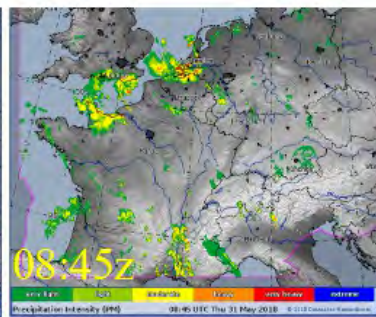
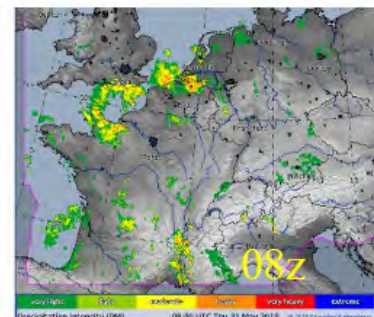


ECA

European Cockpit Association



Top: CB Tops 30,000 40,000 50,000 ft
Mid: FL300/300mb Wind Speed 60 80 100 120 140 160 knots
Low: FL240/400mb In Cloud Turbulence .005 .015 .025 .035

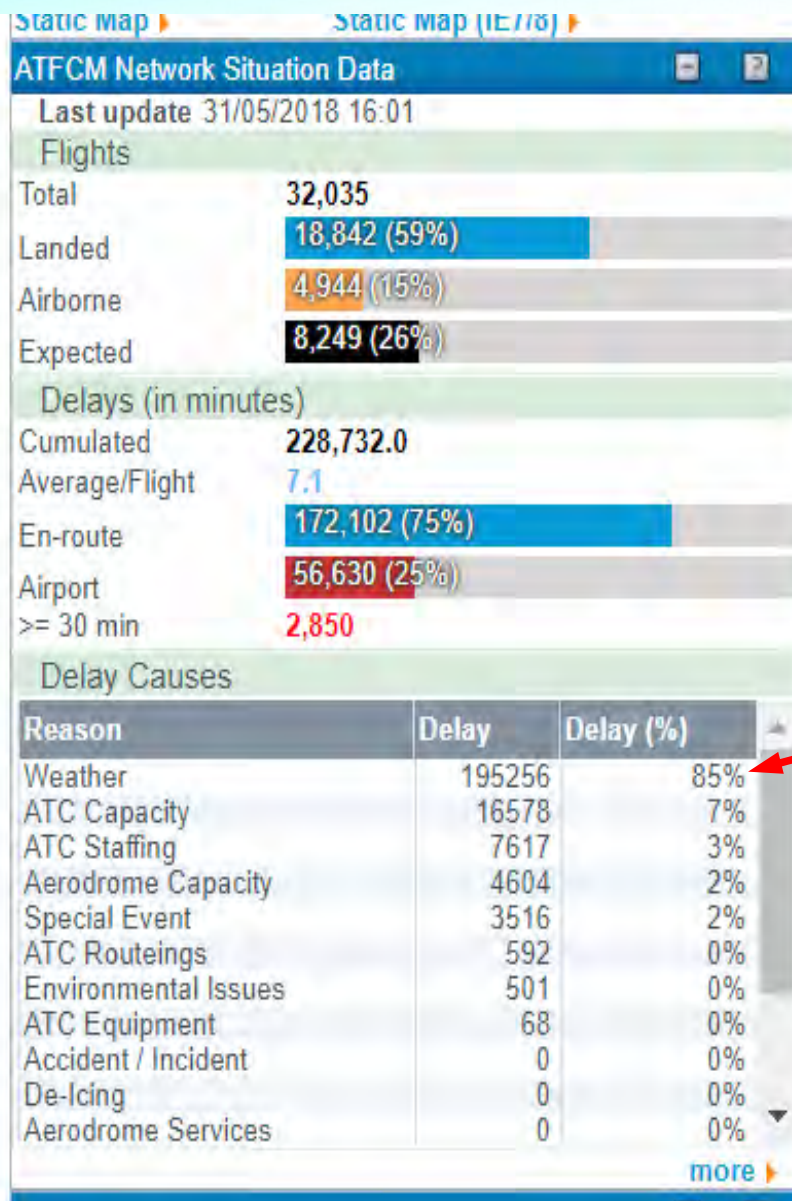


Global, gridded ICAO-style forecast ?
too coarse and insufficient skill.



ECA

European Cockpit Association



At 16:01 z, delay attributed to

Weather : **85%**

195256 minutes,

13 times the 2017 average !!

Note that Eurocontrol has no real control over traffic flows and routes
“due to weather”

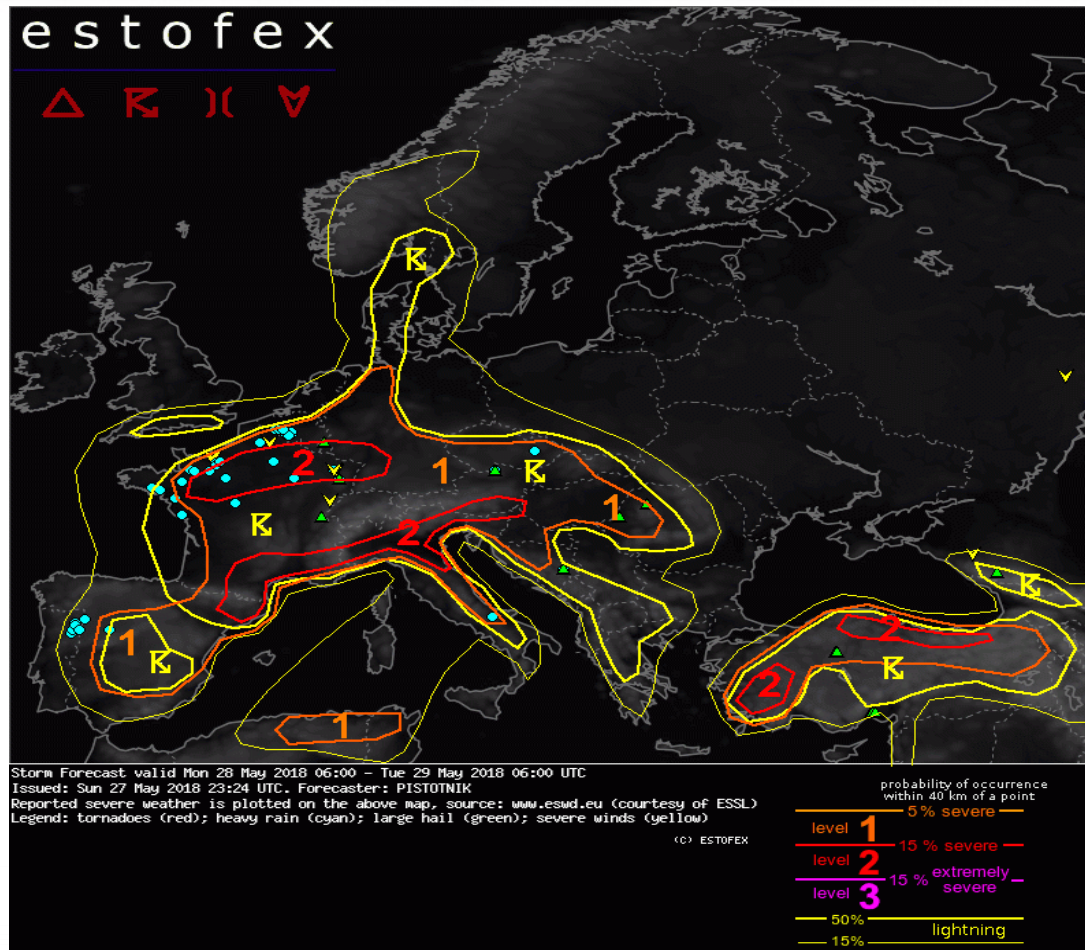
Weather for ATM: need for improvement

- > skill level of forecasts not high enough
- > geographic granularity of forecasts is not adequate

??? Could modern, tailored weather information help Eurocontrol NM, ATM Centers, controllers and pilots. ???



SCIENCE to the rescue..... well, maybe...



28th May 2018

70% weather
delay

European
Storm
Forecasting
Experiment

Thematic challenge 3

Efficient provision and use of meteorological
information in ATM

<http://www.estofex.org/>



ECA

European Cockpit Association

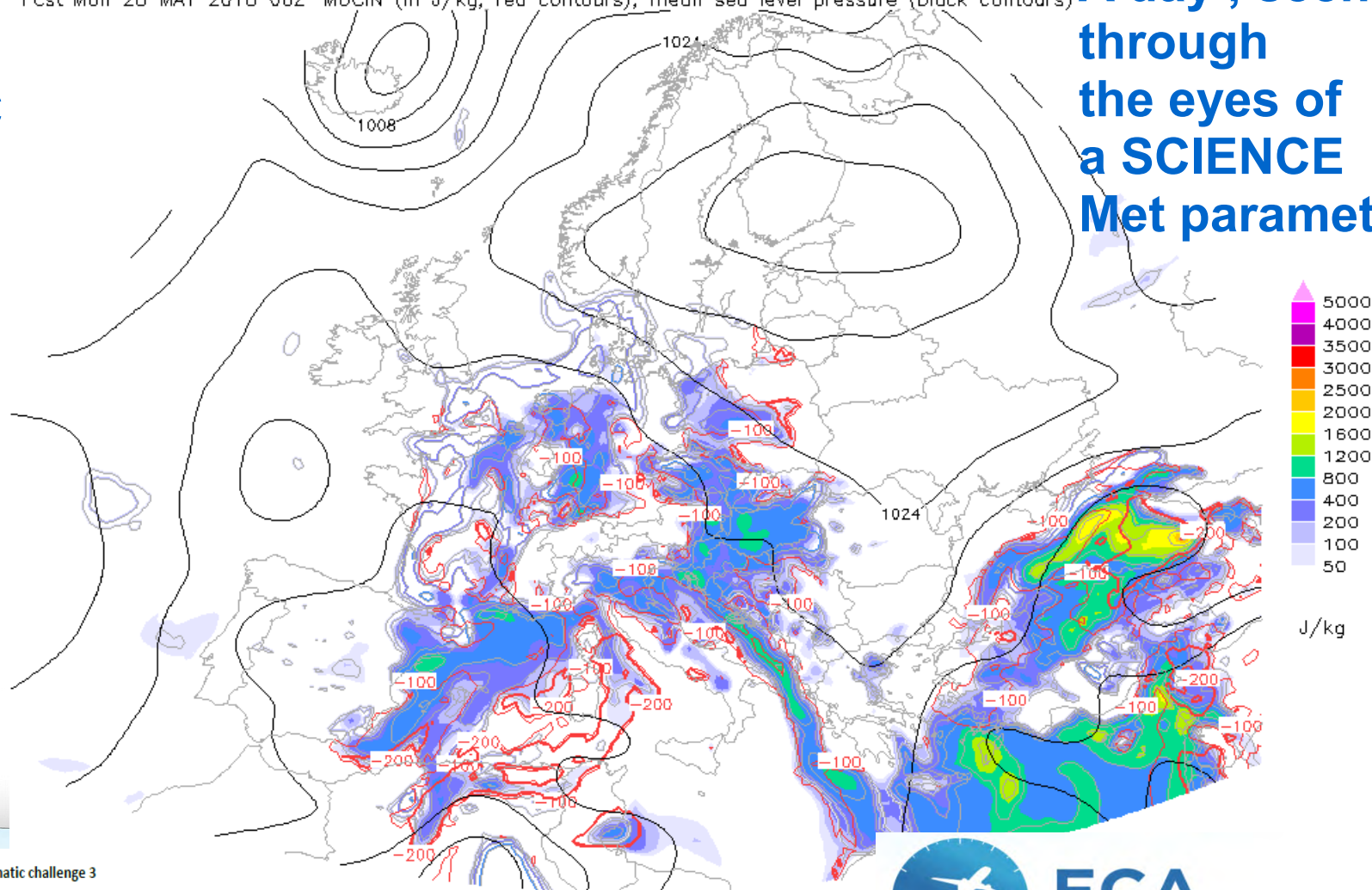
MLCAPE (Mixed Layer Convective Available Potential Energy)

https://www.spc.noaa.gov/exper/mesoanalysis/help/help_mlcp.html

06 UTC

Init Sun 27 MAY 2018 12Z NCEP GFS 0-30 hPa AGL MLCAPE (shaded) and MUCAPE (contours)
Fcst Mon 28 MAY 2018 06Z MUCIN (in J/kg, red contours), mean sea level pressure (black contours)

A day, seen
through
the eyes of
a SCIENCE
Met parameter



Thematic challenge 3

Efficient provision and use of meteorological
information in ATM

Source:
<http://www.estofex.org/>



ECA

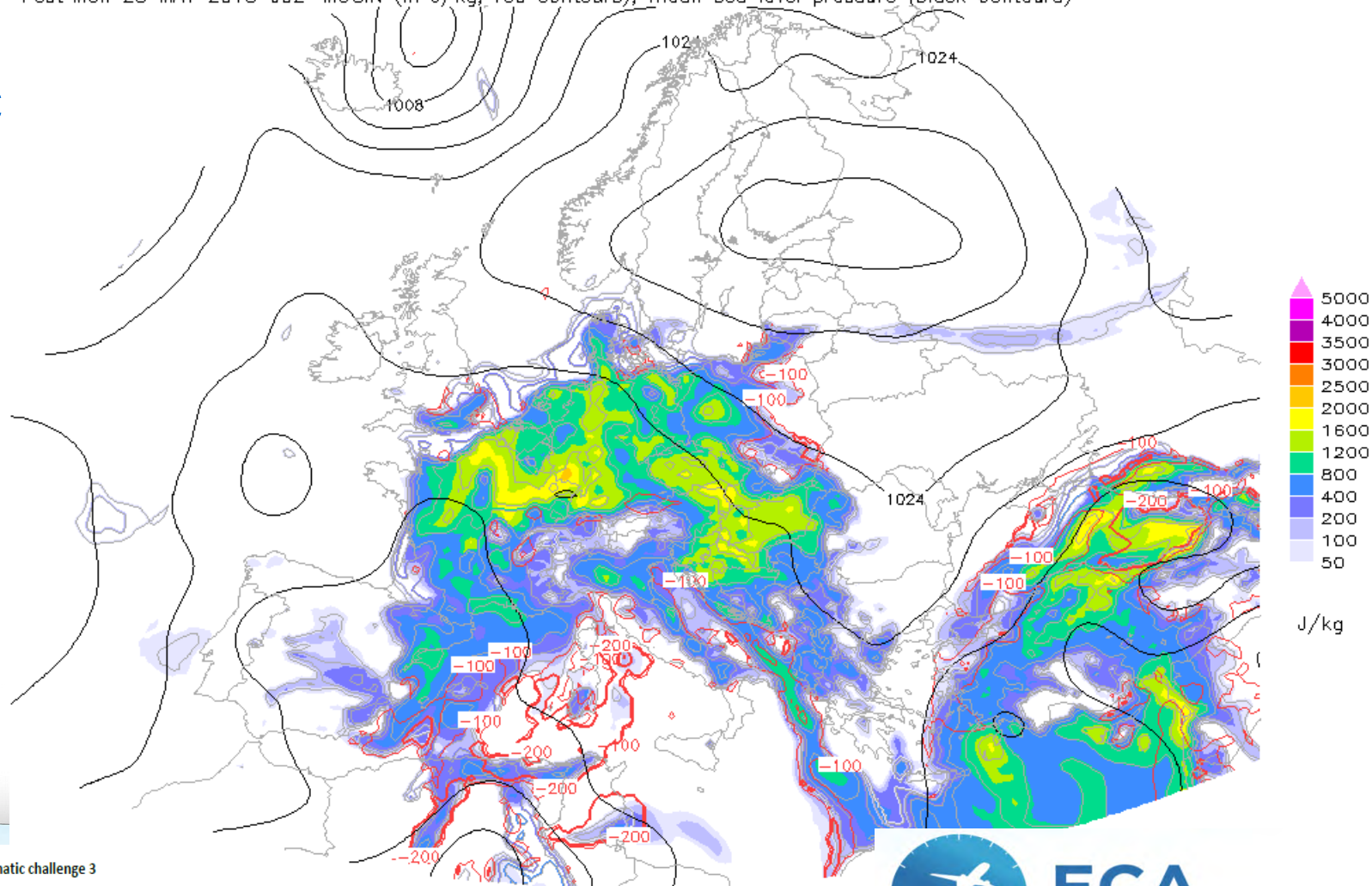
European Cockpit Association

MLCAPE (Mixed Layer Convective Available Potential Energy)

https://www.spc.noaa.gov/exper/mesoanalysis/help/help_mlcp.html

09 UTC

Init Sun 27 MAY 2018 12Z NCEP GFS 0-30 hPa AGL MLCAPE (shaded) and MUCAPE (contours)
Fcst Mon 28 MAY 2018 09Z MUCIN (in J/kg, red contours), mean sea level pressure (black contours)



Thematic challenge 3

Efficient provision and use of meteorological
information in ATM

Source:
<http://www.estofex.org/>



ECA

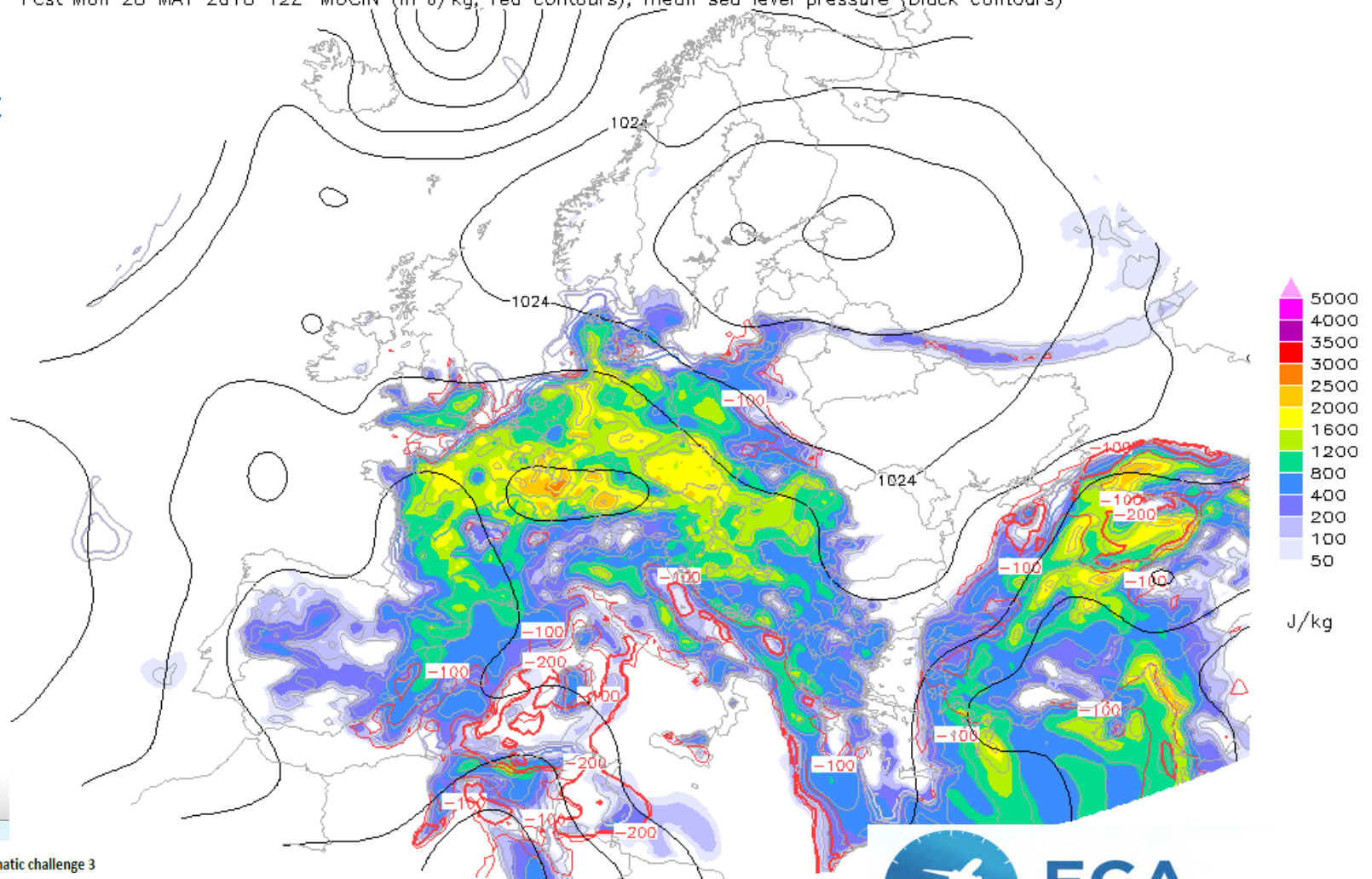
European Cockpit Association

MLCAPE (Mixed Layer Convective Available Potential Energy)

https://www.spc.noaa.gov/exper/mesoanalysis/help/help_mlcp.html

12 UTC

Init Sun 27 MAY 2018 12Z NCEP GFS 0-30 hPa AGL MLCAPE (shaded) and MUCAPE (contours)
Fcst Mon 28 MAY 2018 12Z MUCIN (in J/kg, red contours), mean sea level pressure (black contours)



Thematic challenge 3

Efficient provision and use of meteorological
information in ATM

Source:
<http://www.estofex.org/>



ECA

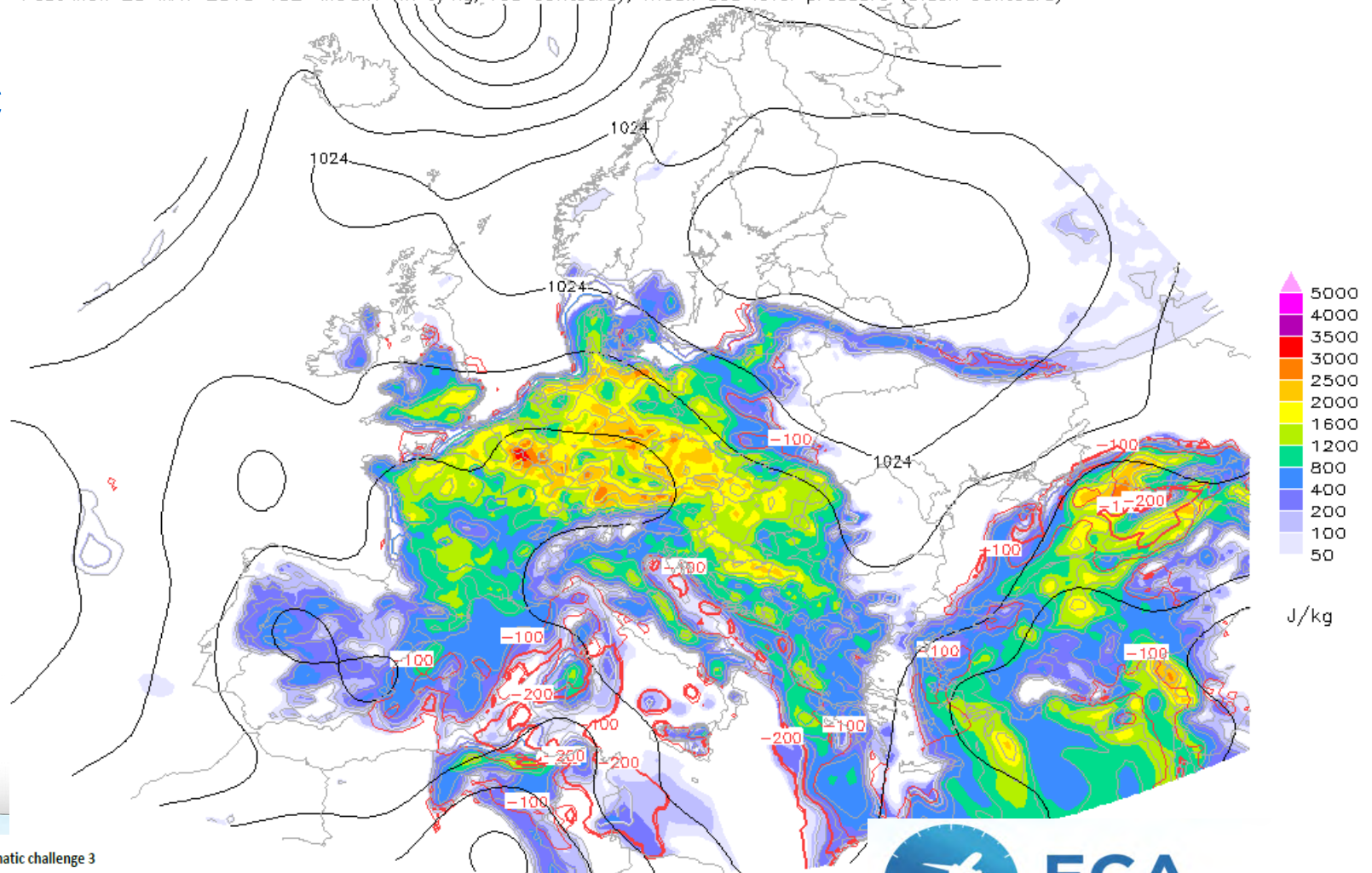
European Cockpit Association

MLCAPE (Mixed Layer Convective Available Potential Energy)

https://www.spc.noaa.gov/exper/mesoanalysis/help/help_mlcp.html

15 UTC

Init Sun 27 MAY 2018 12Z NCEP GFS 0-30 hPa AGL MLCAPE (shaded) and MUCAPE (contours)
Fcst Mon 28 MAY 2018 15Z MUCIN (in J/kg, red contours), mean sea level pressure (black contours)



Thematic challenge 3

Efficient provision and use of meteorological
information in ATM

Source:
<http://www.estofex.org/>



ECA

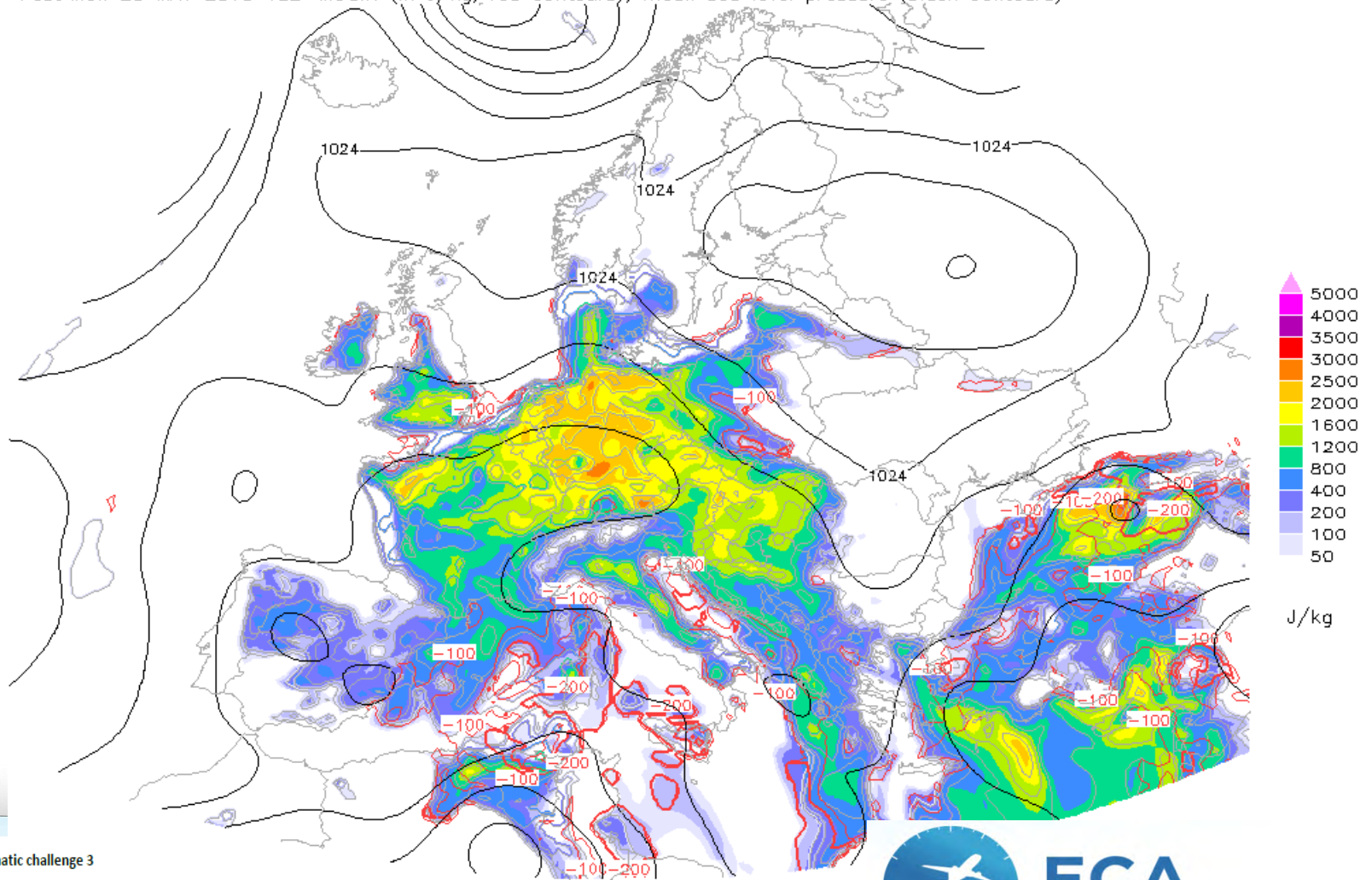
European Cockpit Association

MLCAPE (Mixed Layer Convective Available Potential Energy)

https://www.spc.noaa.gov/exper/mesoanalysis/help/help_mlcp.html

18 UTC

Init Sun 27 MAY 2018 12Z NCEP GFS 0-30 hPa AGL MLCAPE (shaded) and MUCAPE (contours)
Fcst Mon 28 MAY 2018 18Z MUCIN (in J/kg, red contours), mean sea level pressure (black contours)



Thematic challenge 3

Efficient provision and use of meteorological
information in ATM

Source:
<http://www.estofex.org/>



ECA

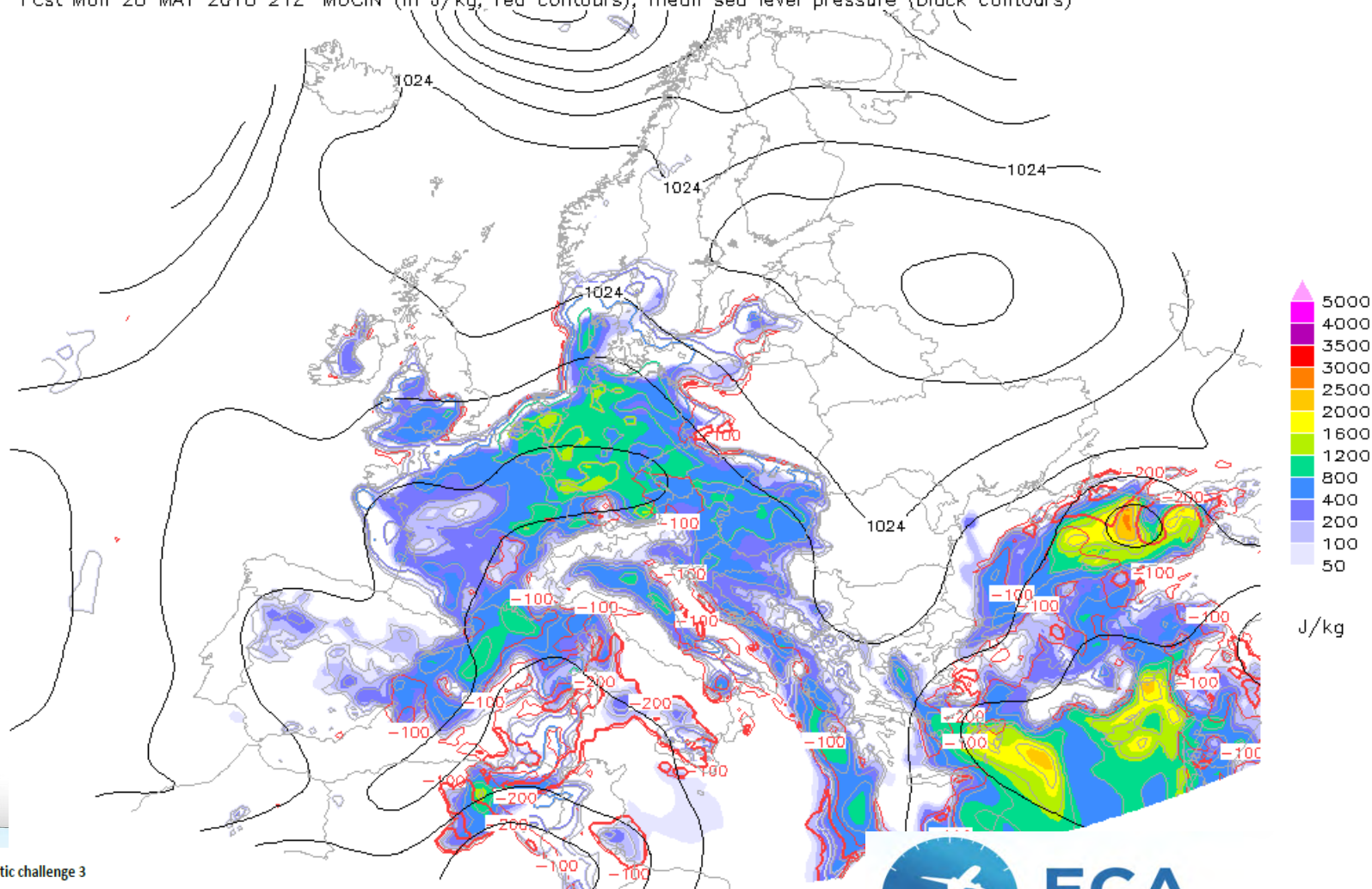
European Cockpit Association

MLCAPE (Mixed Layer Convective Available Potential Energy)

https://www.spc.noaa.gov/exper/mesoanalysis/help/help_mlcp.html

21 UTC

Init Sun 27 MAY 2018 12Z NCEP GFS 0-30 hPa AGL MLCAPE (shaded) and MUCAPE (contours)
Fcst Mon 28 MAY 2018 21Z MUCIN (in J/kg, red contours), mean sea level pressure (black contours)



Thematic challenge 3

Efficient provision and use of meteorological
information in ATM

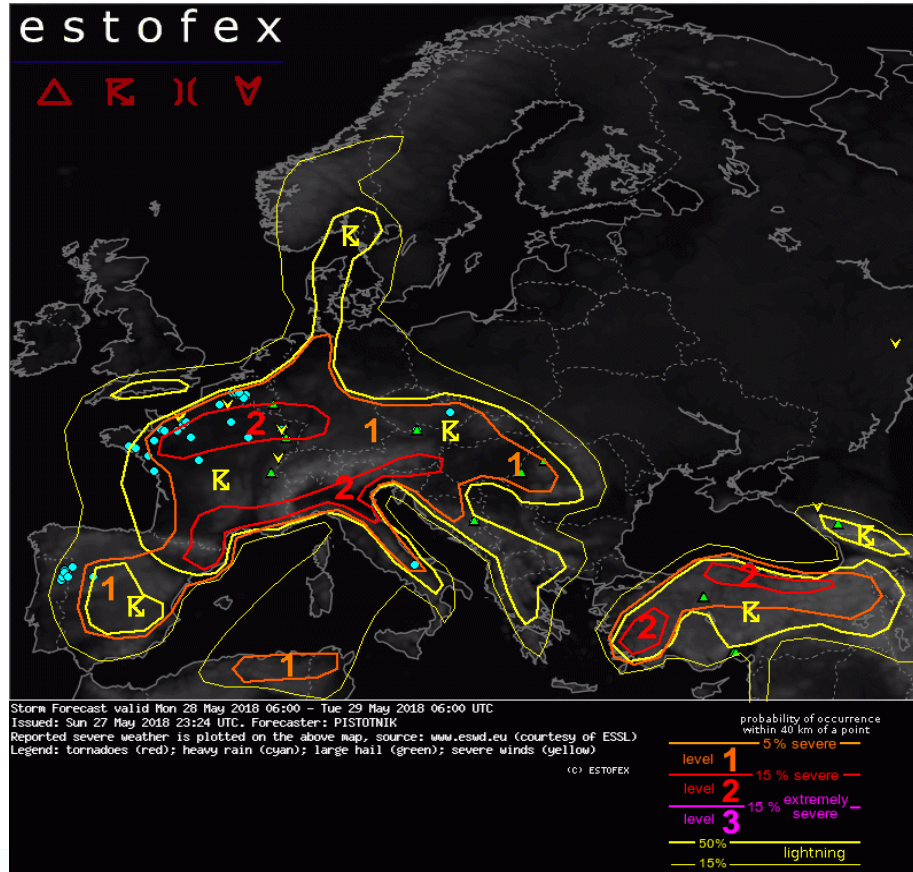
Source:
<http://www.estofex.org/>



ECA

European Cockpit Association

SCIENCE can help, but needs to be interpreted by specialists: Meteorologists !



Thematic challenge 3

Efficient provision and use of meteorological
information in ATM



ECA

European Cockpit Association

A European weather platform: working models

Карта
Метео ▾
SIGMET
Метеодисплей
Обработка
Техническое состояние
👤 рае
Выйти
? Помощь

The screenshot shows the homepage of the Asian Aviation Meteorological Center (AAMC). The header includes the AAMC logo and name in Chinese and English. Below it, there's a section titled "AVIATION WEATHER CENTER" with a NOAA National Weather Service logo. The main content area features a map of Asia with various weather symbols and a sidebar with navigation links like "HOME", "ADVISORIES", "FORECASTS", etc.

Asian Aviation Meteorological Center

AAMC is jointly established by
Hong Kong Observatory, Civil Aviation Administration
of China and China Meteorological Administration

- Russia ✓
- China ✓
- USA ✓
- Europe ***WHEN ??***

Thematic challenge 3

Efficient provision and use of meteorological information in ATM

www.Aviationweather.gov



ECA

European Cockpit Association

A European weather platform: for coordinated ATM



Thematic challenge 3

Efficient provision and use of meteorological
information in ATM

<https://aviationweather.gov/trafficflowmgmt/portal>



ECA

European Cockpit Association

A European weather platform: for coordinated ATM



Thematic challenge 3

Efficient provision and use of meteorological
information in ATM



ECA

European Cockpit Association

working model



SPC Interactive Plumes

SPC Enhanced Thunderstorm Fcst

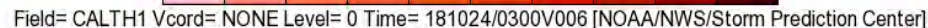
[Return to SPC 1-Hour SREF front page](#)

Ensemble Links

✚ Convective Guidance 2009

- Mouse over individual forecast hours to advance time or click the image for an animated loop.
- Or, click the forecast hour to see previous runs valid for that particular time. (Courtesy WFO Sterling, VA)

FCST: F006 VALID: Wed 20181024/0300 UTC



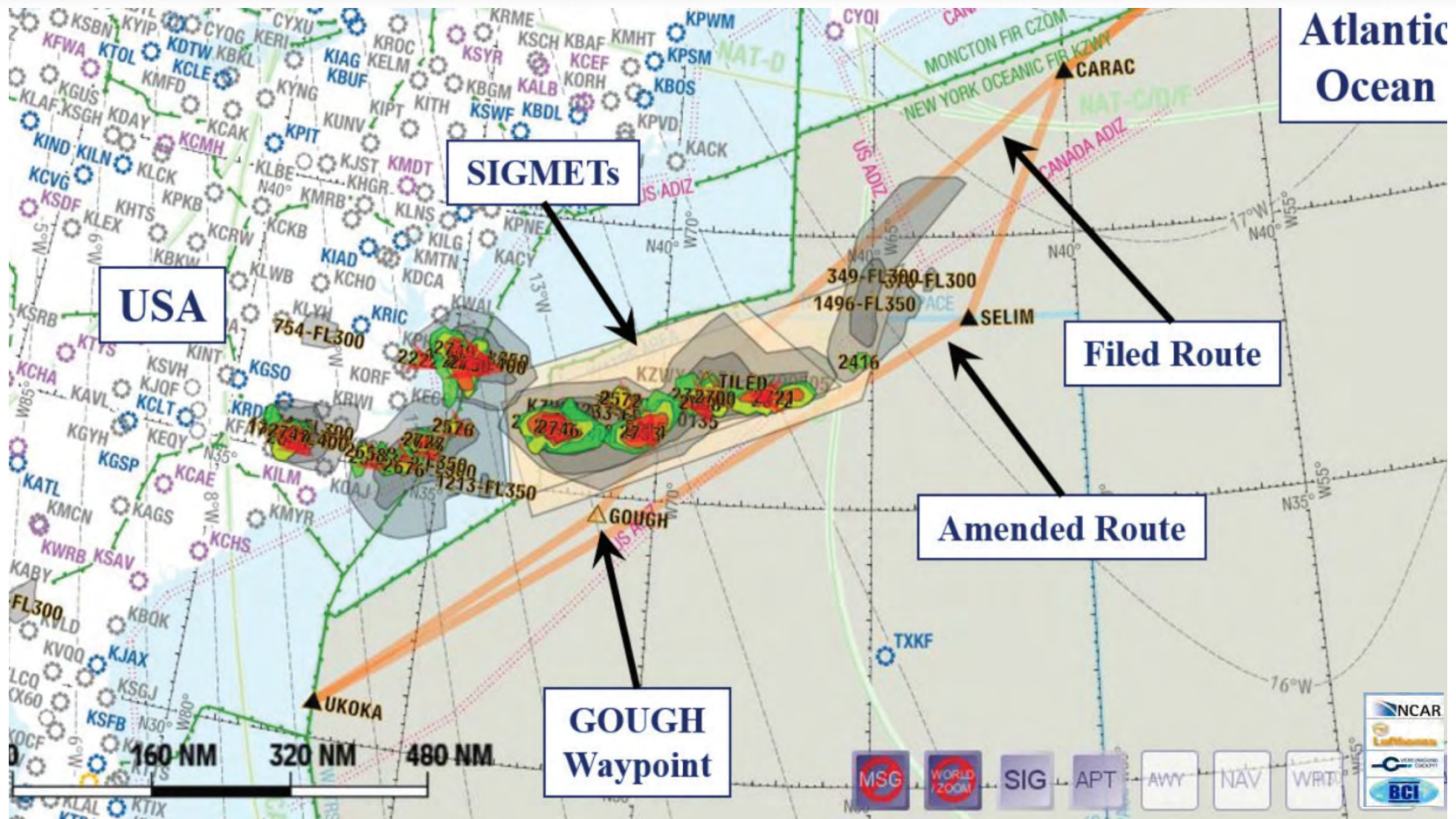
f01 f02 f03 f04 f05 f06 f07 f08 f09 f10 f11 f12 f13 f14 f15 f16 f17 f18 f19 f20 f21 f22 f23 f24 f25 f26 f27 f28 f29 f30 f31 f32 f33 f34 f35 f36 f37 f38 f39

Efficient provision and use of meteorological information in ATM

ECA

European Cockpit Association

Effects of WX- coordinated flight ops



ATC initiated route-change:
175 nm lateral deviation – great for safety,
passenger comfort and.... ATM !



ECA

European Cockpit Association

Effects of WX- coordinated flight ops



Pilots would prefer coordinated routes with reduced WX impact to flying zig-zag to avoid convection.

Trials ex Munich...

Before takeoff in Rome, guidance should be offered by ATM for a safer, better route !



ECA

European Cockpit Association

Weather for ATM: findings

- > skill level of forecasts not high enough
- > geographic granularity of forecasts is not adequate
- > meteorologists, integrated in operations, are needed to communicate science results
- > multiple wx portals exist, bring benefits
- > weather – coordinated flight operations enhances safety, comfort and in all probability, reduces delays



Weather for ATM: path to improvement

1. Step > modern, tailored weather information to be made available to Eurocontrol NM, Centers, controllers and pilots.
2. Step > Wx cell at Eurocontrol, with meteorologists integrated in enhanced decision making, including flow measures due to weather
3. Step > build an appropriate, accessible European aviation weather platform with science , ATM and cockpit focus

1 + 2 + 3 = investment is needed !

Thematic challenge 3

Efficient provision and use of meteorological
information in ATM



ECA

European Cockpit Association

Thank you !



<https://www.eurocockpit.be/positions-publications/pilots-vision-weather>

Klaus.Sievers@Vcockpit.de

Title event – Date, Place



ECA

European Cockpit Association