

Alaro Forecast Experience Belgium

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Rafiq Hamdi, Rozemien De Troch, Steven Caluwaerts

ALADIN Forecasters meeting 2014
September 10-11, 2014, Ankara, Turkey



Outline

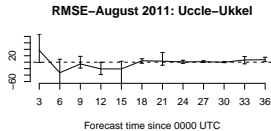
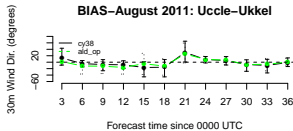
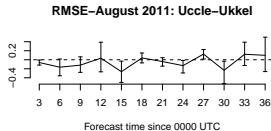
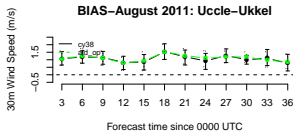
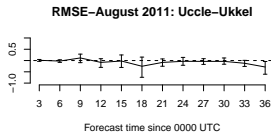
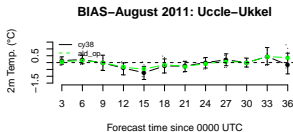
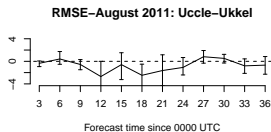
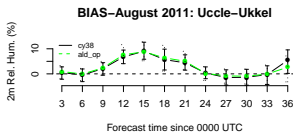
- How Alaro is used
- Pukkelpop storm
- Pentecost storms
- CAPE

How Alaro is used in Belgium

Where we are now

- Alaro at 7 and 4 km with 46 vertical levels
- Coupled to Arpège
- Four runs/day: 00h, 06h, 12h, 18h
- Since 17 July: switch to cy38

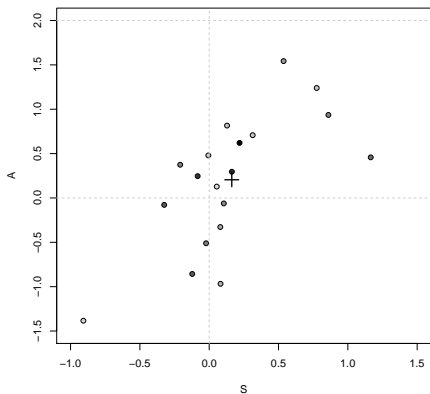
How Alaro is used in Belgium *cy38 scores*



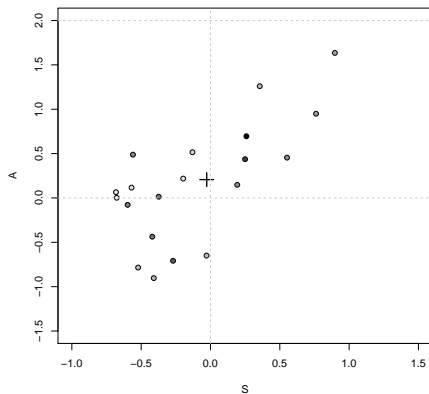
How Alaro is used in Belgium

cy38 scores

ALO4 ald_op_cy35 SA score for August 2011



ALO4 cy38_esuite SA score for August 2011



How Alaro is used in Belgium

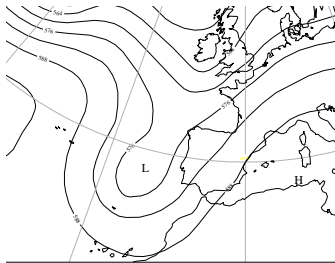
Where we are now

- Alaro at 7 and 4 km with 46 vertical levels
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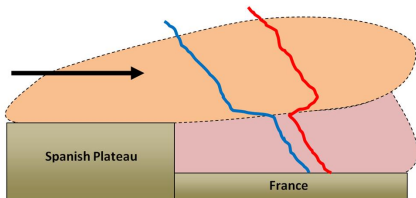
Next steps

- Unsaturated downdrafts
- Data assimilation
 - 1 Conventional data
 - 2 Radar
 - 3 GNSS (GPS data)

Pukkelpop storm Introduction



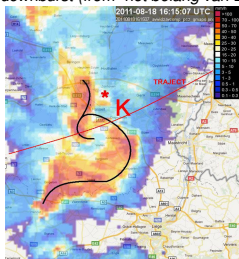
ECMWF 500 hPa analysis 18 August 2011 1200 UTC



Spanish plume

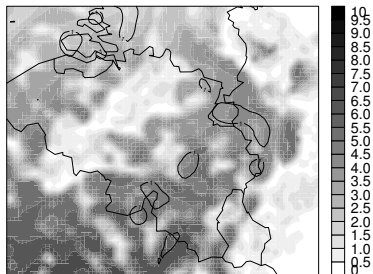


Path of downburst (from "het belang van Limburg")

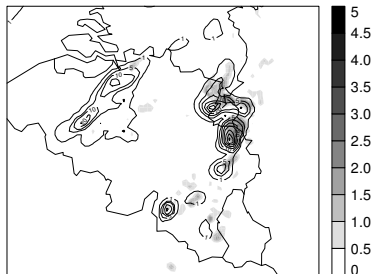


Bow echo with bookend vortex

ald_op Omega_DD mass flux (kg m⁻² s⁻¹) 18.08.2011 17 UTC

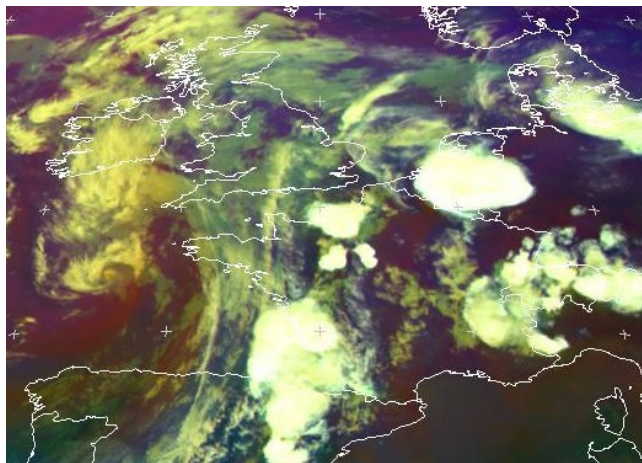
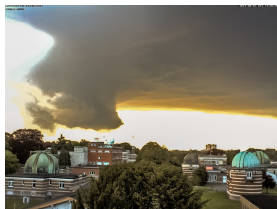


cy36o7_tll Omega_DD mass flux (kg m⁻² s⁻¹) 18.08.2011 17 UTC



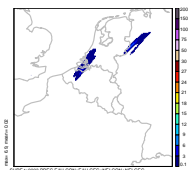
9 June 2014

Introduction

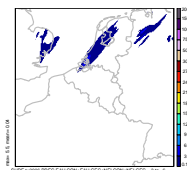


Airmass 1800 UTC 9 June 2014 (from Meteosat)

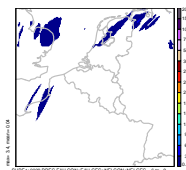
be40_oper : 2014/6/9 z0:0 +3h



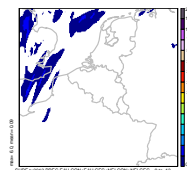
be40_oper : 2014/6/9 z0:0 +6h



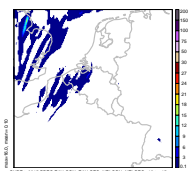
be40_oper : 2014/6/9 z0:0 +9h



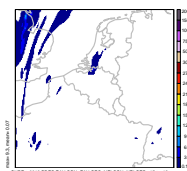
be40_oper : 2014/6/9 z0:0 +12h



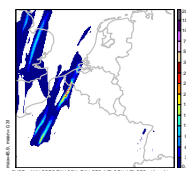
be40_oper : 2014/6/9 z0:0 +15h



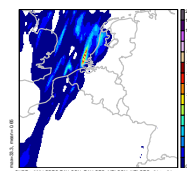
be40_oper : 2014/6/9 z0:0 +18h



be40_oper : 2014/6/9 z0:0 +21h



be40_oper : 2014/6/9 z0:0 +24h

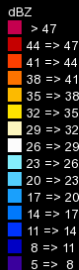
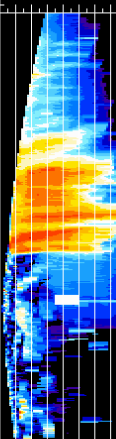
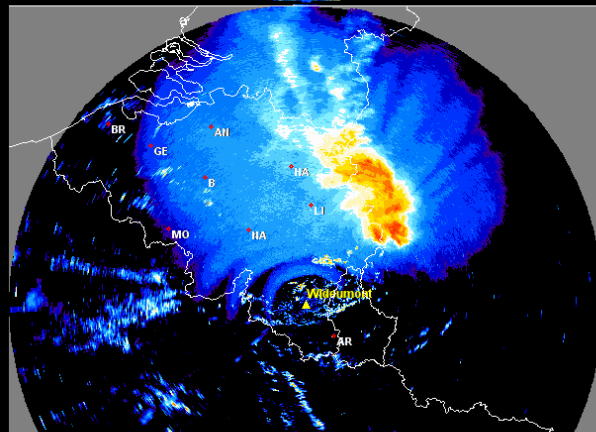
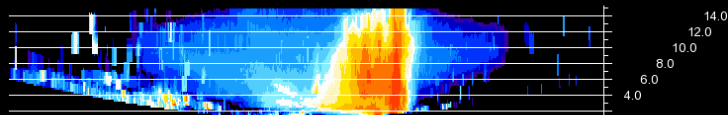


9 June 2014

MCC

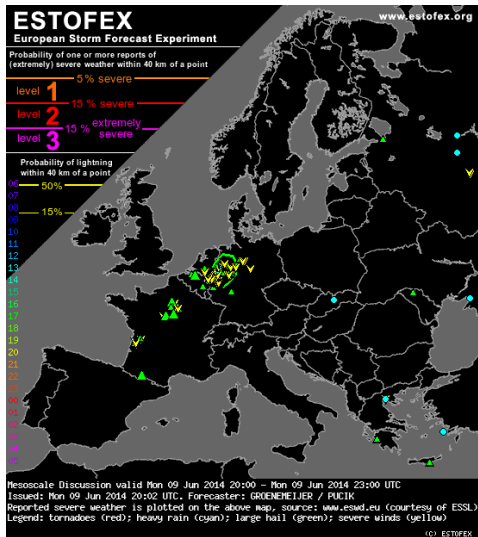
File : 2014060918194599.caz
Type : MAX(Z)
Range : 240.0km

09.06.2014
18:19:45



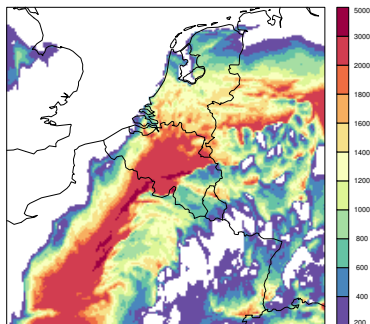
PRF : 483 / 0
RS : 2
TS : 20
CC : none
RES : 0.800 km
H : 15.00 km
LS : 0.250 km

KMI - IRM
Radar Wideumont

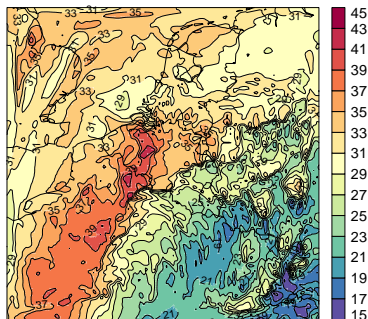


Mesoscale Discussion
Valid: Mon 09 Jun 2014 20:00 to Mon 09 Jun 2014 23:00 UTC
Issued: Mon 09 Jun 2014 20:02
Forecaster: GROENEMEIJER / PUCIK

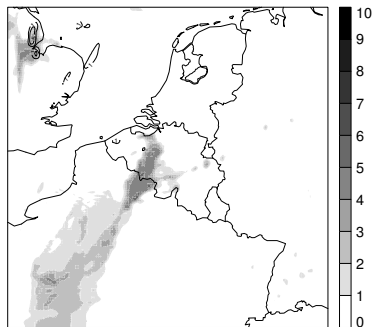
An ongoing **bow echo** with a history of producing extreme severe wind gusts (>32 m/s) and likely an embedded supercell structure continues to move **NEward across W Germany**. 10-15 m/s low-level shear ahead of the system and low LCL heights suggest that the system will continue to harbour a risk of embedded - possibly strong - tornadoes in addition to the severe wind threat. The system will likely continue for at least several hours as the airmass ahead remains very unstable per sfc obs and NWP guidance.



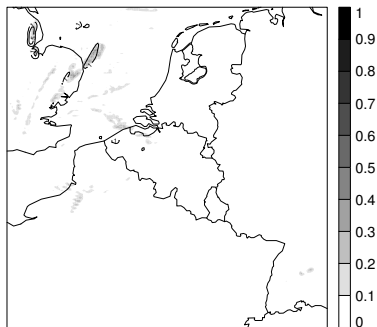
CAPE (J/kg) 1400 UTC



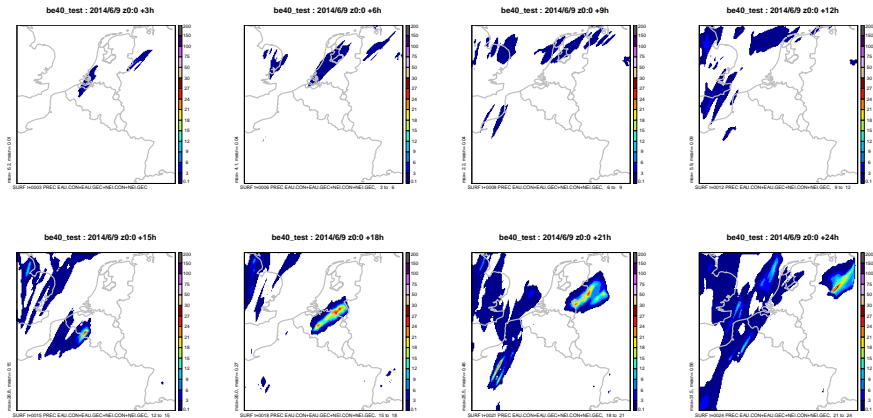
Total precipitable water content (mm) 1400 UTC



Sub-grid scale updraft mass flux 1400 UTC



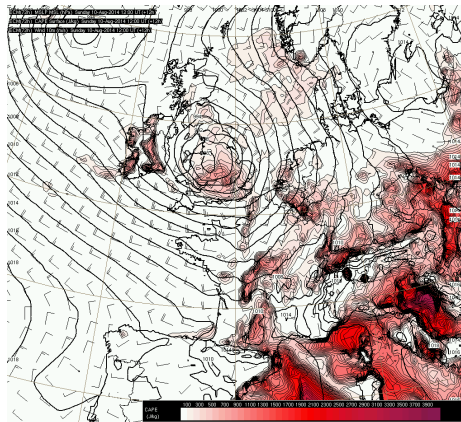
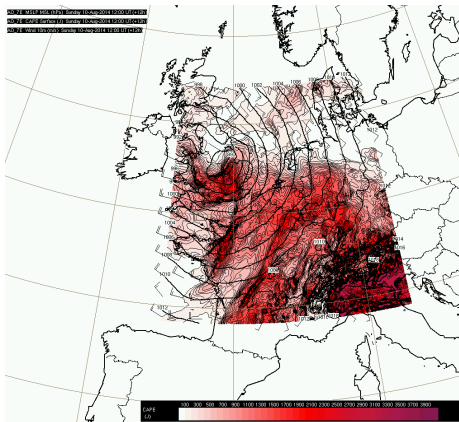
Mesh fraction sub-grid scale updraft 1400 UTC



Challenges

| Large scale | Alaro |
|-----------------------|--|
| Risk of thunderstorms | <p>2</p> <ul style="list-style-type: none">• None will initiate• Thunderstorms will initiate with following properties (rain rate, gusts, ...) <p>1</p> |

CAPE *CAPE values too high in Alaro?*



Alaro CAPE forecast (left) vs ECMWF CAPE forecast (right)

Namelist changes for test 9 June 2014

LCVGQD=.T.

RMULACVG=15 instead of -25

LVERTFE=.F.

NVSCH=0 instead of 3

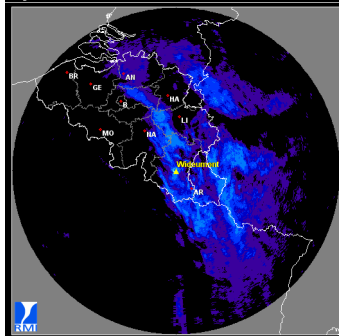
LAPRXPB=.F.

GCVALFA=0.3E-4 instead of 0.45E-4

Data Assimilation

File : 2012030500002438.pcr
Type : PCAPPI(R)
Range : 240.0km

05.03.2012
00:00:24

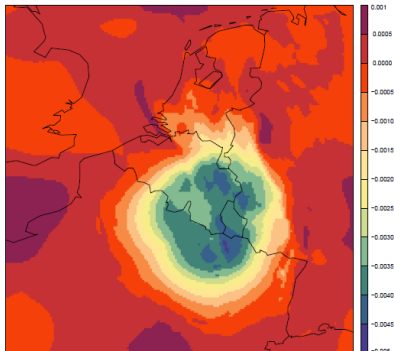


mm/h
>100
70 - 100
50 - 70
40 - 50
30 - 40
25 - 30
20 - 25
15 - 20
10 - 15
5 - 10
3 - 5
1 - 3
0.5 - 1
0.3 - 0.5
0.1 - 0.3

PRF : 600 / 0
RS : 2
TS : 33
CC : Doppler 7
RES : 0.841km
H : 1500m
A/B : 200.0/1.6

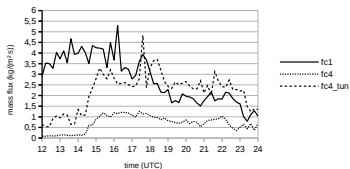
KMI - IRM
Radar Wideumont

S046HUMI.SPECIFI
2012/3/5 z0:0 Uninitialized

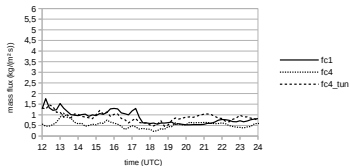


Pukkelpop

Downdraft mass flux 18 August 2011



Downdraft mass flux 8 August 2011



Downdraft mass flux 14 July 2010

