

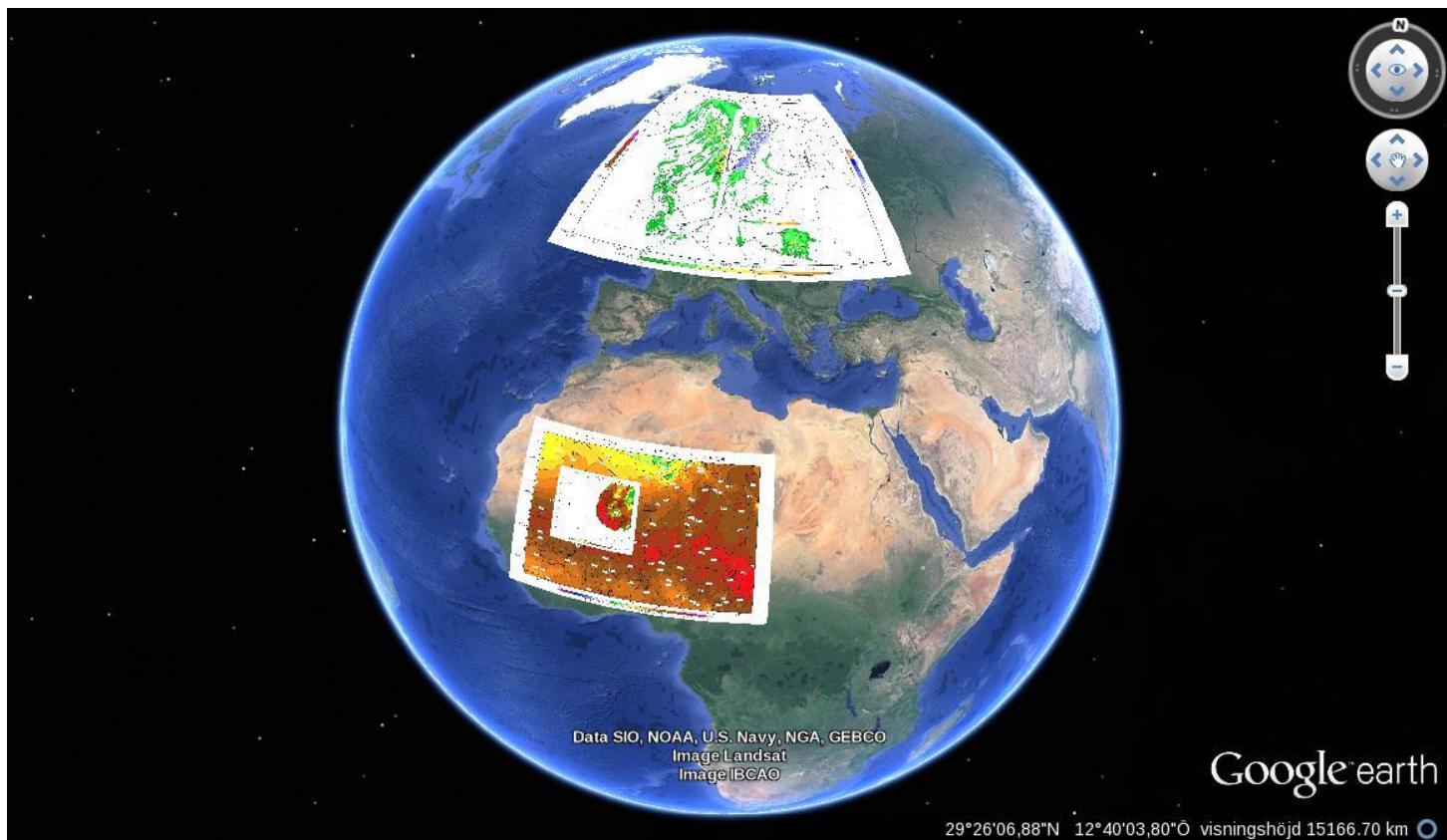
Visualisation and Communcation of uncertainties in the Swedish Armed Forces

UEF 2015

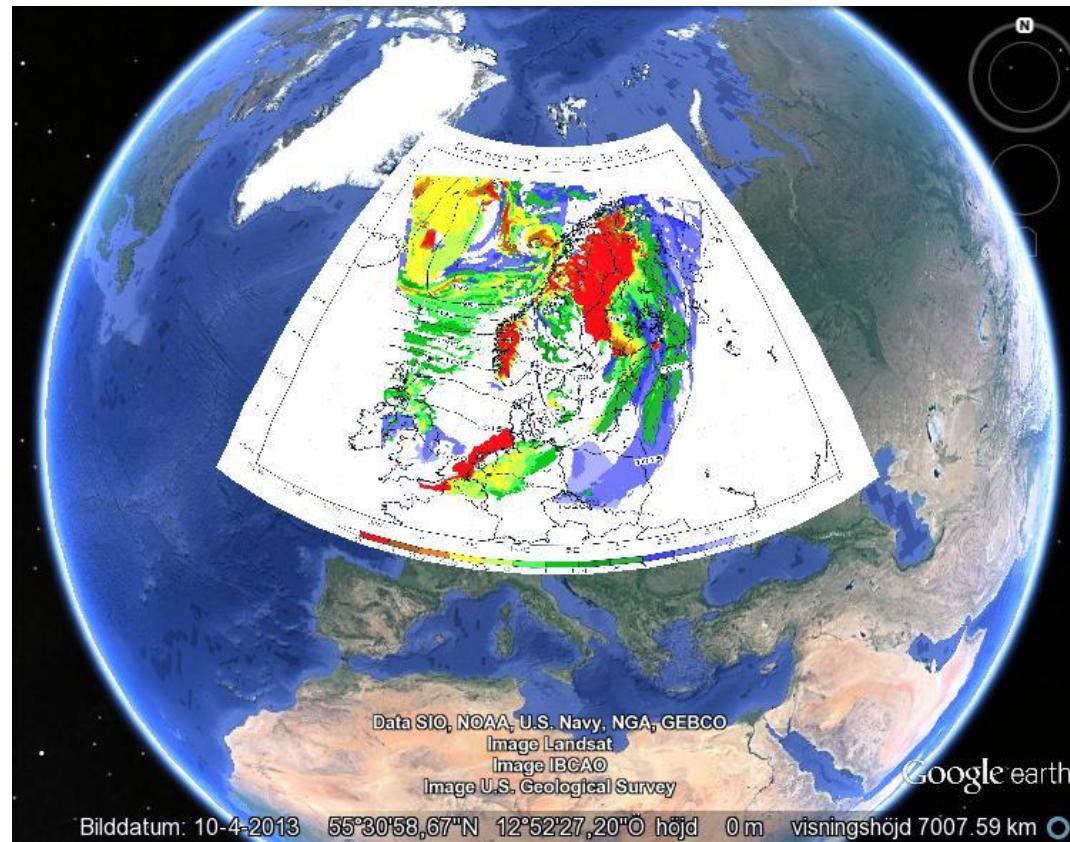
Outline

- The use of WRF Model in Swedish Armed Forces
- SAF-WRF LAMEPS (Limited Area Model Ensemble Prediction System)
- Showing some LAMEPS testproducts
- Future

WRF Model



WRF Northern Europe



LAMEPS

**Limited Area Model Ensemble Prediction
System
(9 km horizontal resolution)**

SAF-WRF LAMEPS

LAMEPS members parameterization

Medlem	Oper	CTRL	1	2	3	4	5	6	7	8	9	10
Indata	EC HRES	GFS Oper	GEFS medi 1	GEFS medi 2	GEFS medi 3	GEFS medi 4	GEFS medi 5	GEFS medi 6	GEFS medi 7	GEFS medi 8	GEFS medi 9	GEFS me 10
DA	3Dvar	3Dvar	Cold start	Cold start								
PBL	YSU	YSU	YSU	YSU	YSU	MYJ	QNSE	YSU	YSU	YSU	YSU	YSU
Mikrofysik	Thomp	Thomp	Thomp	Thomp	Thomp	Thomp	Thomp	Mill 2	Mill 2	Godd	Godd	Godd
Markschema	MonO	MonO	MonO	MonO	MonO	ETA	QNSE	MonO	MonO	MonO	MonO	MonO
LSM	Noah	Noah	Noah	Noah	RUC	Noah	Noah	Noah	Noah	Noah	Noah	Noah
Konvektion	KF	KF	KF	Grell	KF	KF	KF	Grell 3D	KF	Grell	KF	Grell 3D



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ANSWER

9 km

00z 06z 12z 18z

NV Europa/Sverige X X X X

LAMEPS X X

3 km

AOI 00z 06z 12z 18z

Sverige x x x x

Område 2 - Sahel/V Afrika

9 km

AOI 00z 06z 12z 18z

Sahel/N Afrika MPF X X X X

3 km

00z 06z 12z 18z

Mali MPE X X X X

Punktprognose

Meteogram

Sonderingar

LAMEPS-gram

Sonderingar LAMEPS

Höjdprognoser

TPA

Sky Diver TDA Test! X

Bullerprognos

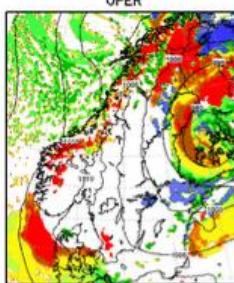
Model stn charts Domains

Theatre 1

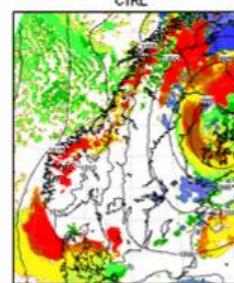
Theatre 2

CIG members 2015-05-13 00z+24

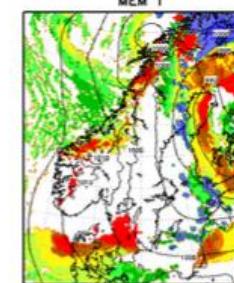
OPER



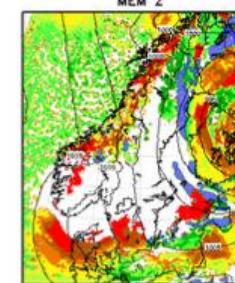
CTRL



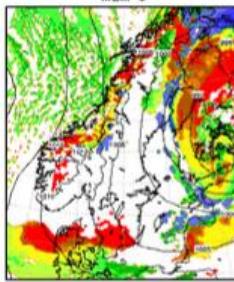
MEM 1



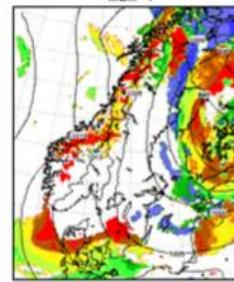
MEM 2



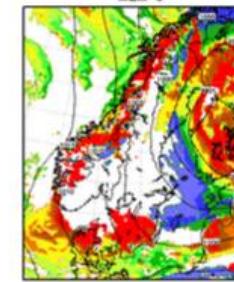
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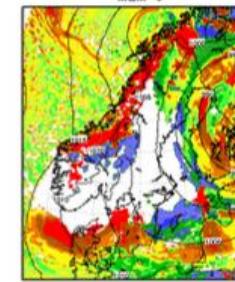
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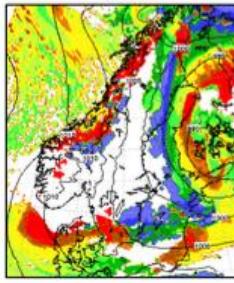
MEM 5



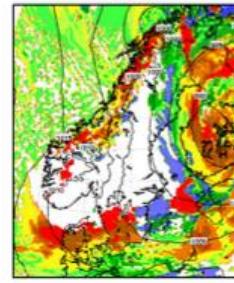
MEM 6



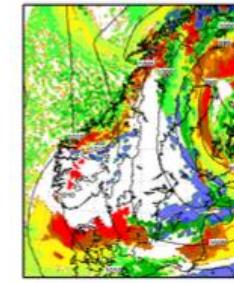
MEM 7



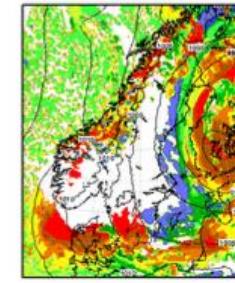
MEM 8



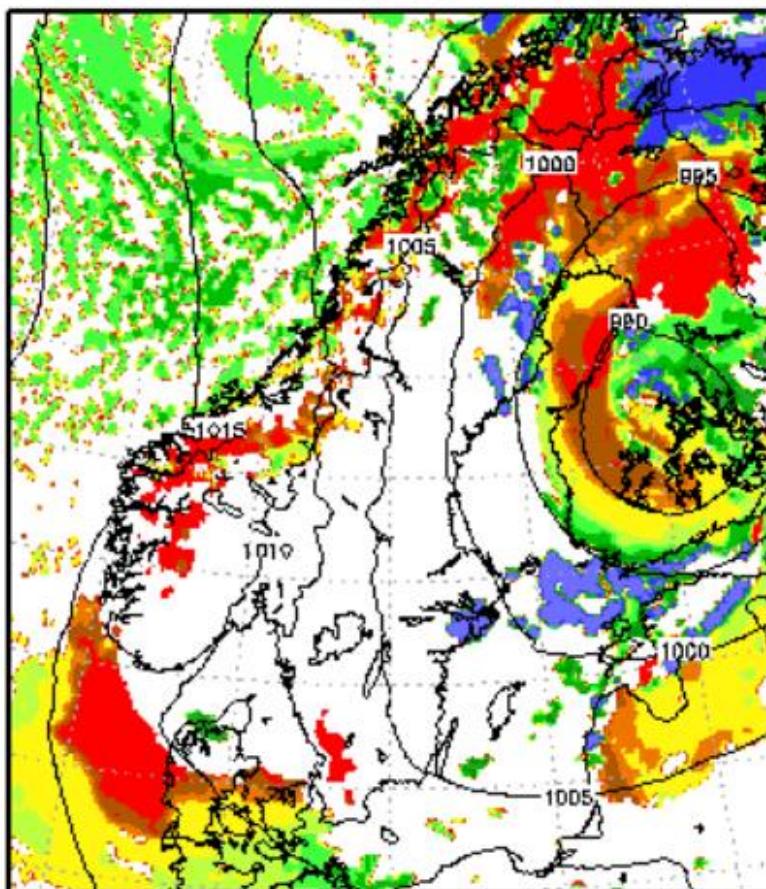
MEM 9



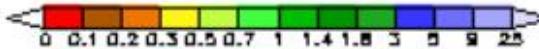
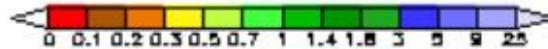
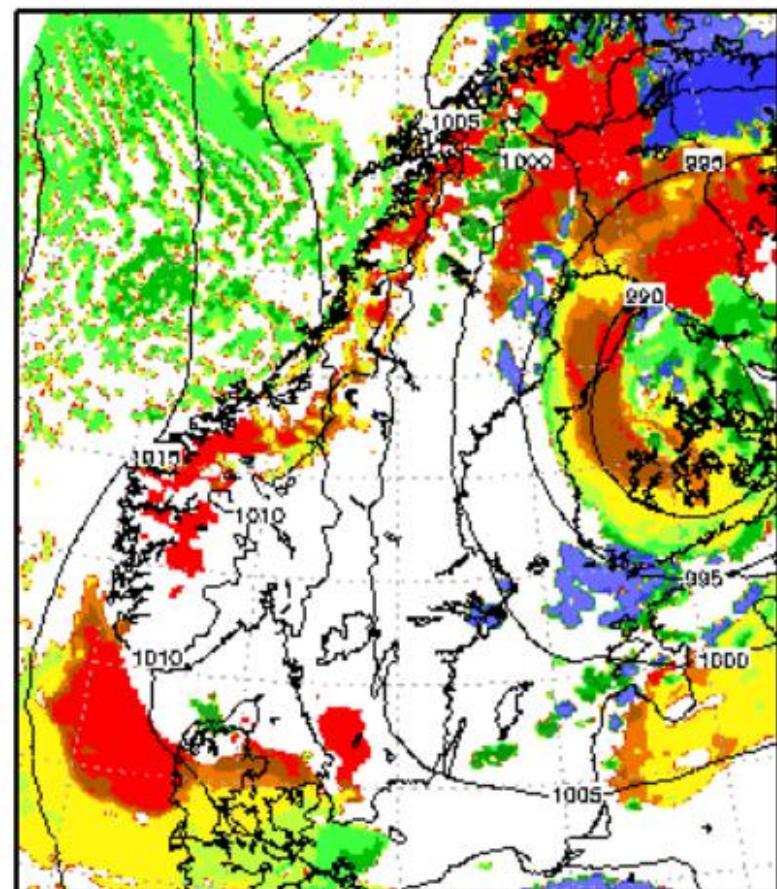
MEM 10



OPER



CTRL




Status
Område 1 - Europa
9 km

	00z	06z	12z	18z
NV Europa/Sverige	X	X	X	X
LAMEPS	X	X		

3 km

	00z	06z	12z	18z
Sverige	X	X	X	X

Område 2 - Sahel/V Afrika
9 km

	00z	06z	12z	18z
Sahel/V	X	X	X	X
Afrika MPE				

3 km

	00z	06z	12z	18z
Mali MPE	X	X	X	X

Punktprediktioner

Meteogram	X
Sonderingar	X
LAMEPS-gram	X
Sonderingar LAMEPS	X
Höjdprediktioner	X

TDA

Sky Diver TDA Test!	X
Bullerprediktioner	X

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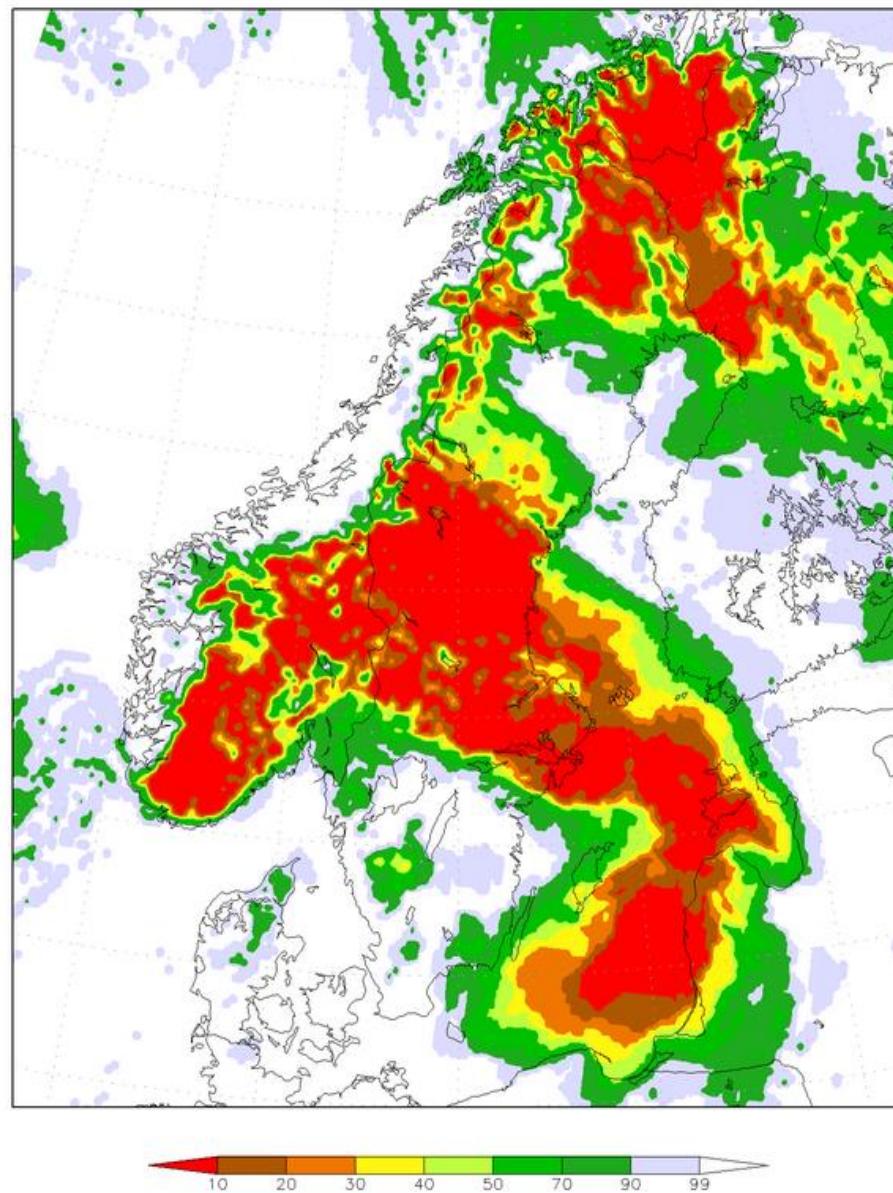
Produkter / Statistik / Information / WIMO / Väderfall / Kontakt

SAFWRF LAMEPS produkter för Skandinavien 9 km Run: 00Z

Parameter	0	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	Animering
Nederbörd medlemmar	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Denna
Molnbas medlemmar	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Denna
Vind 10 m medlemmar	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Denna
Sikt medlemmar	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Denna
MSLP Mean & RMS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Denna
MSLP Mean & vind RMS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Denna
Nederbörd medel	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Denna
Prob [%] 10 m vind >= 10 m/s	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Denna
Prob [%] 10 m vind >= 14 m/s	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Denna
Prob [%] 10 m vind >= 20 m/s	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Denna
Prob [%] 10 m vind >= 25 m/s	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Denna
Prob [%] 10 m vind >= 33 m/s	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Denna
Prob [%] 10 m byvind >= 16 m/s	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Denna
Prob [%] 10 m byvind >= 20 m/s	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Denna
Prob [%] 10 m byvind >= 25 m/s	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Denna
Prob [%] 10 m byvind >= 33 m/s	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Denna
Prob [%] VFR (>5km/300m)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Denna
Prob [%] inte VFR (>5km/300m)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Denna
Prob [%] VMC mellan 1.5-5 km	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Denna
Prob [%] VMC mellan 1.5-9 km	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Denna
Prob [%] VMC mellan 6-12 km	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Denna
Prob [%] CAS low	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Denna
Prob [%] CAS mid	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Denna

SAFWRF LAMEPS - Prob [%] VFR (>5km/300m)

Prob VFR 2015-05-19 00z+24



WIMO database

IMPACT

(Not being able to conduct operations)

75%

50%

25%

A | CAS low level

clg < 180 < clg < 300 < clg
vis < 5 < vis < 8 < vis

CAS: Close Air Support



Status

Område 1 - Europa

9 km

AOI 002 002 122 102
NV Europa/Sverige X X X X
JAMERS X X

LAMM

3 Km

Område 3 - Sahel/V Afrika

Omrade 2 - Sanelli v Afrika

AOI	00z	06z	12z	18z
Sahel/V		X	X	X
Afghanistan	MPE			

Afrika

3 km
AOI 00z 06z 12z 18z

Punktprognosen

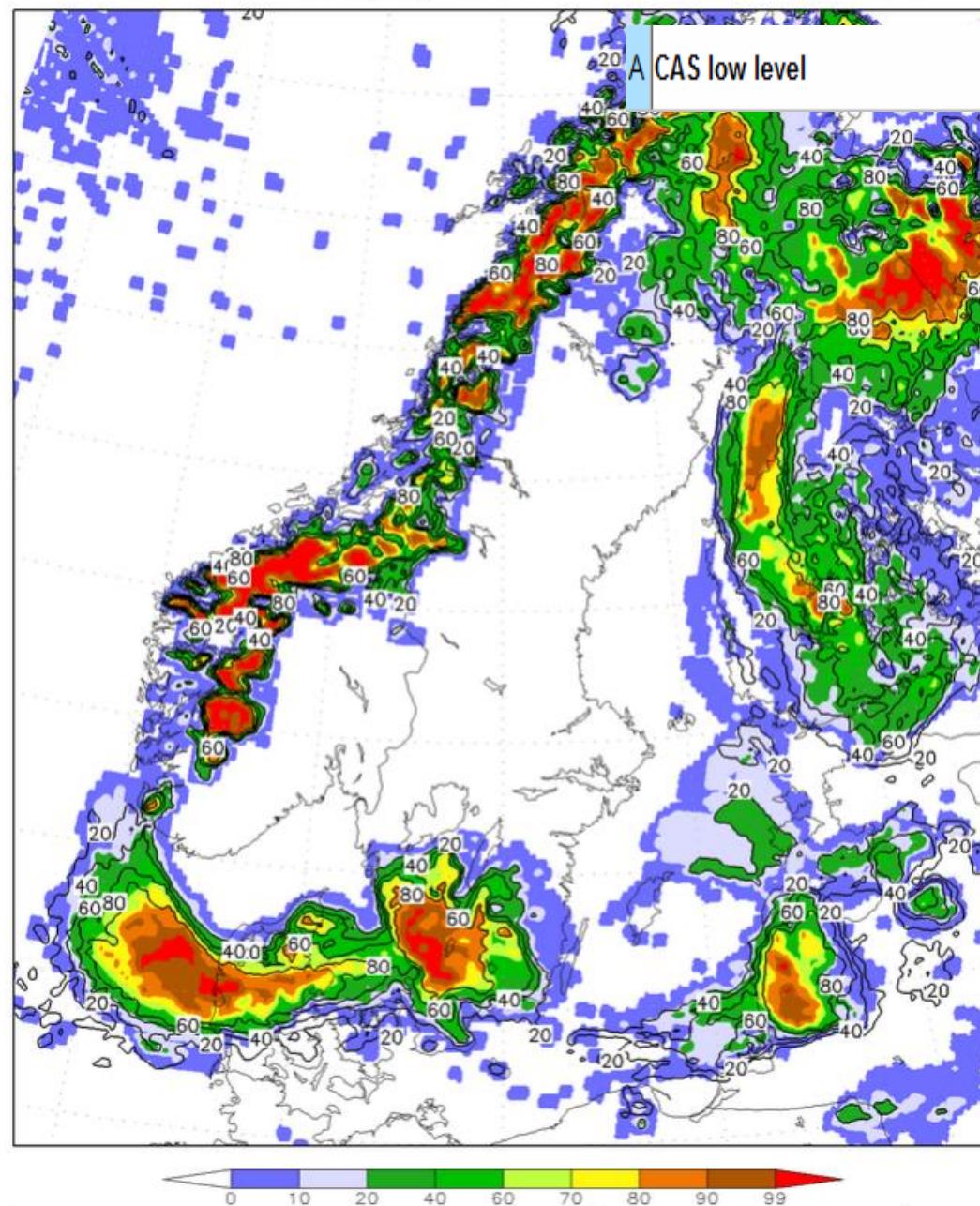
Meteogram	X
Sonderingar	X
LAMEPS-gram	X
Sonderingar LAMEPS	X
Höjdprognosar	X

TDA

Sky Diver TDA Test! X
Bullerprognos X

Model stn charts	Domains
Theatre 1	1 2
Theatre 2	1 2

SAFWRF LAMEPS produkter för Skandinavien 9 km Run: 00Z



clg < 180 < clg < 300 < clg
vis < 5 < vis < 8 < vis

Impact

75% 50% 25%

Risk= Probability * Impact

Example:

Orange area: $0,85 \times 0,75 = 0,64$



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Status**Område 1 - Europa****9 km**

AOI 00z 06z 12z 18z

NV Europa/Sverige X X X X

LAMEPS X X

3 km

AOI 00z 06z 12z 18z

Sverige X X X X

Område 2 - Sahel/V Afrika**9 km**

AOI 00z 06z 12z 18z

Sahel/V X X X X

Afrika MPE

3 km

AOI 00z 06z 12z 18z

Mali MPE X X X X

Punktpрогнoser

Meteogram X

Sonderingar X

LAMEPS-gram X

Sonderingar LAMEPS X

Höjdprognoser X

TDA

Sky Diver TDA Test! X

Bullerprognos X

Model stn charts Domains

Theatre 1 1 2

Theatre 2 1 2

Senaste modellkörningar/produkter:

Område	Prognosfält	Punktdata
NV Europa 9 km	2015051306Z	2015051306Z
Sverige 3 km	2015051306Z	2015051306Z
SAF-WRF LAMEPS	2015051300Z	2015051300Z
<hr/>		
Sahel/V Afrika 9 km	2015051306Z	2015051306Z
Mali 3 km	2015051306Z	2015051306Z

Klicka för plan av körningar

vid frågor om denna sida och innehåll kontakta:

Andreas Grantinger
FM METOCC, LedR



Status

Område 1 - Europa

9 km

AOI	00z 06z 12z 18z
NV	X X X X
Europa/Sverige	
LAMEPS	X X
3 km	
AOI	00z 06z 12z 18z
Sverige	X X X X

Område 2 - Sahel/V Afrika

9 km

AOI	00z 06z 12z 18z
Sahel/V	X X X X
Afrika MPE	
3 km	
AOI	00z 06z 12z 18z
Mali MPE	X X X X

Punktprognosser

Meteogram	X
Sonderingar	X
LAMEPS-gram	X
Sonderingar LAMEPS	X
Höjdprognos	X

TDA

Sky Diver TDA Test!	X
Bullerprognos	X

Model stn charts	Domains
Theatre 1	1 2
Theatre 2	1 2

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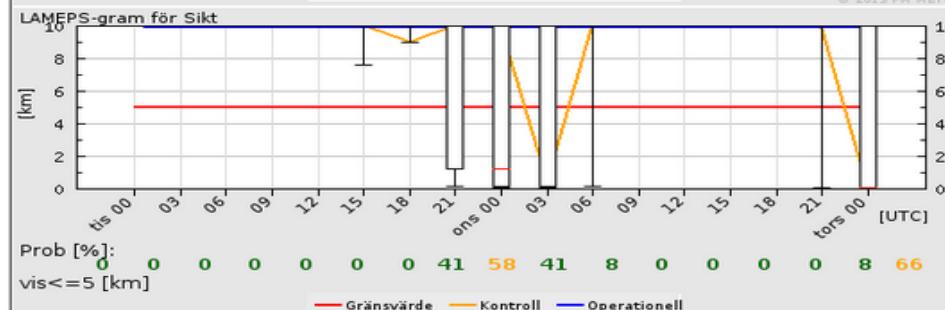
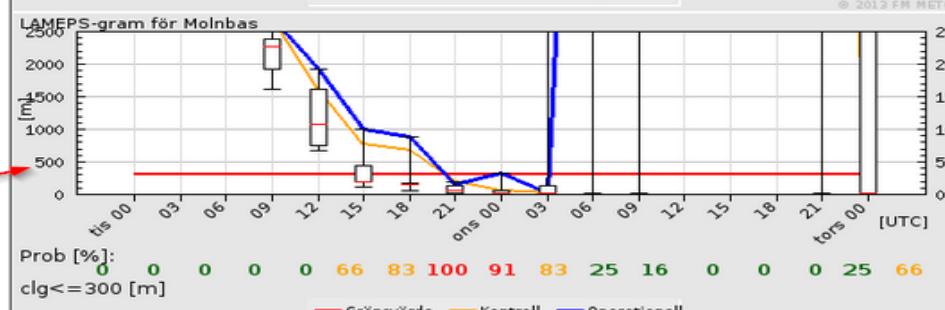
Produkter / Statistik / Information / WIMO / Väderfall / Kontakt

Välj parameter:

1. Total nbd [mm/3tim] \geq 5
2. Molnbas [m] \leq 300
3. Sikt [km] \leq 5

LAMEPS-gram
Sök plats:
Stockholm eller Lat/lon: N /E Sök! Rensa Instruction-pdf

LAMEPS-gram för Stockholm mellan 20150519 00z till 20150521 00z



Prognosvärden ges för N59.3E18.1 (1000000.00 km ifrån valid ort). Klicka nedan:

Länk till punktkarta!

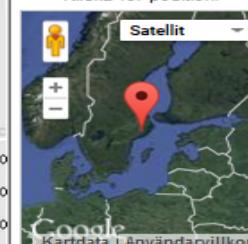
Skriv ut

BLUE: Deterministic

ORANGE: Control

RED: Threshold

Klicka för position!





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Produkter / Statistik / Information / WIMO / Väderfall / Kontakt

Status**Område 1 - Europa****9 km**

AOI 00z 06z 12z 18z
NV X X X X
Europa/Sverige

LAMEPS X X

3 km

AOI 00z 06z 12z 18z
Sverige X X X X

Område 2 - Sahel/V Afrika**9 km**

AOI 00z 06z 12z 18z
Sahel/V X X X X
Afrika MPE

3 km

AOI 00z 06z 12z 18z
Mali MPE X X X X

Punktprognoser

Meteogram X
Sonderingar X
LAMEPS-gram X
Sonderingar LAMEPS X
Höjdprognos X

TDA

Sky Diver TDA **Test!** X
Bullerprognos X

Model stn charts Domains
Theatre 1 1 2
Theatre 2 1 2

Ensemble Prognossonderingar

Sök plats (prioriteras före Lat/Lon):

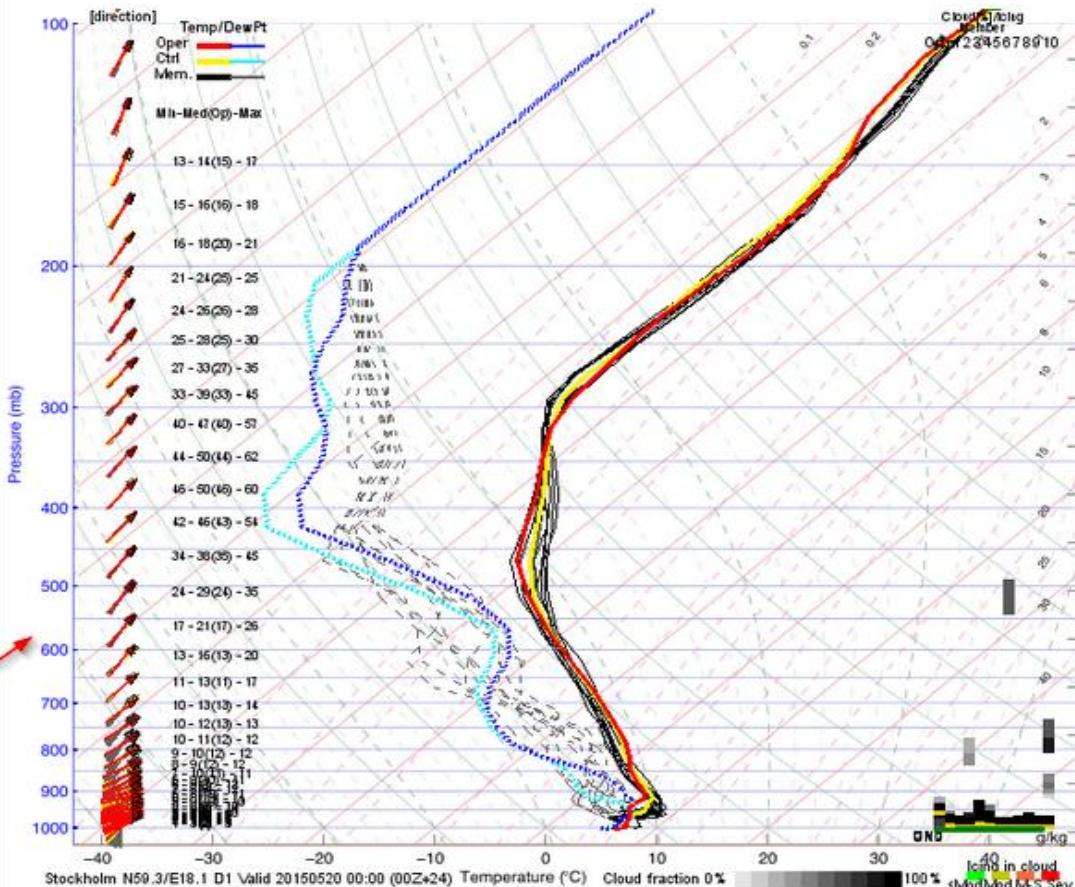
Stockholm

eller Lat/lon: N

/E

Sök!

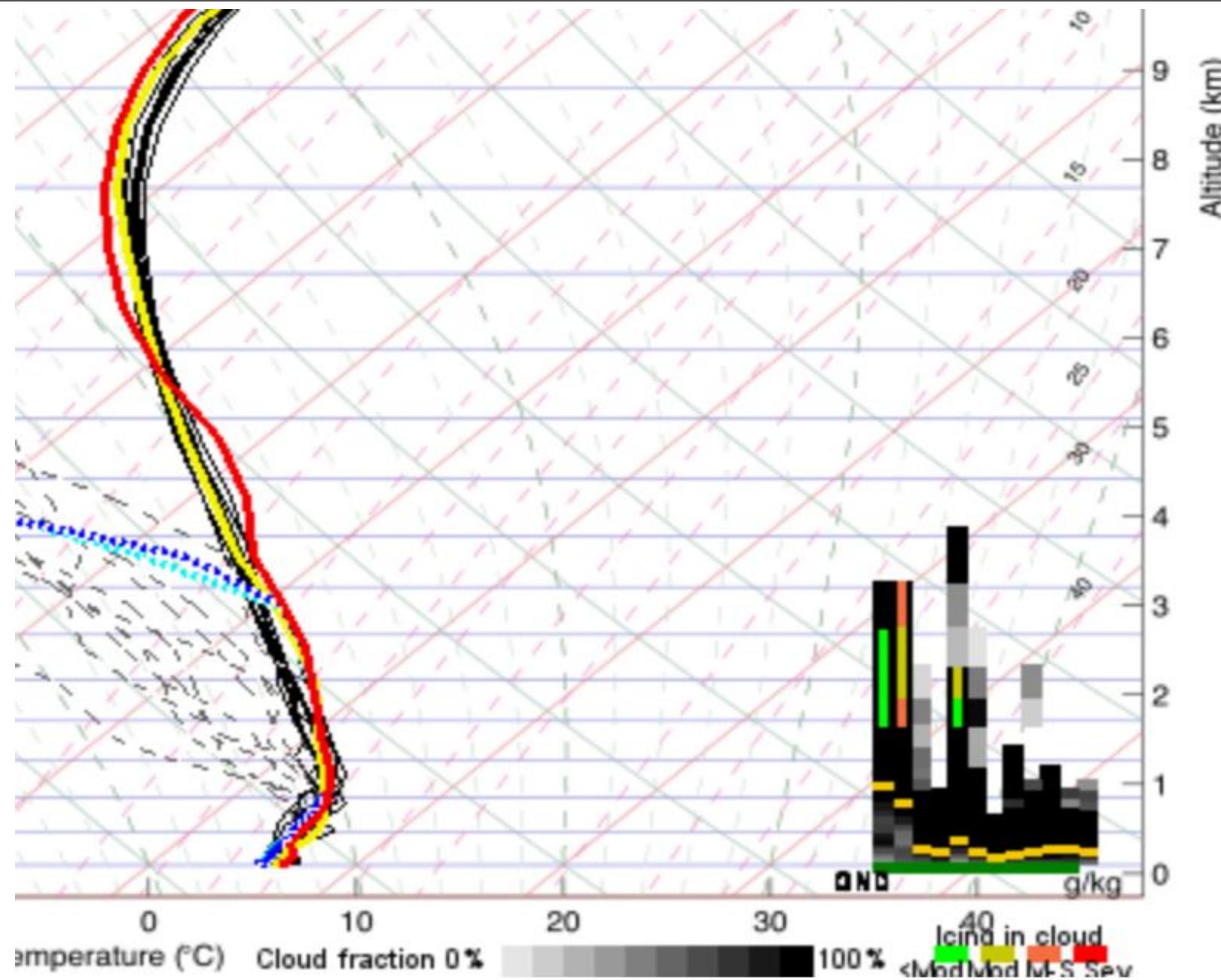
Rensa

**Tidssteg:**

- kl 00z tis 19/5
- kl 03z tis 19/5
- kl 06z tis 19/5
- kl 09z tis 19/5
- kl 12z tis 19/5
- kl 15z tis 19/5
- kl 18z tis 19/5
- kl 21z tis 19/5
- kl 00z ons 20/5
- kl 03z ons 20/5
- kl 06z ons 20/5
- kl 09z ons 20/5
- kl 12z ons 20/5
- kl 15z ons 20/5
- kl 18z ons 20/5
- kl 21z ons 20/5
- kl 00z tors 21/5

Prognosvärder ges för N59.3/E18.1 (100000.00 km ifrån valid ort). Klicka nedan:
Länk till punktkarta!

Sonderingar från DA: Valj WMO station ▾



FUTURE

A lot more is to be done with the EPS on the short-range timescale:

- Increased spatial resolution(9 km->3 km).
- To have ECMWF analysis every 6 hours, i.e using global perturbations from ECMWF EPS.
- To conduct own local perturbations using ETKF.
- Assess the uncertainty in general forecasts for the customers. Recently formed group SWaF-SMHI. Start to use short-range EPS products more regularly to assess the usefulness.
- Even more specific demands, for their specific system, from the customers.



QUESTIONS ?