

COSMO-DE EPS –

A new way predicting severe convection

- 1. Set-up of the COSMO-DE EPS**
- 2. From research to users and vice versa**
- 3. Some Verification results**
- 4. Strong points and limitations –
how the COSMO-DE EPS should be used**

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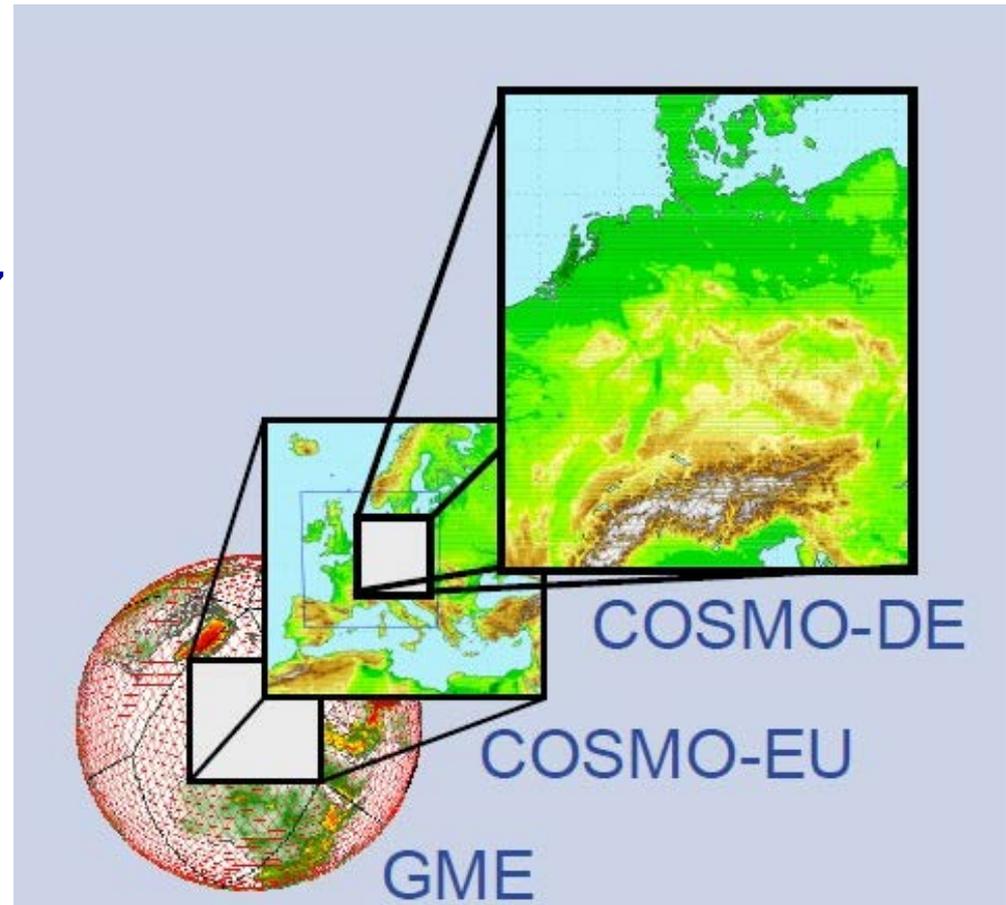


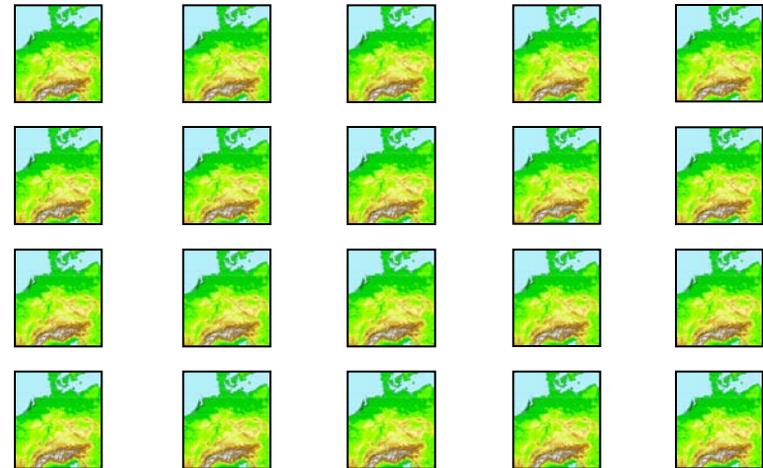
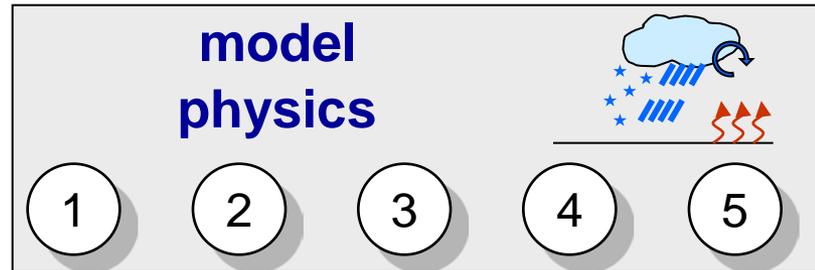
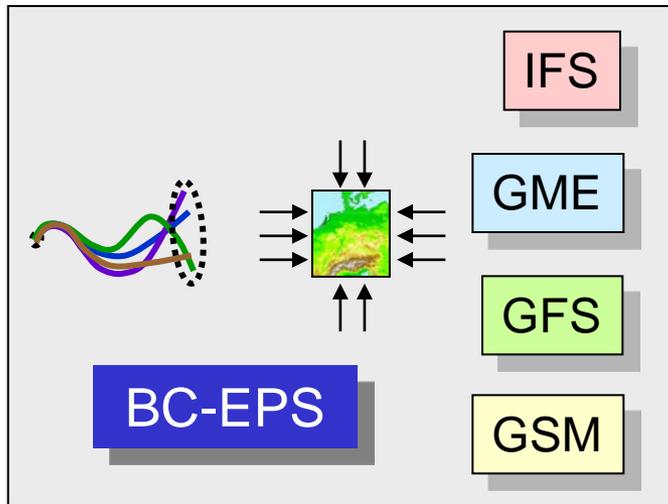
1. The set-up of the COSMO-DE EPS

- based on COSMO-DE
- grid size: 2.8 km
- Operational since April 2007
- Introduced on 10 MOS workshop Nov 2005

convection-permitting

lead time: 0-21 hours,
8 starts per day
(00, 03, 06,... 21 UTC)





variations in lateral boundaries,
initial conditions

20 Members + products
probabilities, quantiles, ensemble mean,
spread, min, max, ...

Availability: approx 1:40 h in database,
2:00 h in NinJo



2. From research to users and vice versa

COSMO-DE EPS from Dec 2010 to 21 May 2012
pre-operational – why for such a long time ?

Pre-operational means no disaster backup

Evaluation and **early** feedback

Missing products ?

Use this products !
Play with it !
Seek the limits !

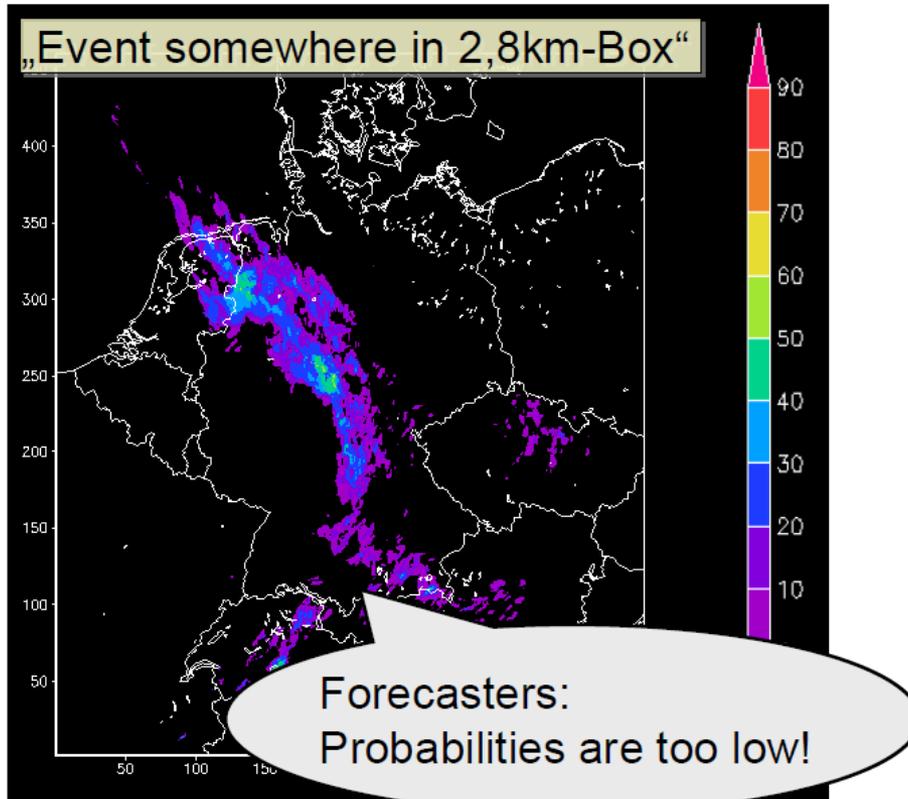
Quality of the products – related to other forecast tools

Visualization: User-friendly ? Clearly represented ?

Availability (How often products / model runs will be missed?)

Coordination by the working group „Introduction of the COSMO-DE
EPS

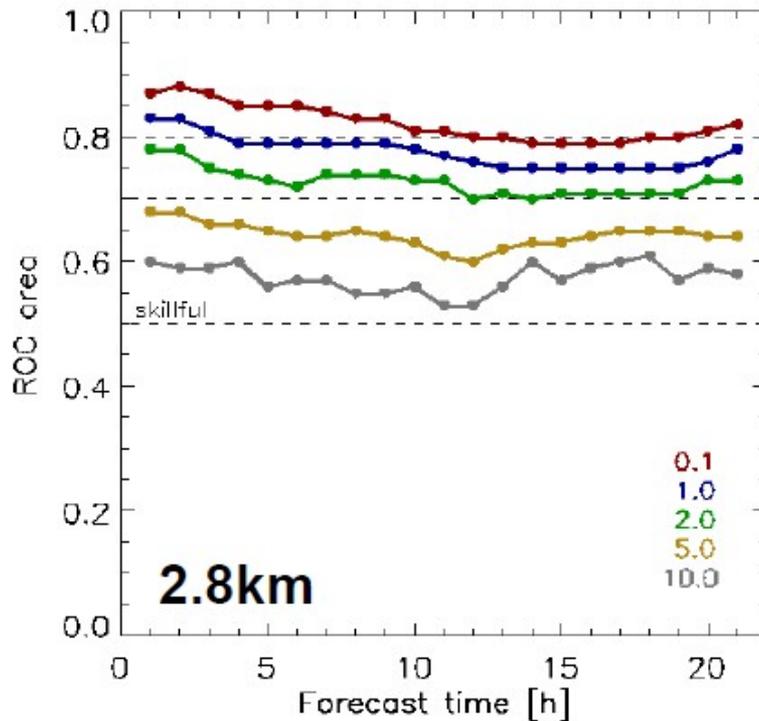
Why 2.8 and 28 km grid boxes ?



- „Upscaling“ of the COSMO-DE EPS
- Using of an appropriate scale (warning areas, districts)

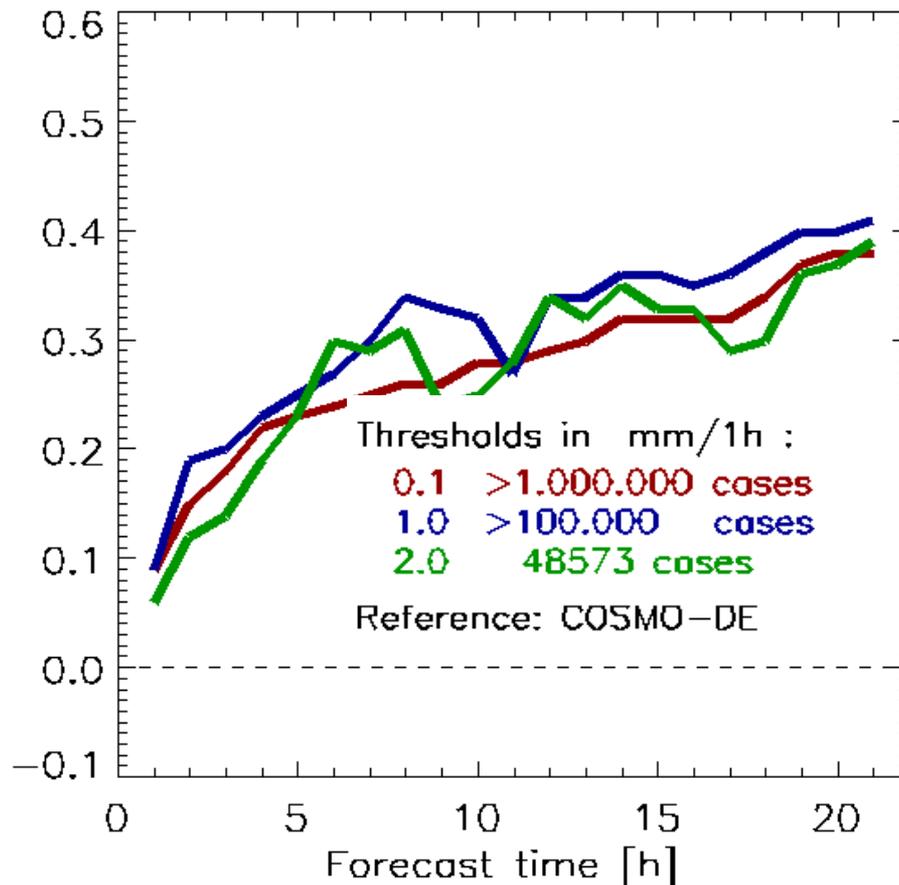
3. Some Verification results

PREC(1h) Summer 2011 00UTC ROC area



1-hr precip, Dec 2010 – Apr 2011, 00 UTC

BRIER SKILL SCORE

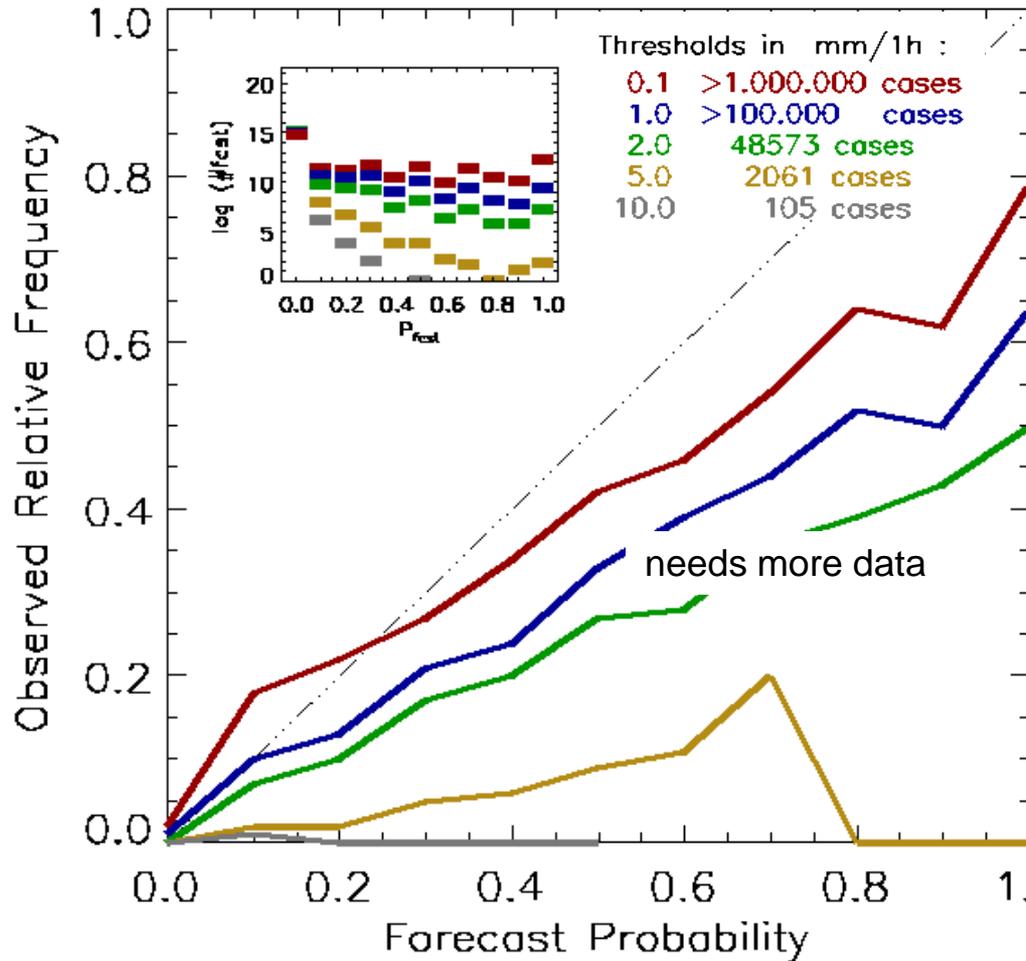


How good are the probabilities derived from the ensemble ?

In relation to COSMO-DE:

- Forecast will be improved for all precip thresholds by the EPS
- Additional value grows with lead time (less predictability by the deterministic model)

RELIABILITY DIAGRAM



- Events more often predicted than observed
- Some overpredicting is to be seen
- additional calibration has a good potential to improve the forecasts

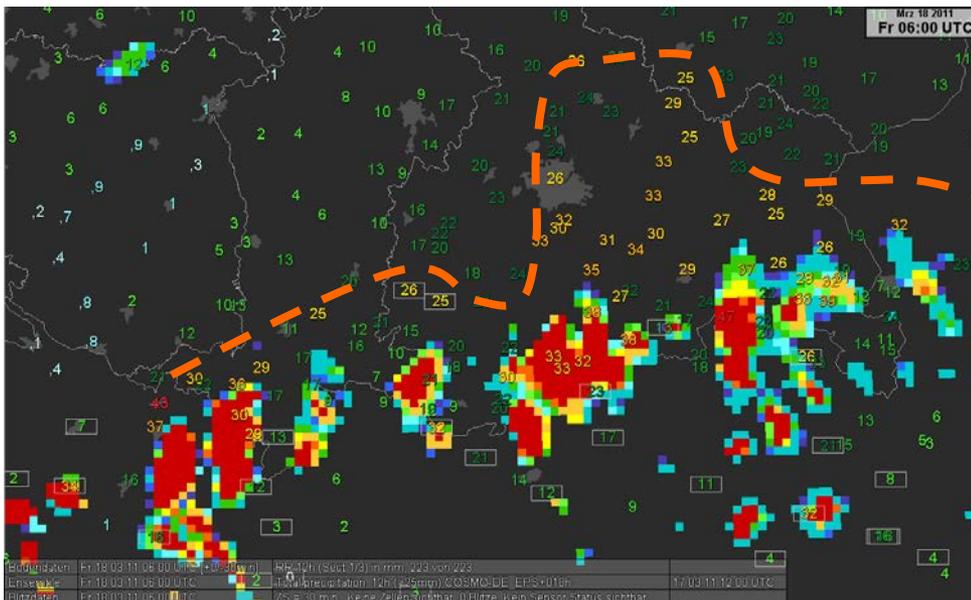
4. How the COSMO-DE EPS should be used (the „vice versa“)

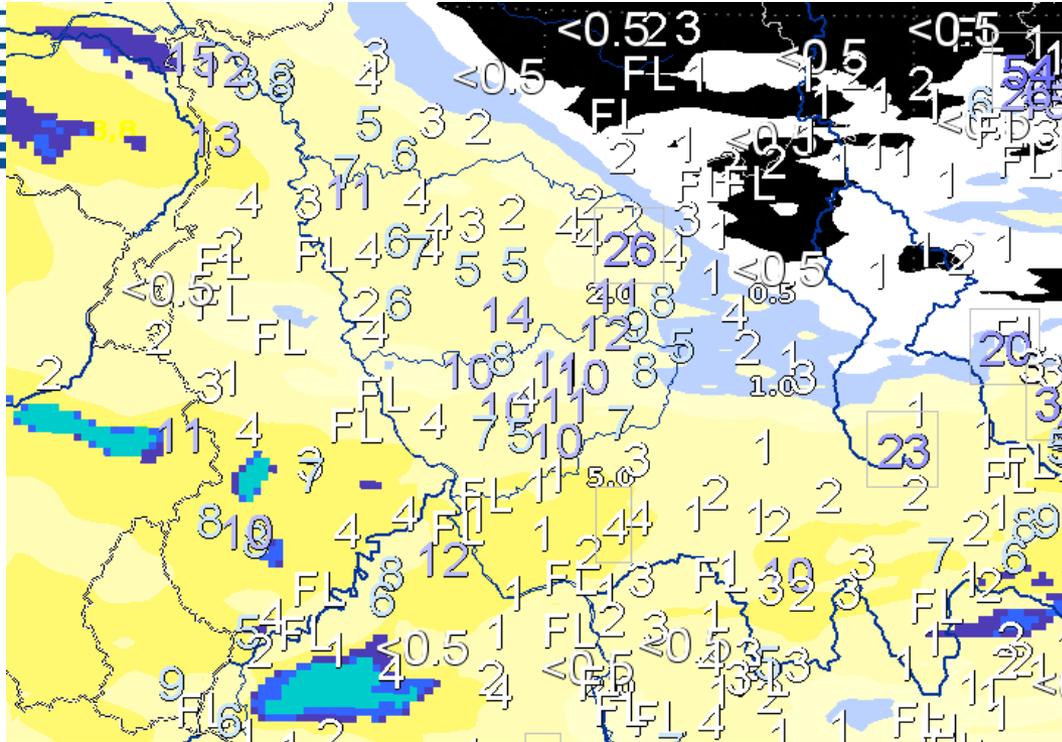
Well predictable:

Persistent (large-scale) rain events
(accumulation time 12 hours)

Caution:

Spreading of the precip
far away from steep
orography sometimes not
well predicted !





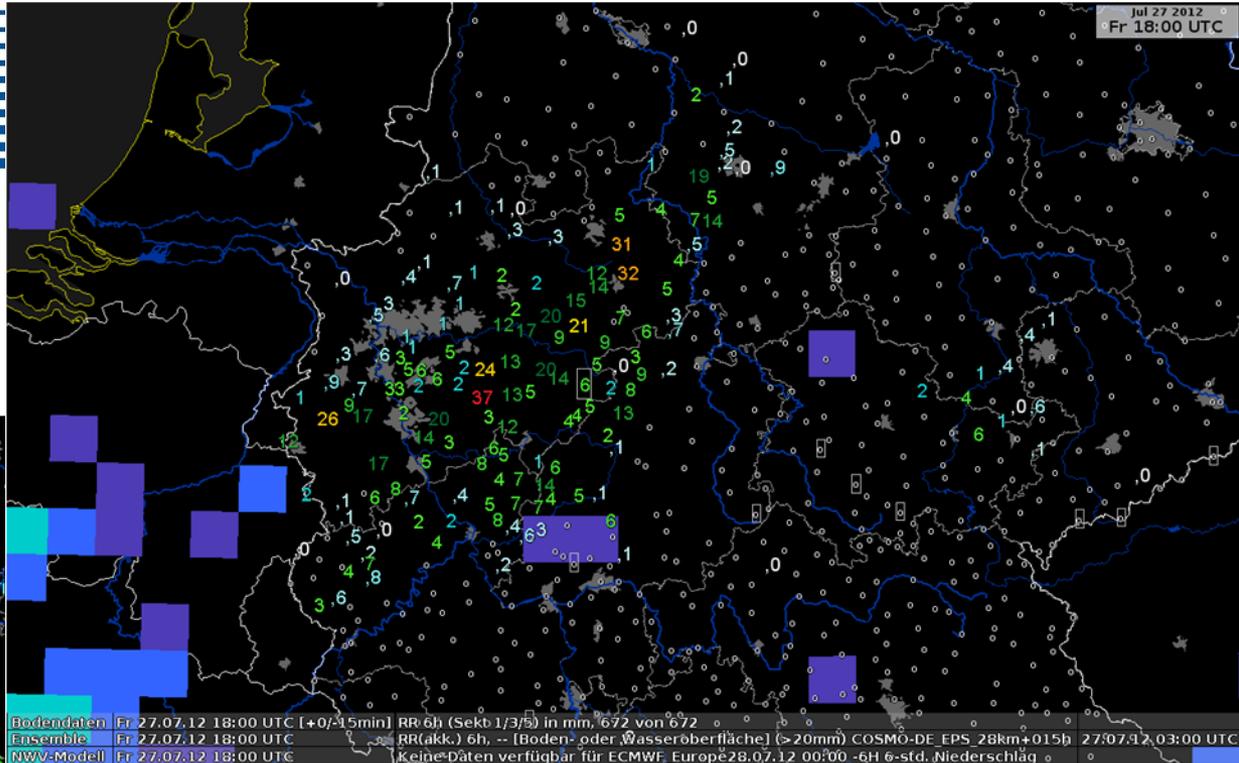
Snowfall events:

„Younger“ model runs from COSMO-DE EPS (and also COSMO-EU) sometimes tends to reduce Expected total snowfall amounts

**12-hr snowfall, COSMO-DE EPS,
Q75 + Prob > 10 cm,
05 Feb 2013, 12 + 06 ... 18 H
Total snow (observations)**

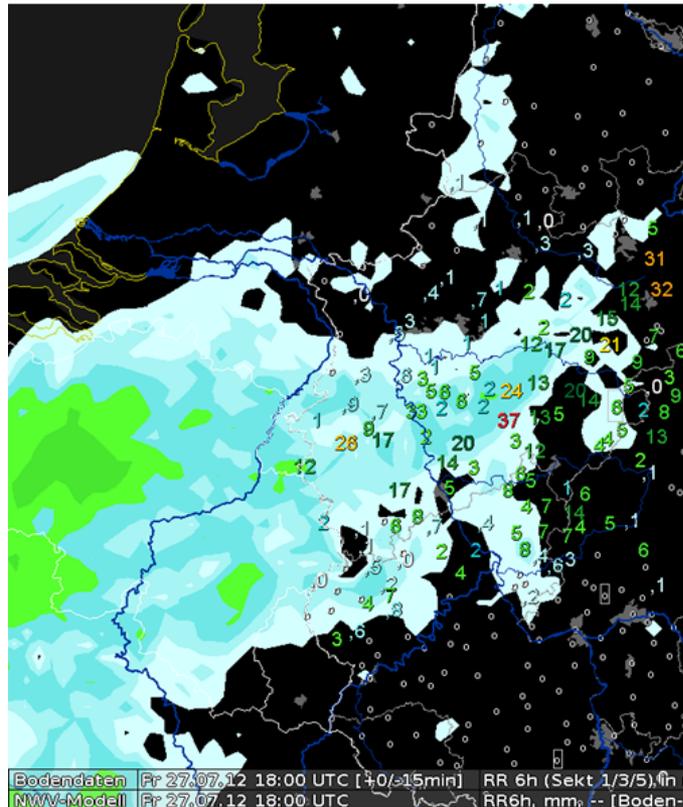


27 July 2012,
12 to 18 UTC



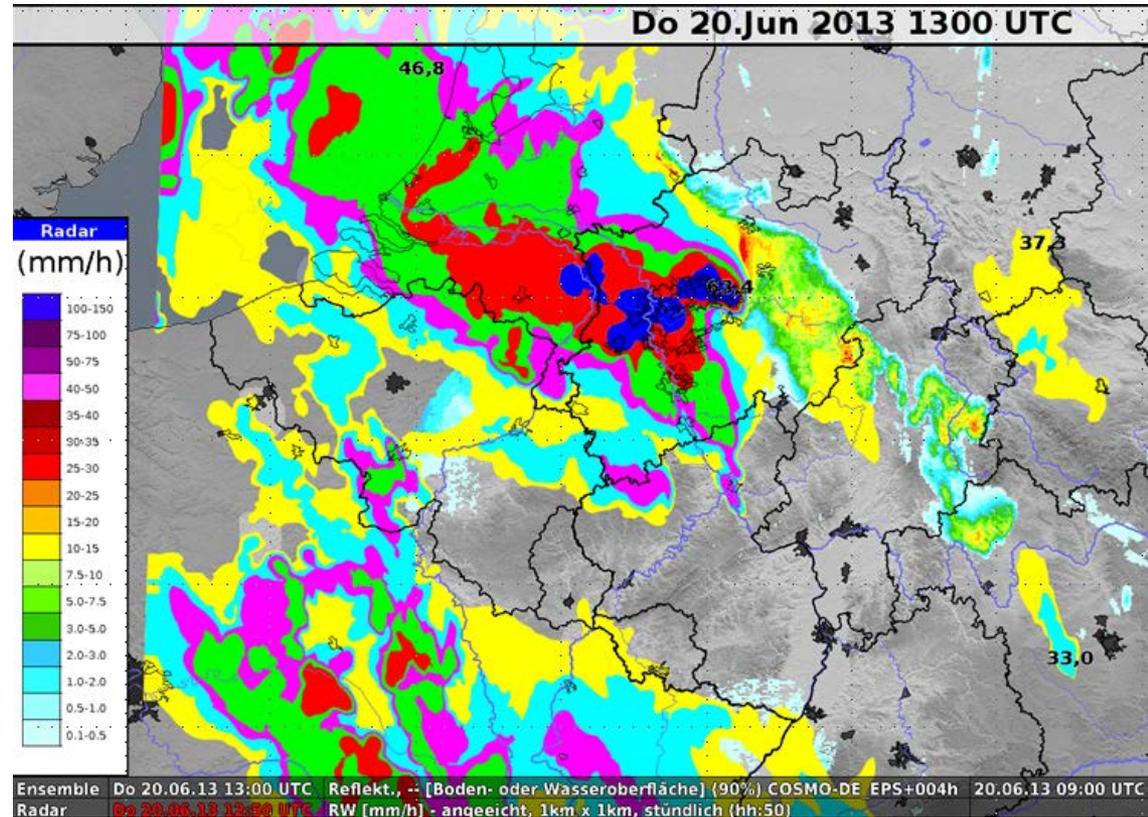
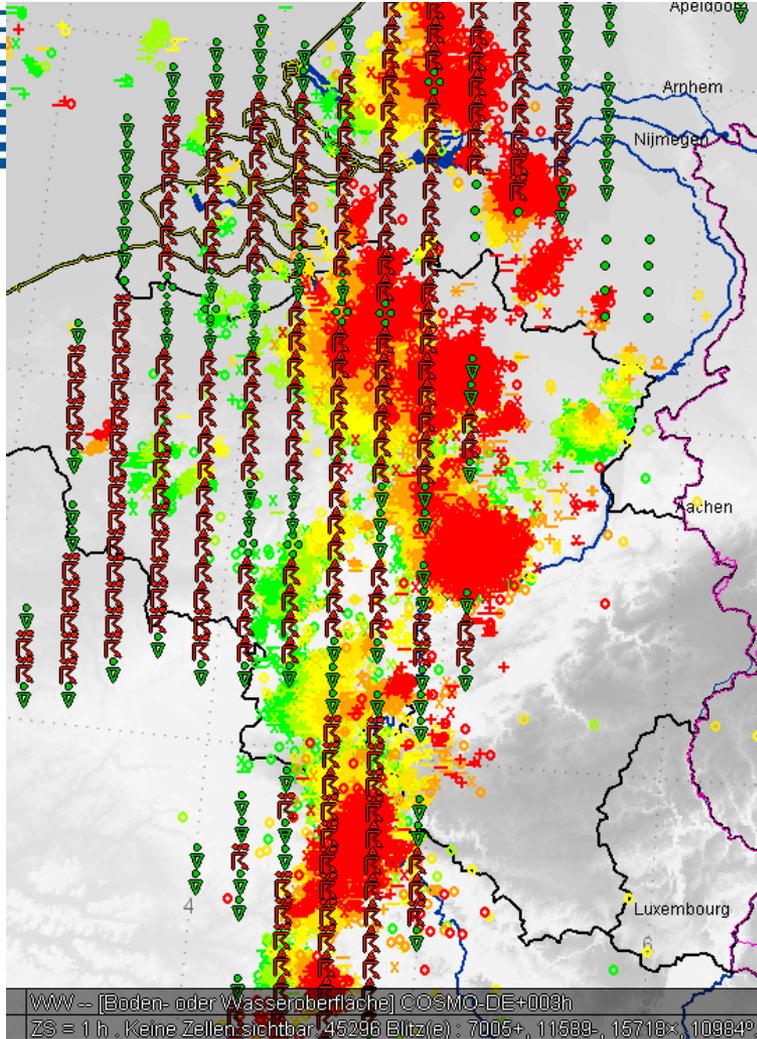
27.07., 18 UTC: 6-std. Niederschlag (Beobachtungen) +
COSMO-DE EPS, Prob > 20 mm, 27.07., 03 + 09 ... 15 H

Onset of severe
convection after
long dry spells not
well predictable !



27.07., 18 UTC: 6-std. Niederschlag (Beobachtungen) +
COSMO-EU, 27.07., 06 + 06 ... 12 H





Predicted ww-code
Observed strikes

Predicted radarreflectivity

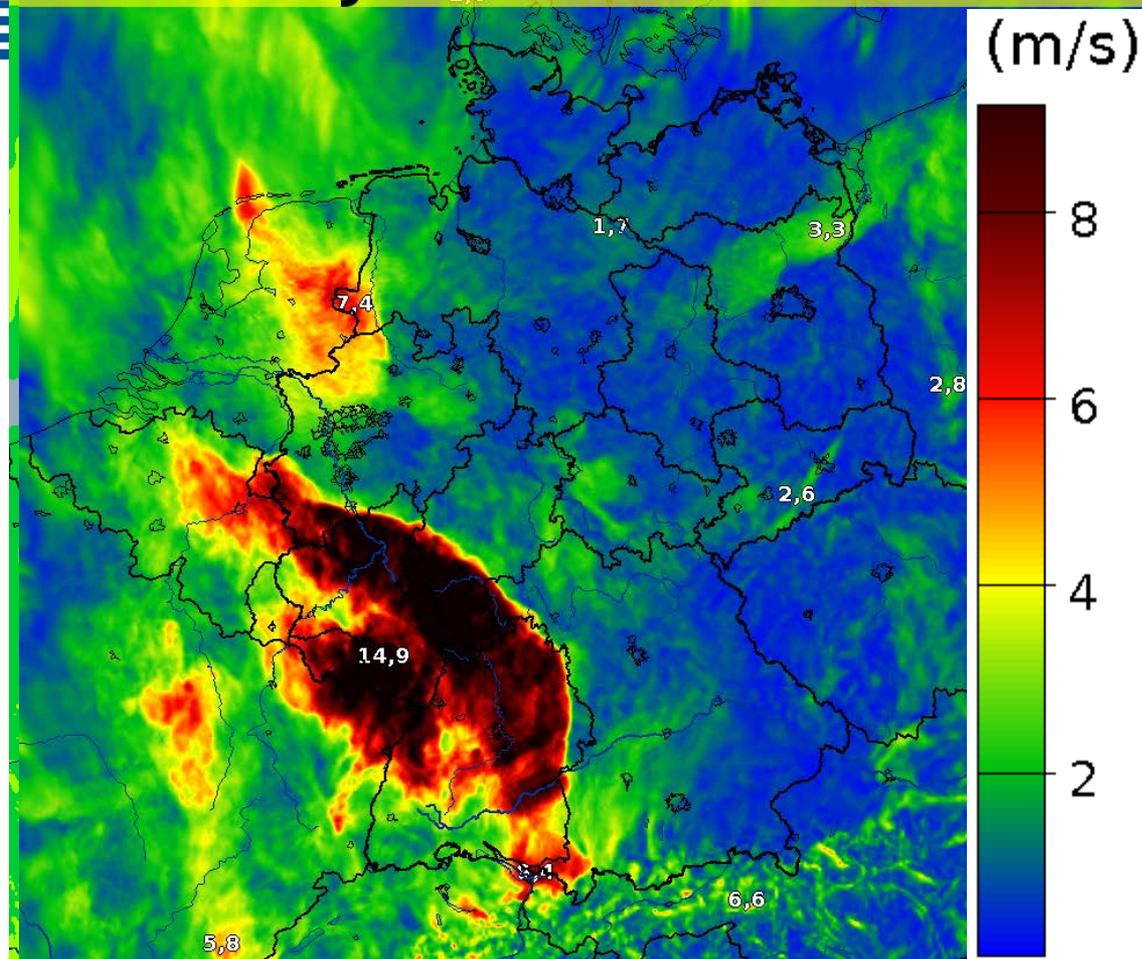
Often performs better than predicted precip totals or predicted ww-code from the deterministic model



COSMO-DE EPS is able to simulate deep convection triggered gust events in a realistic way

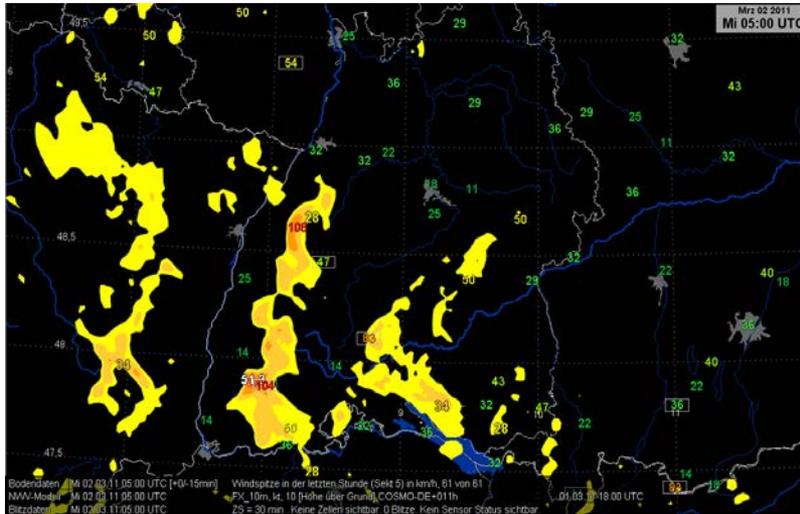
Most successful in case of well-organized events (squall lines, fronts)

**Predicted gusts sometimes of a unrealistic high value !
(Observations: 2 stations Bft 11, 2 stations Bft 10)**



**10m windgusts in m/s at 18 UTC
+ COSMO-DE EPS, Spread,
20 Jun 2013, 00 + 18 H**

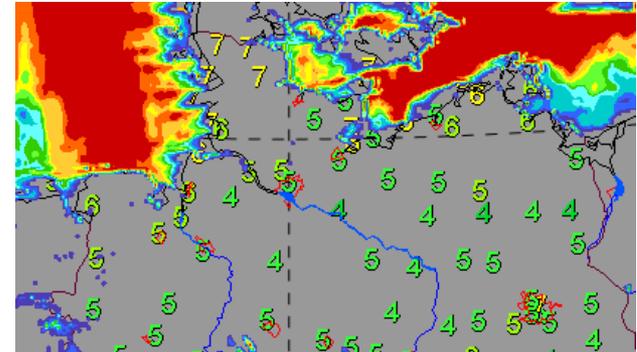
Well predictable:



**COSMO-DE EPS, 01.03.2011,
18 + 11 H. Q90.**

**Wind gusts, especially over
complex orography**

Take care: In some cases

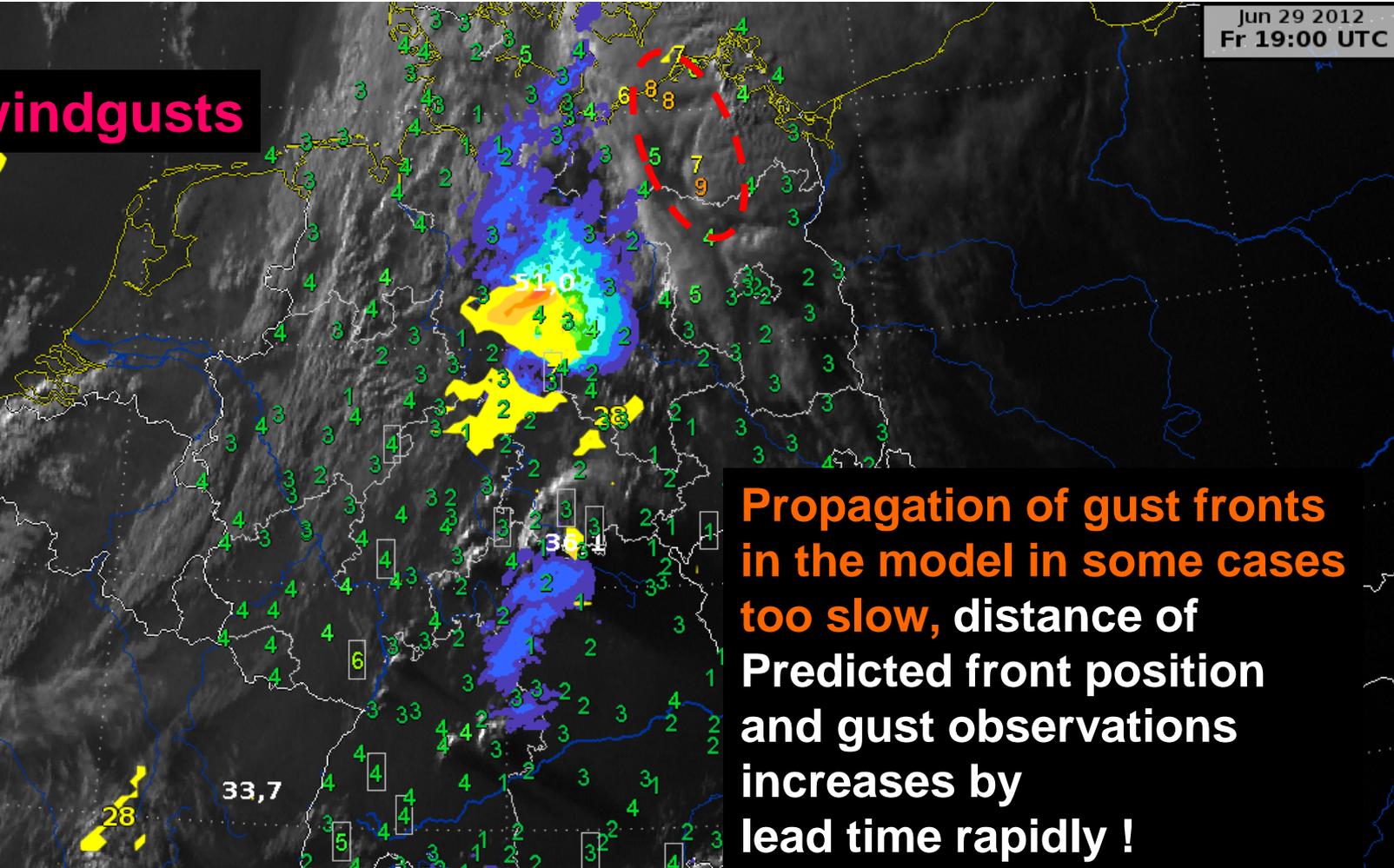
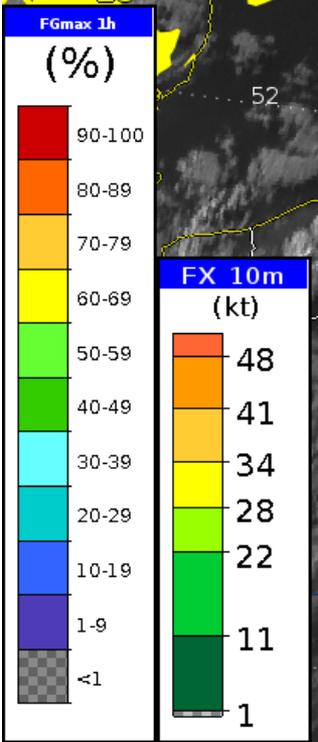


**COSMO-DE EPS,
Prob fx > 14 m/s,
16 Mar 11, 00 + 08 H**

**Tendency to underestimate
10m windgusts over land !**

**Prefer products like
percentiles (Q75, Q90)
instead of probabilities !**

10m windgusts



Propagation of gust fronts in the model in some cases too slow, distance of Predicted front position and gust observations increases by lead time rapidly !

Bodendaten	Fr 29.06.12 19:00 UTC [+0/-15min]	Windspitze in der letzten Stunde (Sekt 5) in bft, 266 von 266	
NWV-Modell	Fr 29.06.12 19:00 UTC	FX 10m, kt, 10 [Höhe über Grund] COSMO-EU+019h	29.06.12 00:00 UTC
Ensemble	Fr 29.06.12 19:00 UTC	FGmax 1h, 10 [Höhe über Grund] (>18m/s (Sturmböen)) COSMO-DE_EPS+016h	29.06.12 03:00 UTC
Satellitendaten	Fr 29.06.12 19:00 UTC	METEOSAT Europa(Zentral) - HRV	

fx, 29 June 2012, 19 UTC (observations) + COSMO-EU, 00 + 19 H + COSMO-DE EPS, Prob > 18 m/s, 29.06., 03 + 16 H



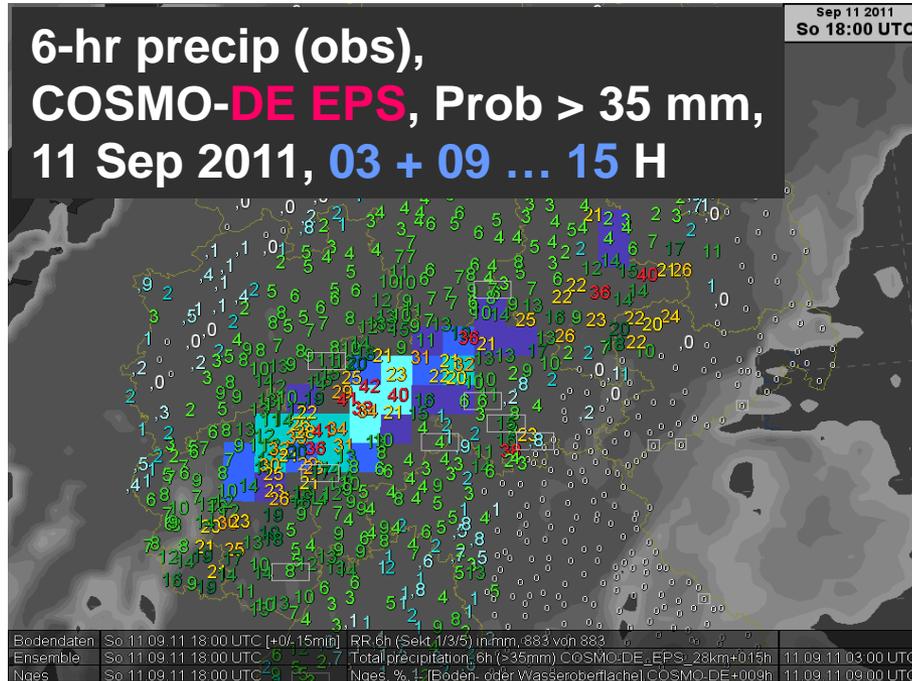
Open questions from users of the COSMO-DE EPS

Severe convection

- **Why quite often night runs from the COSMO-DE EPS performing better than „younger“ runs ?**
- **The nudging of radar data – mostly it works very well, in some other cases not. Is there a reason for this ?**

Non – convective events

- **Younger model runs sometimes tends to weaken severe events (repeatedly observed in case of snowfall events). Why ?**



Don't expect too much !

Recommendations:

- Using 6-hr precip products instead of 1-hr products to reduce jumpiness and prevent double penalty effect
- Consider – if possible – several model runs !
- Probabilities: 28 km-fields recommended ! Is for 1-hr, 6-hr and 12-hr precip available only !
- 90 % - Percentile instead of the Ensemble mean !
- Take even low probabilities into consideration !

Some slides / figures / contributions: Courtesy of The Team

COSMO-DE-EPS

Dr. Christoph Gebhardt

Dr. Susanne Theis

Michael Buchhold

Roland Ohl

Dr. Marcus Paulat

Zied Ben Bouallègue

Dr. Carlos Peralta



Exhibition: Thunderstorm Sqall line, 19 Aug 2013



schwäbische.de  (Coutesy of)

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Windhose zerstört Zeltlager am Hammerschmiedesee

Abtsgmünd-Hammerschmiede (rim) - Eine Windhose hat am Montagnachmittag ein Jugendzeltlager am Hammerschmiedesee komplett zerstört. Auch der benachbarte Campingplatz war betroffen. Insgesamt 27 Menschen wurden bei dem Unwetter verletzt, fünf davon schwer. Es entstand ein Schaden von rund 200 000 Euro. Unsere Redakteurin Alexandra Rimkus war vor Ort und hielt mit ihrer Kamera Bilder der Verwüstung fest.

(Erschienen am: 19.08.2013)



A photograph taken from the perspective of a passenger looking out of an airplane window. The wing of the aircraft is visible on the left side of the frame, extending towards the right. The wing is white with dark markings. Below the wing, a vast expanse of white, fluffy clouds stretches across the horizon. The sky above is a clear, deep blue. The text "That's it!" is overlaid in red, bold font in the upper middle part of the image.

That's it !

Thank you for your attention !