Schweizerische Eidgenossenschaft
Confédération suisse
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Swiss Confederation

Federal Department of Home Affairs FDHA
Federal Office of Meteorology and Climatology MeteoSwiss

Stratified verification of high resolution models and guidelines to forecasters

Pierre Eckert

COSMO WG4: interpretation and applications

Motivation

- There is a continued downward trend in the relative skill advantage of human forecasters with respect to models (MOS). The advantage, where it still exists, largely reflects the ability of human forecasters to recognize those instances in which the MOS approach does not account for bias that is **specific to certain synoptic situations** (Roebber et al. 1996).
- While the skill (or resolution) of models increases the **requirements** (location, quantities, parameters,…) increases as well (often even faster).
- Have a closer look into the usability of models
  - Postprocessing
  - Verification and guidelines to forecasters

EUMETNET embedment

Ideas coming from a recent survey to assess the priorities to be followed by EUMETNET (excerpts):

- We will continue to support the regional and short range modelling consortia in providing coordinated activities (*this is why we are here this week*).
- Throughout the decade we will ensure we always have highly skilled forecasters through shared training and **shared best practice**.
- EUMETNET will develop an **aviation** goal for forecasting and provide the coordination of the development and delivery of additional forecasting capabilities required for aviation.

Proposed strategy

- Weather classification
- Stratified verification (by weather type)
- Guidelines
- Users (forecasters) feedback

COSMO workshop in June 2010
Gathering on (small) invitation: specialists of
   classification, verification, guidelines,…
… and forecasters

Classification, stratified verification, guidelines ¦ EWGLAM / SRNWP meeting October 2010
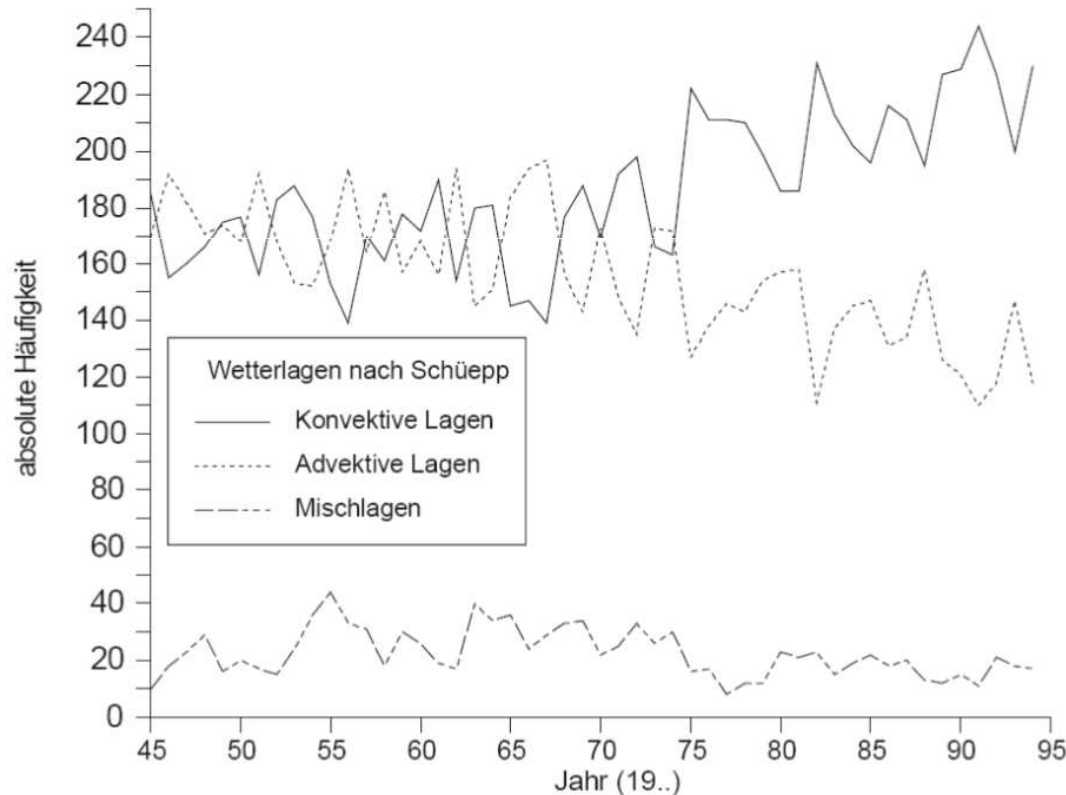Pierre.Eckert[at]meteoswiss.ch

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Classification

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Traditional manual classification

Figure 1: Number of occurrence of AWS main groups from 1945 till 1994. The main groups consist of convective types (solid), advective types (short dashed) and mixed types (long – short dashed), from Wanner et al. (2000).

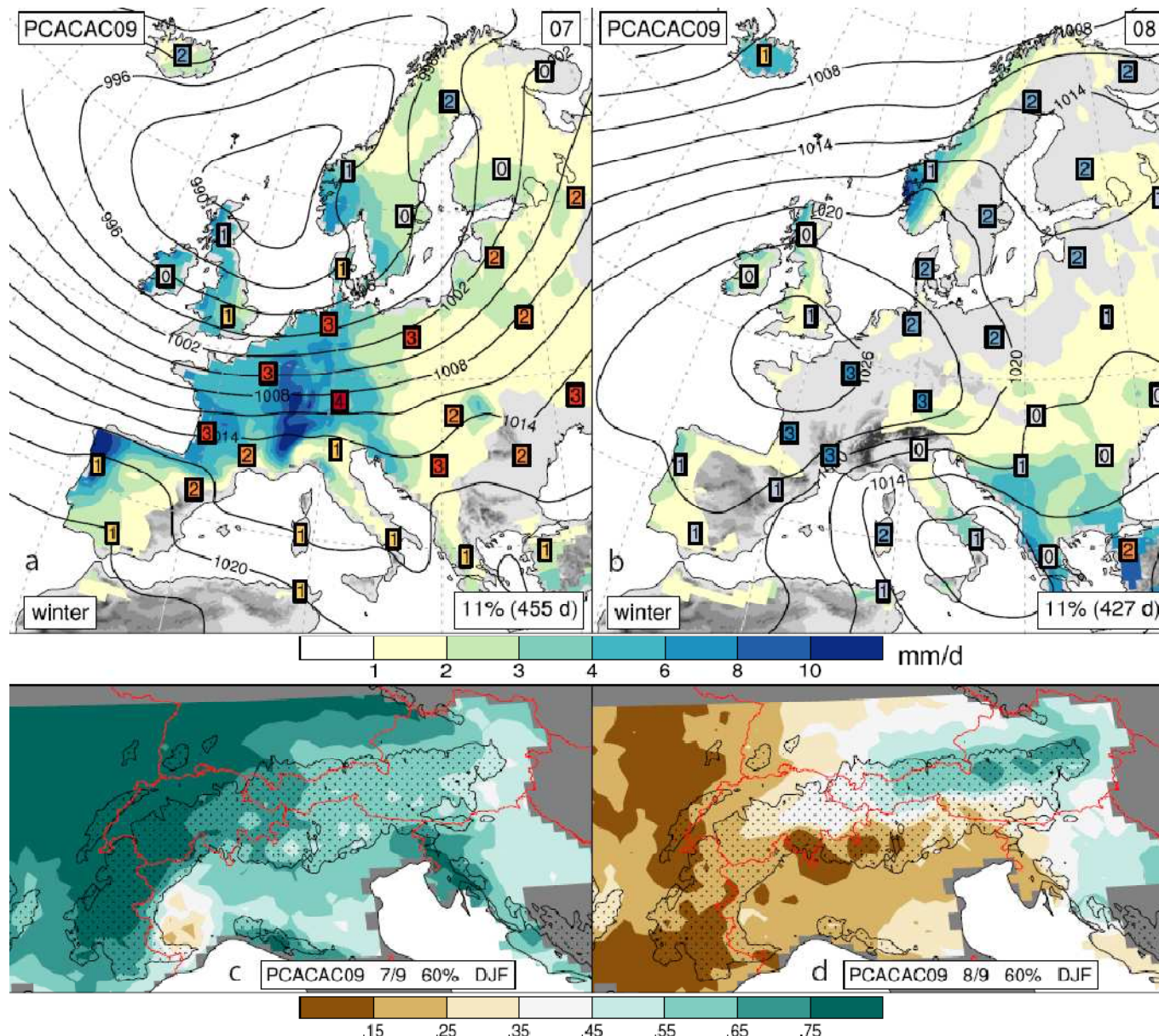for climate analysis (and verification), AWS is not suitable

Classification: COST733

- 12 domains
- data: ERA40, SLP
- number of types fixed: 9, 18, 27

⇨ 22 methods, 73 classifications
(daily, 1958-2001)
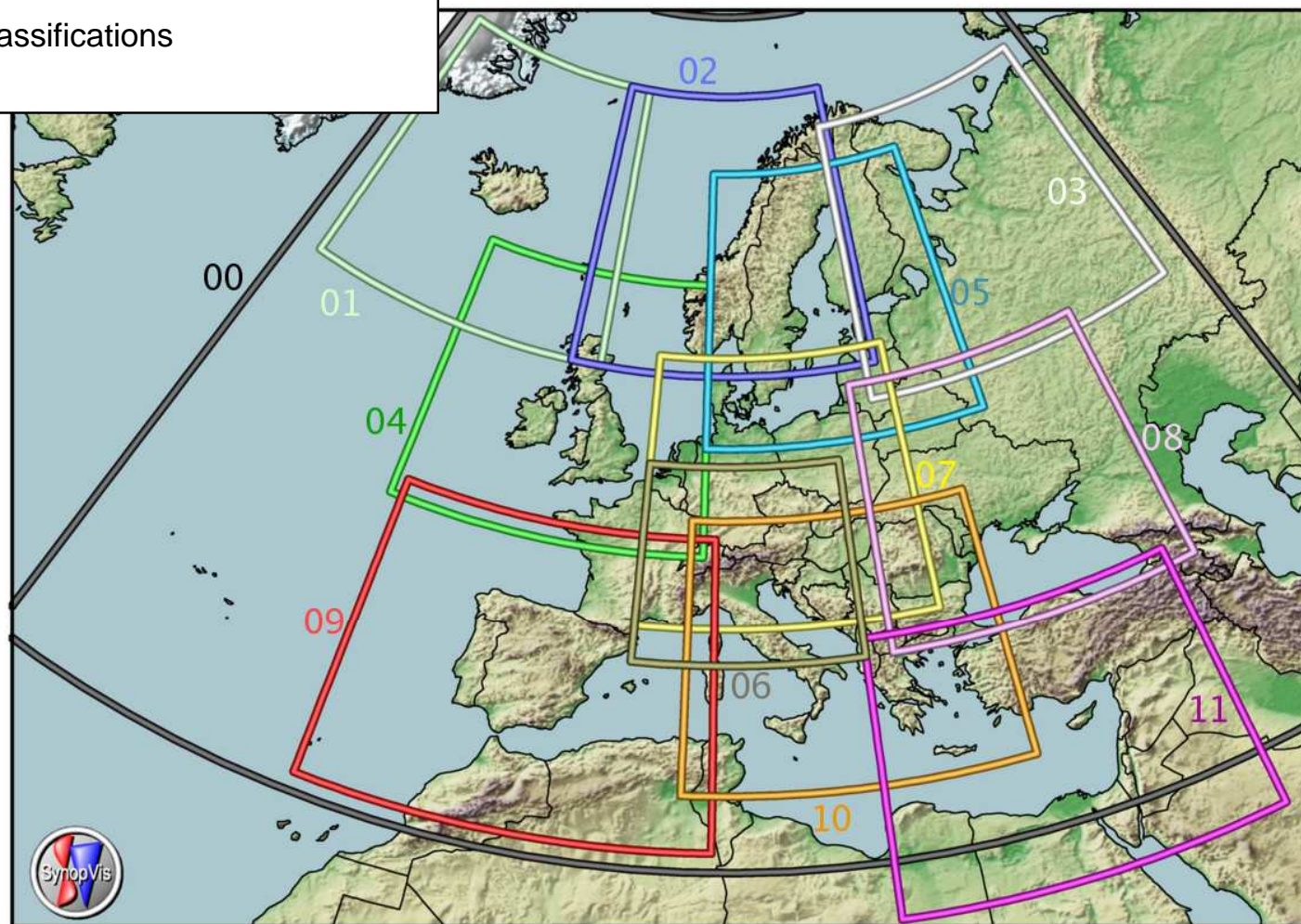
Classes and correlation to precipitation

COST 733 – Weather type classifications in Europe and at MeteoSwiss | COSMO workshop, Geneva, 25 June 2010
Reinhard Schiemann, Christoph Frei, Mark Liniger, Christof Appenzeller

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Skill for precipitation (~Alps)

PCACA   **GWT**

COST 733 – Weather type classifications in Europe and at MeteoSwiss | COSMO workshop, Geneva, 25 June 2010
Reinhard Schiemann, Christoph Frei, Mark Liniger, Christof Appenzeller

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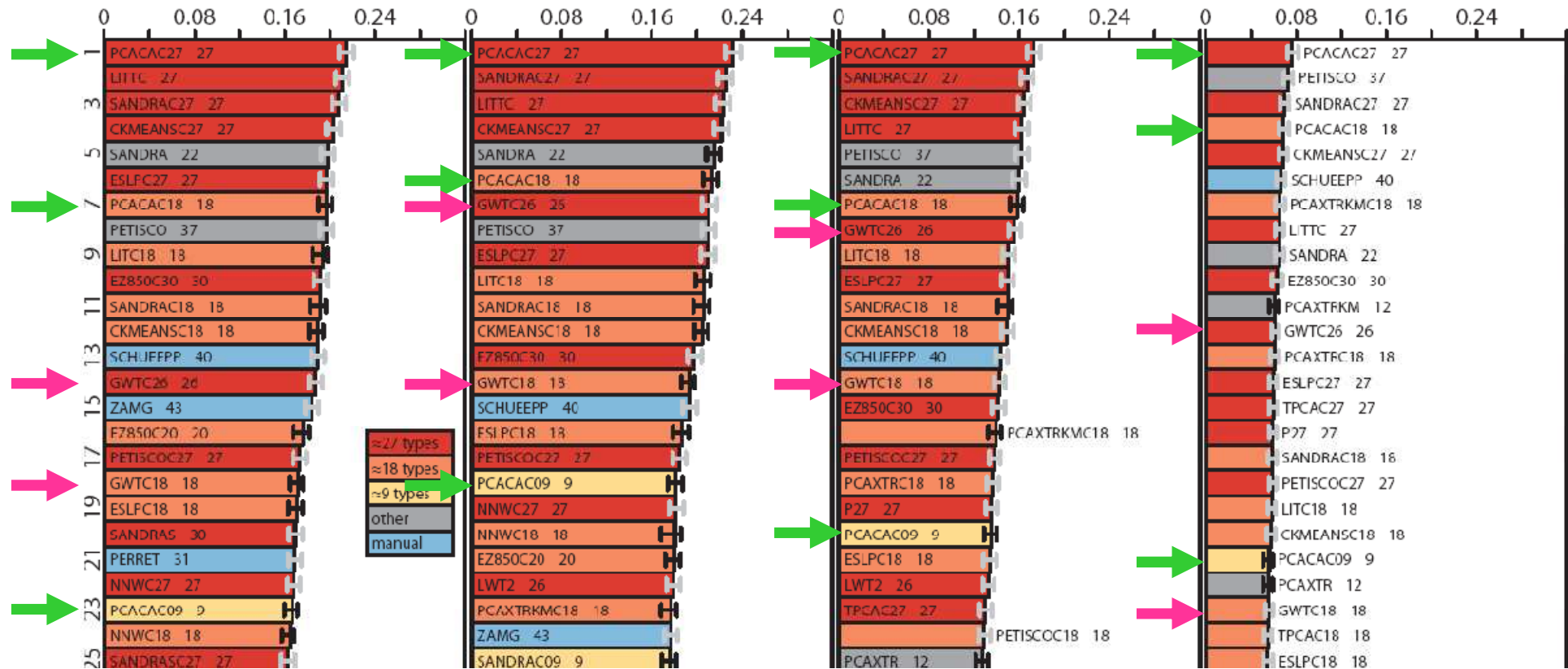
Recommendations w.r. to verification of models

- In COST733, the evaluation of the different weather types was done by looking on the ability to represent different precipitation patterns on the Alpine domain.

- For verification purposes we are more interested in **differentiating weather classes where the models have difficulties** from those where it performs well.

- Therefore, we should **evaluate the weather type classifications** again **with the target measure "model skill"** instead of precipitation.

- Overall: the classification has be **automatic.** Objective; can be used in forecasting mode.
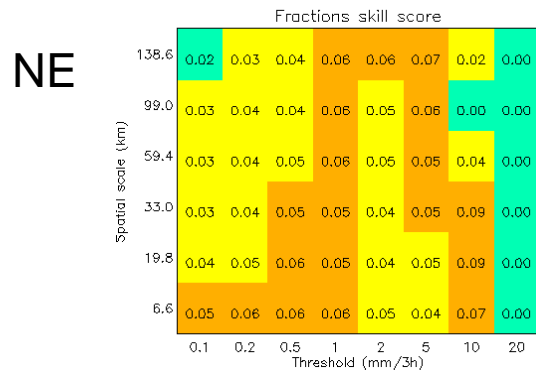
Stratified verification

- By season, by weather class or by type of event.

- Parameters
  - Temperature, dew point, precipitation, cloudiness, wind speed and gusts.
- Scores
  - ME, STD, POD, FAR, ETS, contingency tables, fuzzy scores or fields.

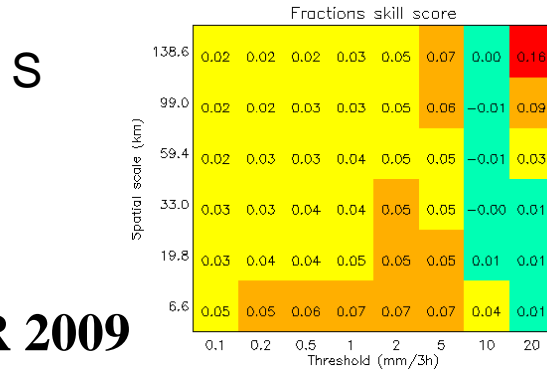Remark: conditional verification is more local (e.g. temperature bias when cloudy)
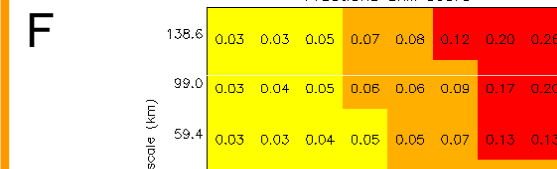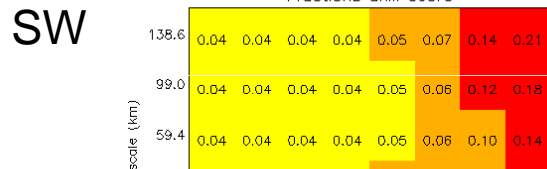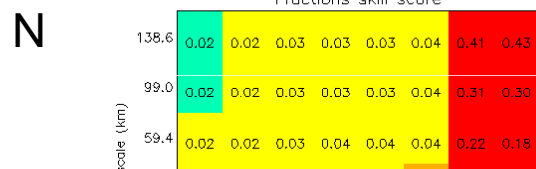
Stratified verification
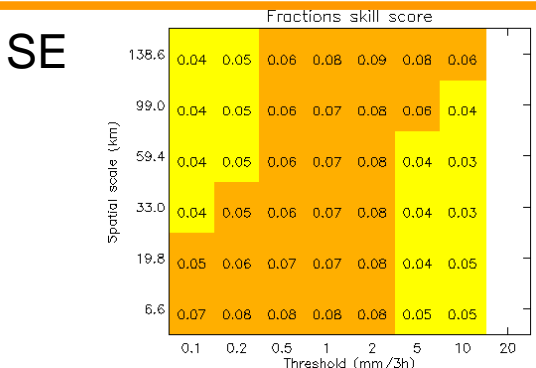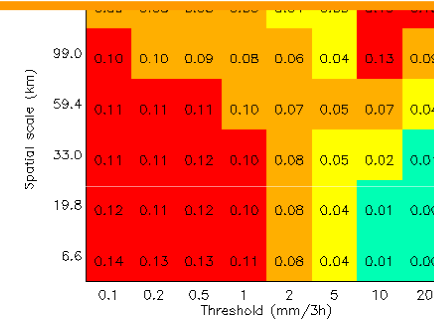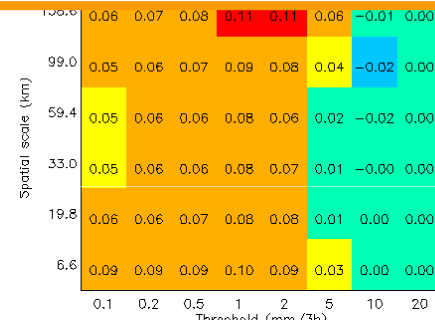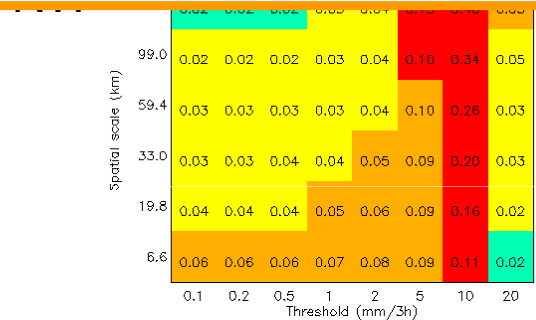
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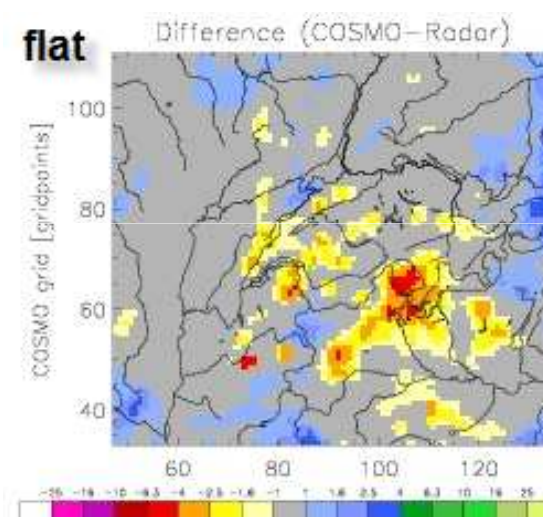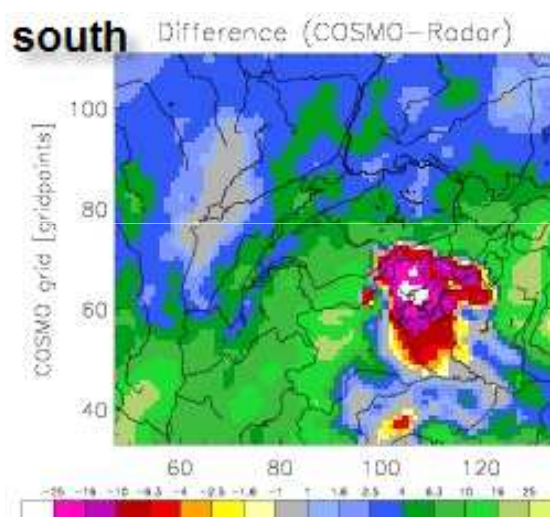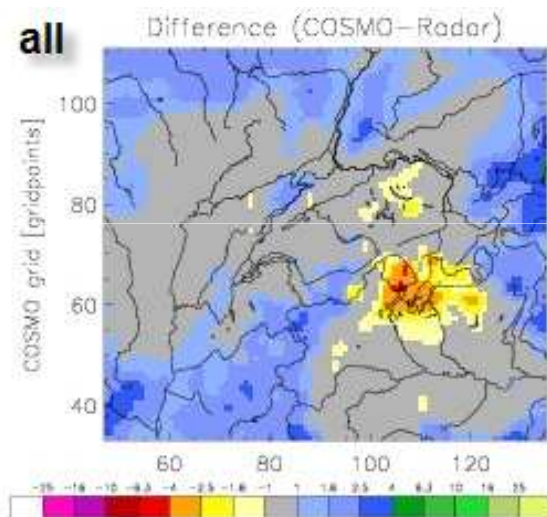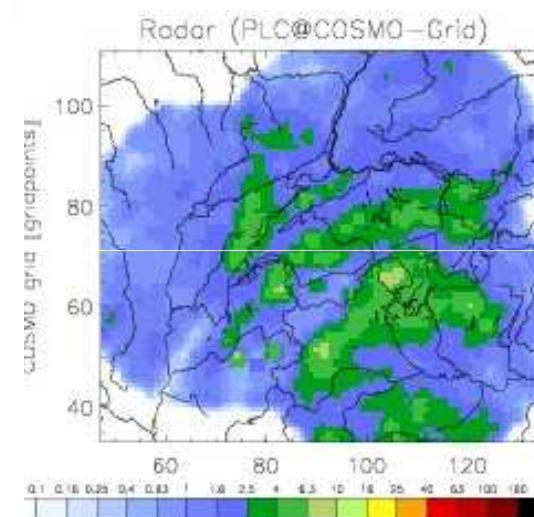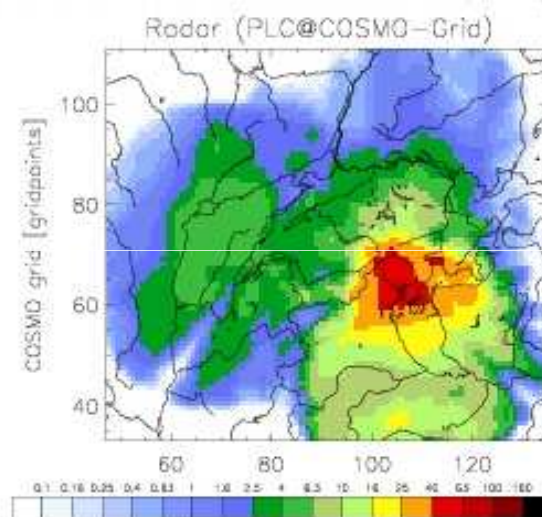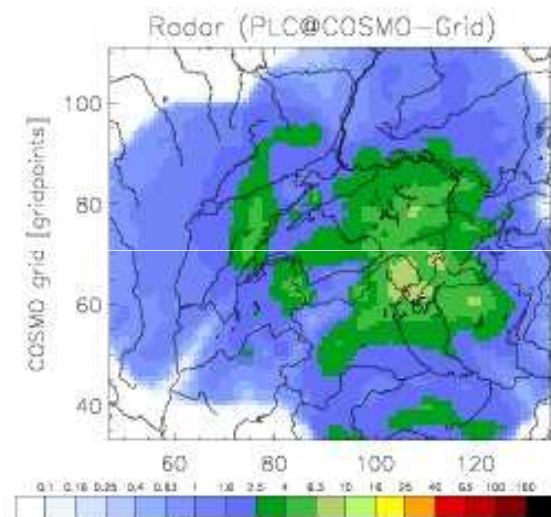
Differences in Fractions Skill score for weather-type dependant verif
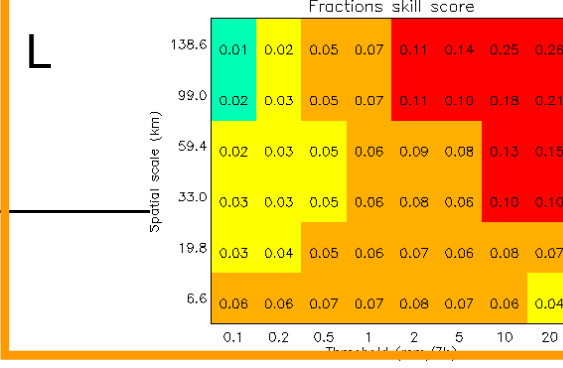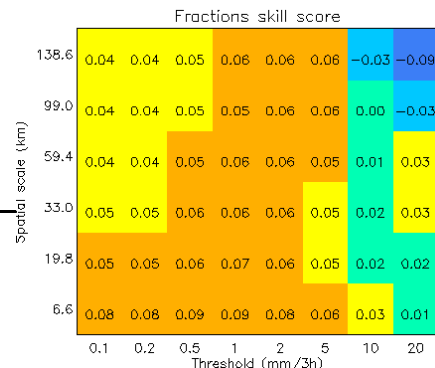
COSMO-2 minus COSMO-7

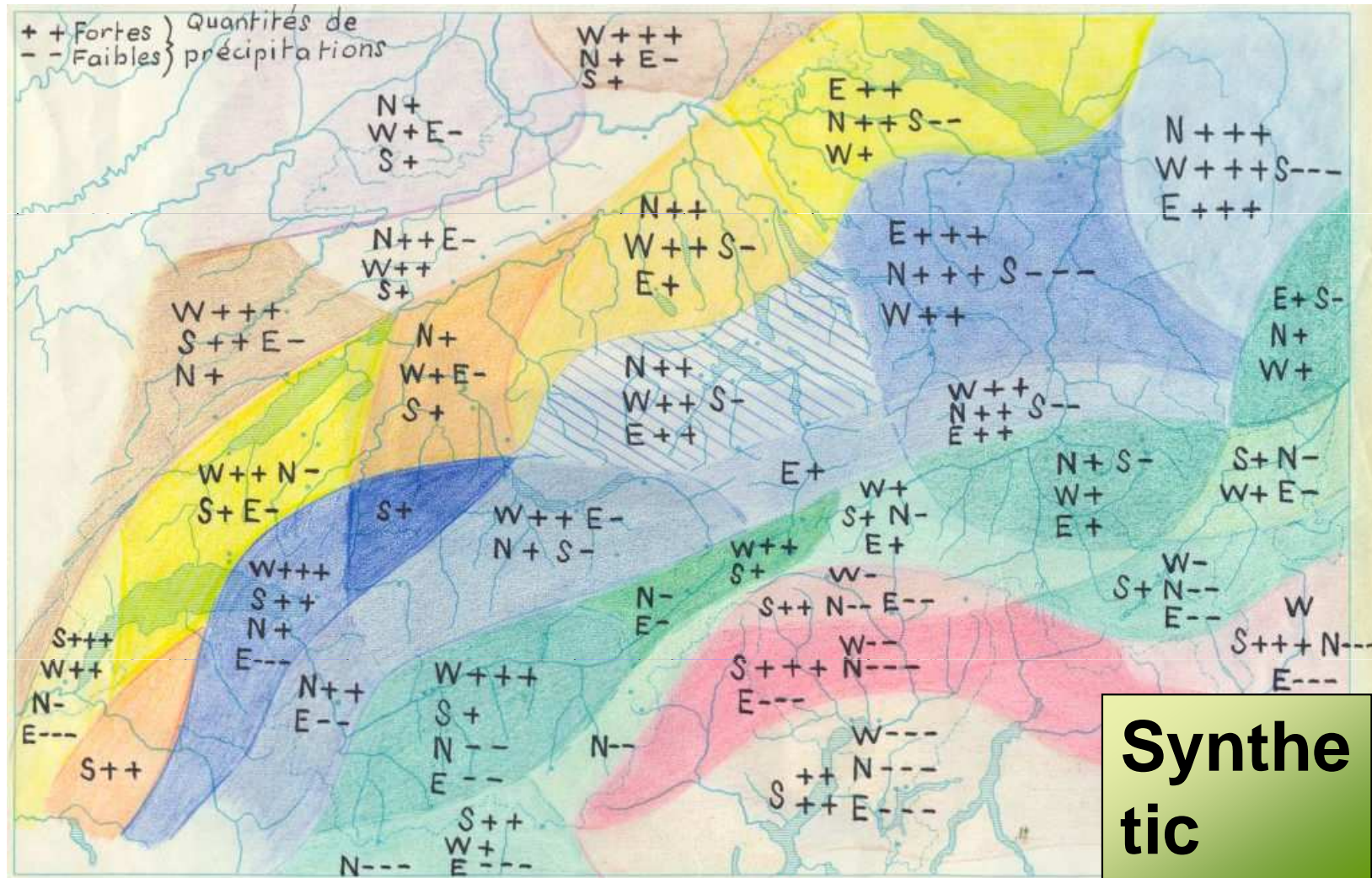COSMO-7 better — COSMO-2 better
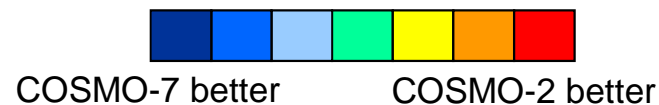
YEAR 2009

→ greatest adavantage for COSMO-2 for weather types N, NW, SW and „flat", „high" and „low" mainly for higher thresholds

O in the year 2010

Presentation of stratified verification

Synthetic map!

Recommendations for text guidelines

- The guidelines should be **self-contained**.
- They can look like a **cookbook**, for instance for the use of a parameter or for the treatment of a specific situation.
- A **light version** can be at the disposal of the forecasted on duty (usually under time stress) when a **longer version** can be studied offline.
- This longer version can also be used as an **education tool for newcomers**.
- The shorter version can also be implemented as a **seasonal factsheet**.
- The seasonal factsheets should include (if possible) the expected **changes of the current model version** with respect to version which was running in the past season.
- Generally speaking the guidelines should be short, attractive and meaningful.

Forecasters feedback

- Forecaster feedback should be organized either by a mailbox, a forum or regular discussions.
- At the end of each season a **debriefing** can be organized and a synthesis written. This can form a good base to the following corresponding season.
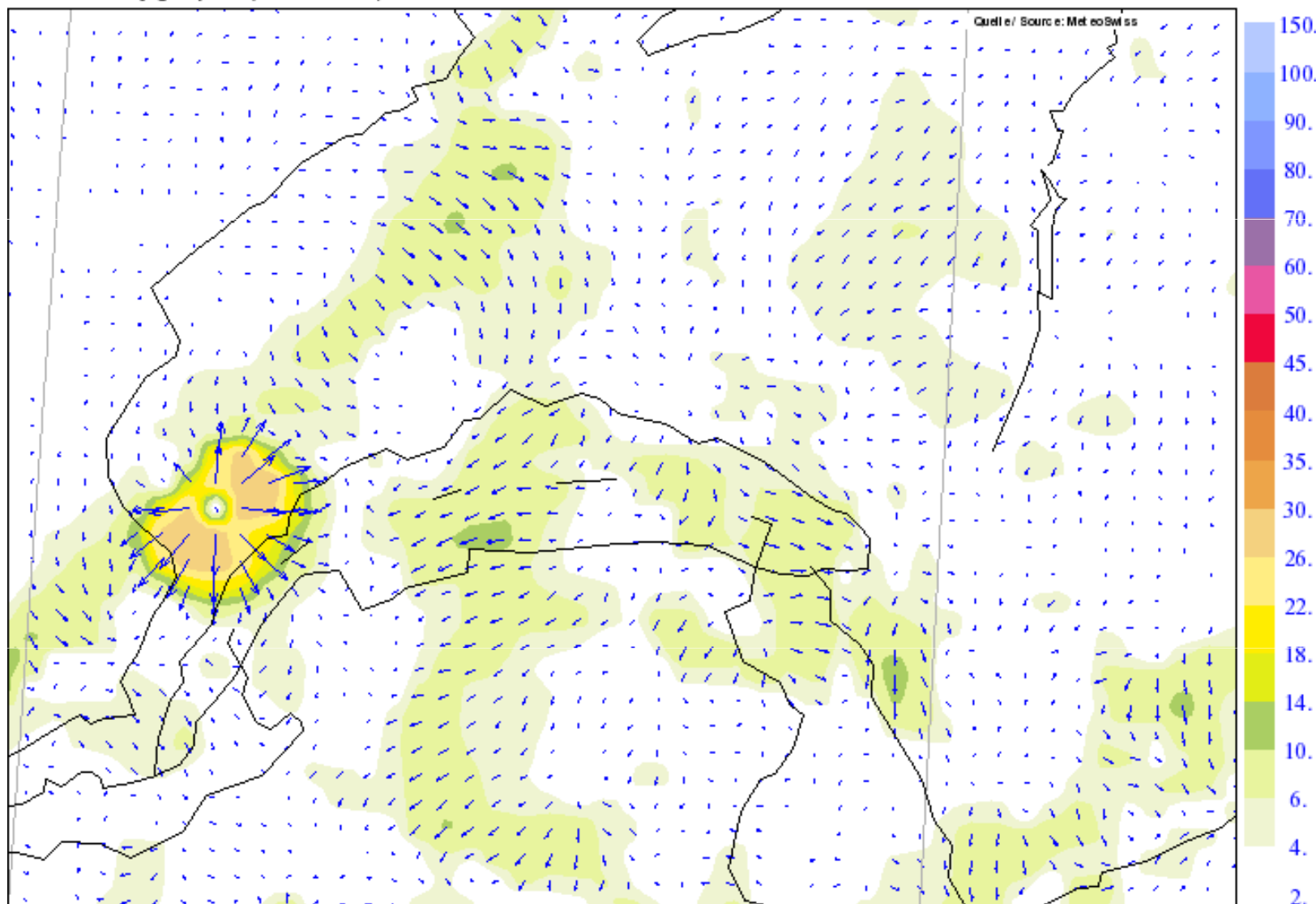
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Forecasters feedback

COSMO-2 Forecast for: Sat 17 Jul 2010 22 UTC   Version: opr 2km (889)
10m Wind every grid point (knots shaded)   Run: 17.07.2010 15UTC+7h
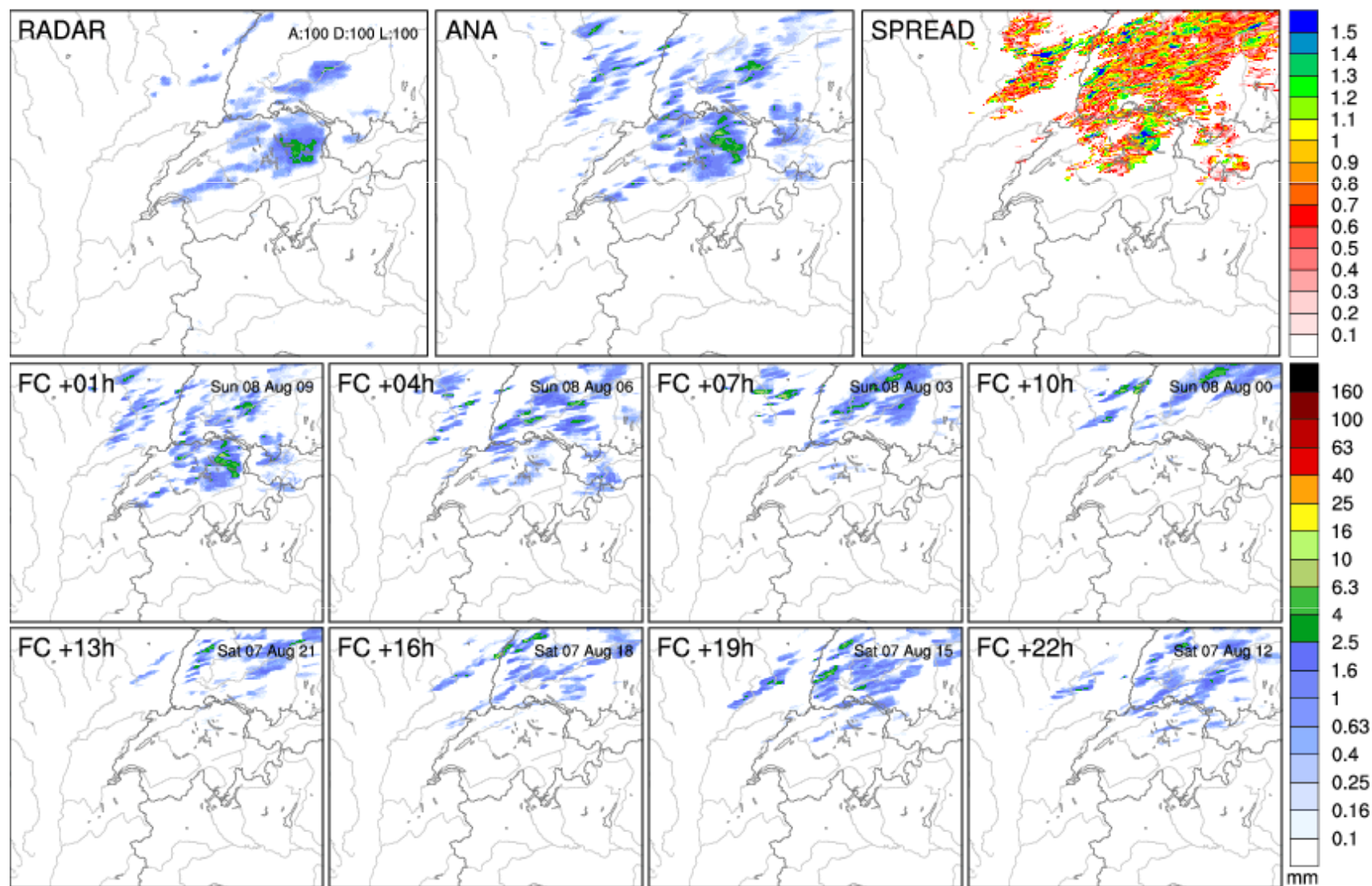
Quelle / Source: MeteoSwiss

Monitoring

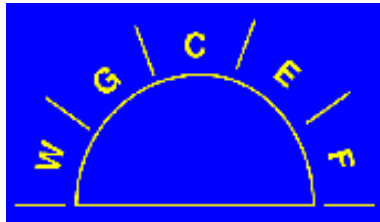COSMO-2 Hourly Rainfall Accumulation up to **Sun 08 Aug 2010 10 UTC**

Outlook

- Proposition for stratified verification exists: try it out!
- V-SRNWP?
- Further work in COSMO! SRNWP ET-App?
- Interferences (collaborations):

Status and Goals

Status of the Working Group on the Cooperation between European Forecasters (WGCEF)

- A permanent body consisting of representatives from most of the European National Meteorological Services (29 out of 35 in meteorological services

- Recognised and supported by the EUMETNET council

Eumetcal (also COMET)

Conclusion

- Consider the whole forecasting chain!
- Stratified verification
- Postprocessing (MOS, expert systems, 1d, 2d, 3d,...)
- Forecasters guidelines and feedback

nk you