"Objectives in evaluation of warnings"

Zentralanstalt für Meteorologie und Geodynamik

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- **Quality of warnings ?**

- How to evaluate?
- Qualitative evaluation by asking the costumers about the effectiveness
- Possible answers: useless, bad, sufficient, very good
- Most cases: positive feedback

- In principle are warnings of a weather service necessary and useful but there should be an improvement.

- Basis of an improvement is a quantitative evaluation.

- **Parameters of a quantitative evaluation**

- **Probability of detection (POD)**

How many measured storm events have been alerted?
POD 100%: if we could warn all storm events

Problem:
To reach 100% POD we have to warn day by day

Public will be unsatisfied by such a way of overwarning!

Solution: other evaluation parameters
False Alarm Rate, Succsess Rate, Equitable Threat Score

- **False Alarm Rate (FAR)**
- **How many distributed storm warnings are not connected with storm evens**
- **Result: number of overwarnings**
  - **POD 100% has a high rate of FAR**

- **Succsess Rate (SR)**
  - **How many distributed storm warnings are connected with storm events.**

Ideal:

SR 100% and FAR 0%

- **Equitable Threat Score (ETS)**
  - **Measure for improvement through a warning by a forecaster with respect to a random warning:**
  - **0 – 1**
    - **0: no improvement**
    - **1: maximum range**
    - **0,5 is very good; models have a range between 0,3 und 0,4**

- **The evaluation of storm warnings in Austria**

- Storm warnings compared with observations 2007-2008

- Austria east (Counties of Vienna, Lower Austria, Burgenland)
  - POD: about 90 %
  - SR: about 70 %
  - ETS: about 0,6
- Austria (whole territory): mean
  - POD: about 75 %
  - SR: about 60 %
  - ETS: about 0,4

- **The evaluation of warnings of precipitation in Austria**

- **Warnings of precipitation are evaluated with the high resolution system INCA (Incorporated Nowcasting through comprehensive Analysis)**

- **Useful is only the evaluation parameter Succsess Rate (SR).**

- **Austria east (Counties of Vienna, Lower Austria, Burgenland): SR: um 73 %**

- **Austria (whole territory): mean**
- **SR: 65 % - 77 %**

- **The evaluation of thunder storm warnings in Austria**

- Warnings of thunder storms are compared with the observations of the lightning system and evaluated with the **Succsess Rate (SR).**

- A warning of thunder storms is counted as correct if

- the warning time is only 25% beyond the determinated warning time
- and
- the lightning signal is in an area within a radius of 3 km

- We distinguish based on the density of the lightning system between
- light, moderate and heavy thunder storms.

Evaluation results 1 May – 31 September 2008

Light thunder storms	SR
▪ Short period (45 – 60 Minuten):	40 – 44 %
▪ Long period (75 – 135 Minuten):	66 – 80 %

Moderate thunder storms	
▪ Short period (45 – 60 Minuten):	51 – 53 %
▪ Long period (75 – 135 Minuten):	73 – 84 %

Heavy thunder storms	
▪ Short period (45 – 60 Minuten):	70 – 72 %
▪ Long period (75 – 135 Minuten):	95 – 100 %

- **Thank you for your patience.**