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MAP D-PHASE – a WWRP Forecast Demonstration Project

Marco Arpagaus

2nd International Symposium on
Quantitative Precipitation Forecasting and Hydrology
Boulder, 5-8 June 2006



Mesoscale Alpine Programme (MAP)

- MAP: 1st WWRP RDP (*→ Volkert*)
 - Phase 1: Preparation, 1993 – 1999
 - Phase 2: Special Observing Period, Sep – Nov 1999
 - Phase 3: Analysis, ongoing (formally ending Sep 2006)
- MAP **D-PHASE**:
 - Phase 4 of MAP: **Demonstration**
 - Focus:
 - heavy precipitation ... (*→ Richard, Rotunno, ...*)
 - ... and hydrology (*→ Ranzi, Rebora, ...*)
 - Endorsed as 2nd WWRP **FDP** in Oct 2005
 - **D-PHASE: *Demonstration of Probabilistic Hydrological and Atmospheric Simulation of flood Events in the Alpine region***
 - **June – November 2007**



Heavy precipitation & related flooding



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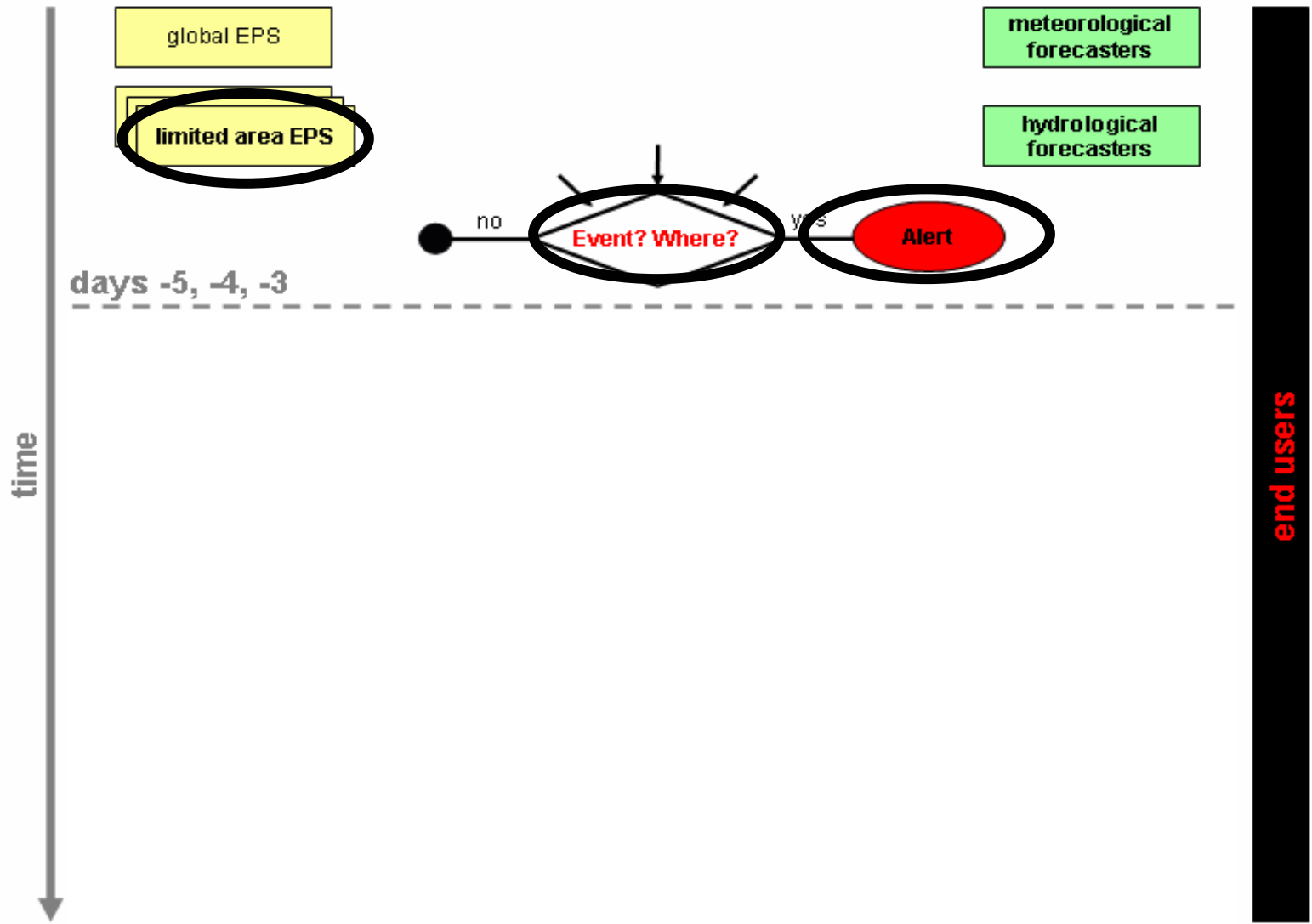


D-PHASE

- **Goal:** *“To demonstrate the benefits in forecasting heavy precipitation and related (flash) flood events, as gained from the improved understanding, refined atmospheric and hydrologic modelling, and advanced technological abilities acquired through research work during the Mesoscale Alpine Programme (MAP).”* (proposal to the WWRP)
- **How:** Distributed **real-time end-to-end forecasting system**, including
 - (limited-area) **probabilistic forecasting**, both for **atmospheric** and **hydrological** processes
 - **high-resolution** deterministic modelling & nowcasting
 - centralised visualisation of model data and alerts
 - forecasters and **end users**
 - **evaluation**, objective and subjective



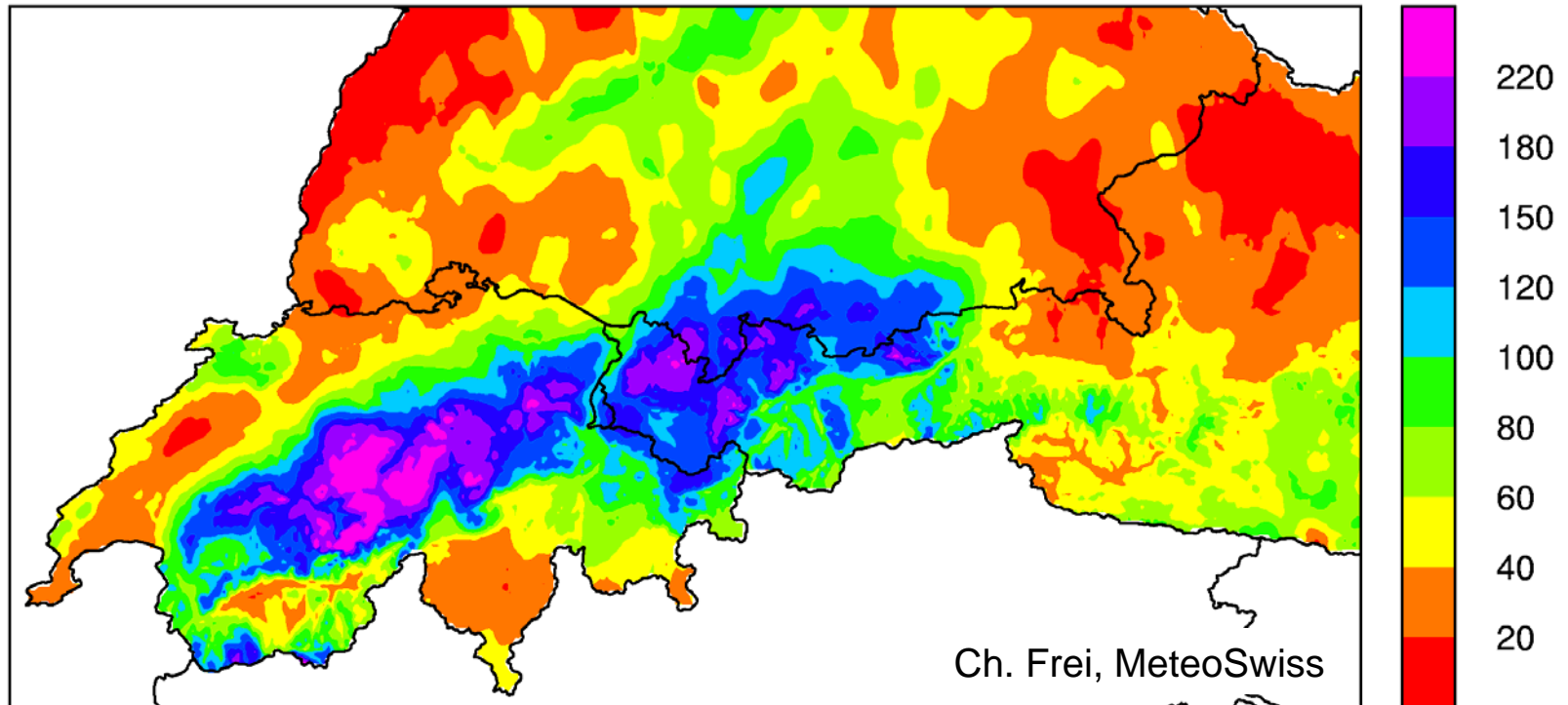
end-to-end forecasting system





August 2005 flood in Switzerland

72h precipitation sum in mm (20-23.8.2005, 06-06 UTC)

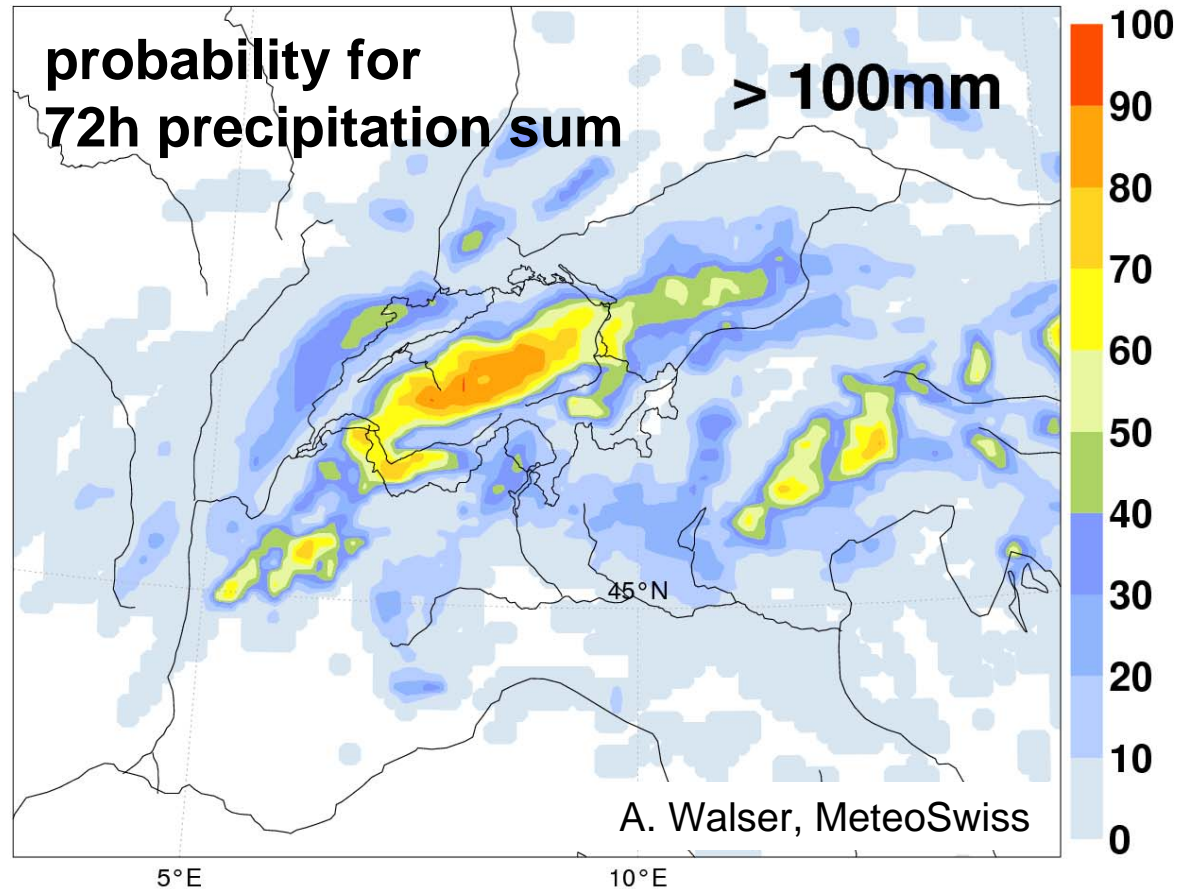


local precipitation peaks over 300 mm / 72 h



August 2005 flood in Switzerland

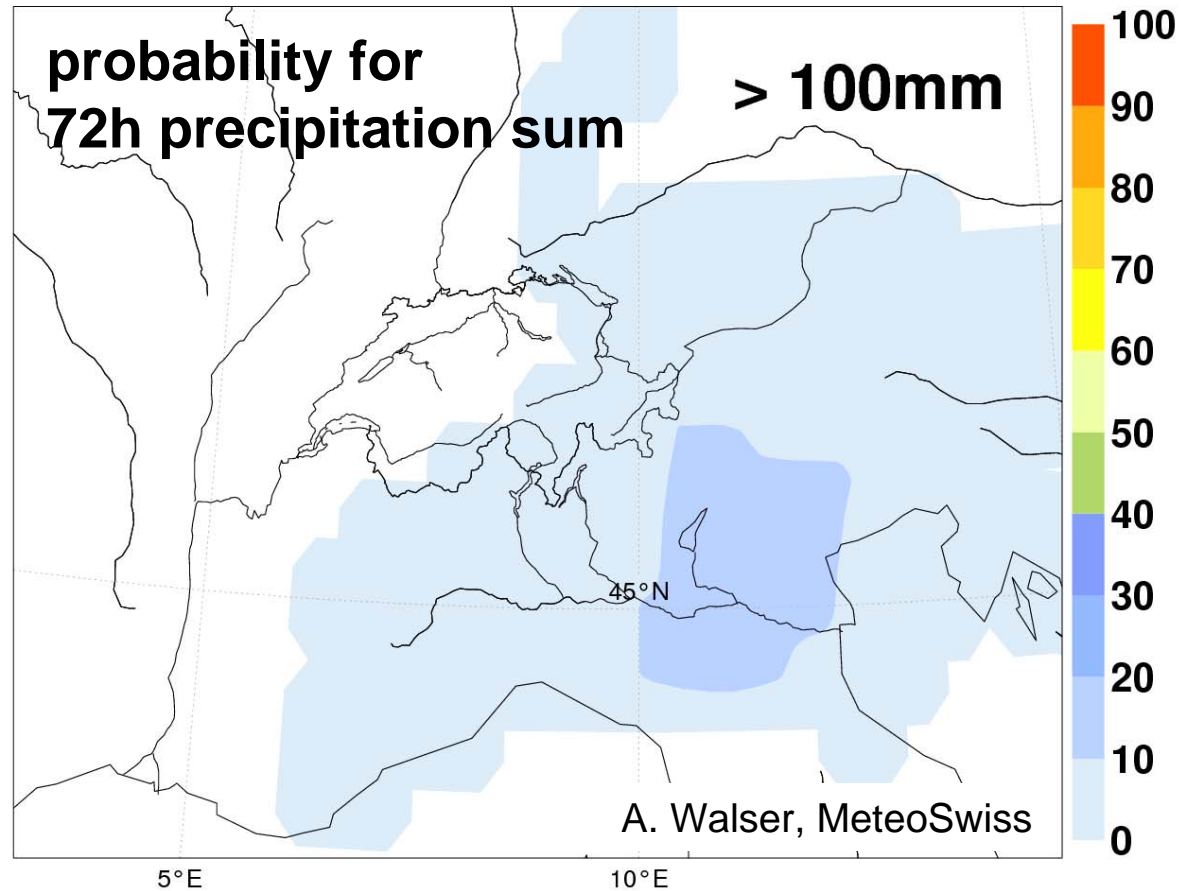
COSMO-LEPS probability forecast: **total precipitation**
19 Aug 2005 12UTC, t+(18-90), **VT: 23 Aug 2005 06 UTC**





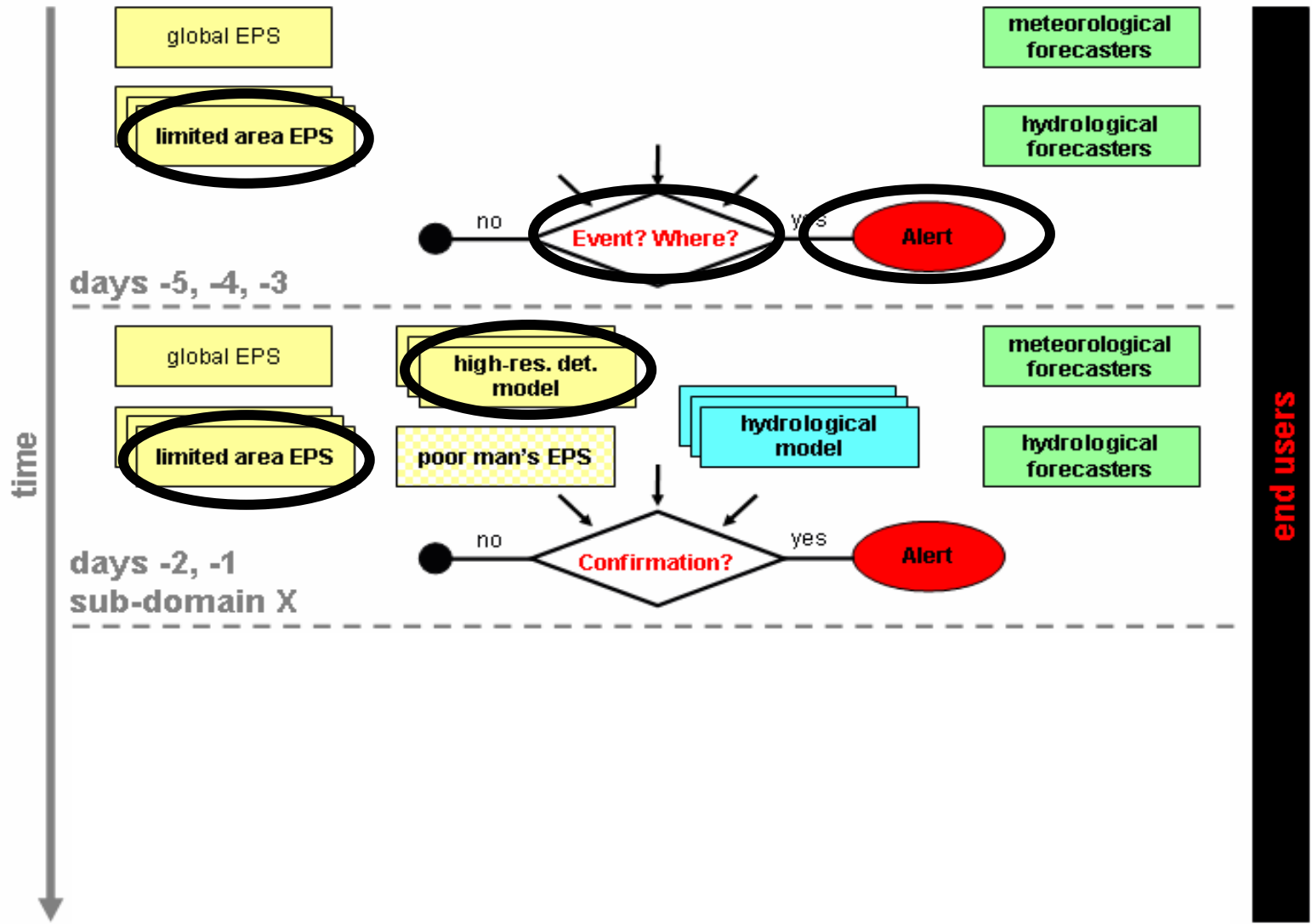
August 2005 flood in Switzerland

ECMWF EPS probability forecast: **total precipitation**
19 Aug 2005 12UTC, t+(18-90), **VT: 23 Aug 2005 06 UTC**



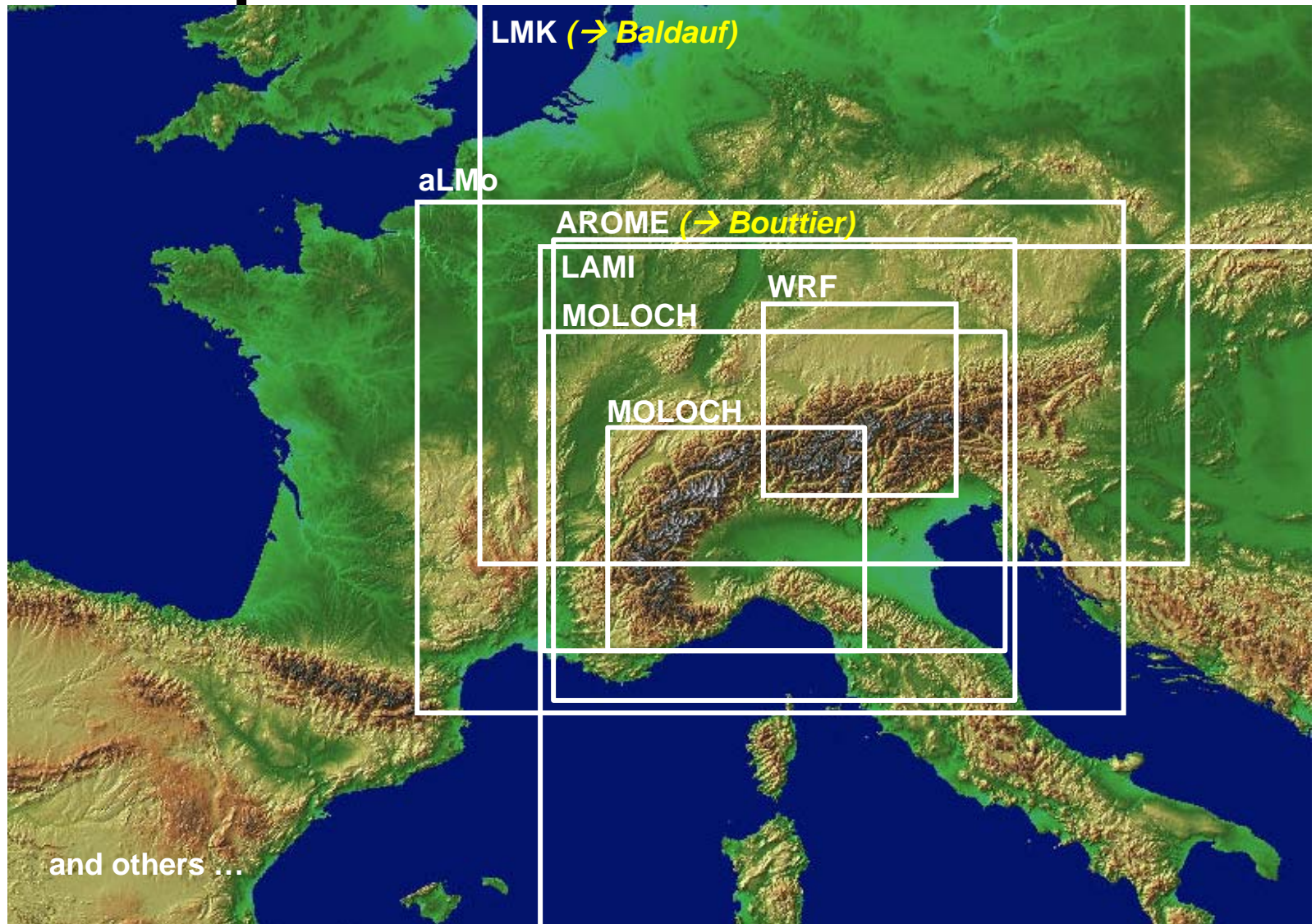


end-to-end forecasting system



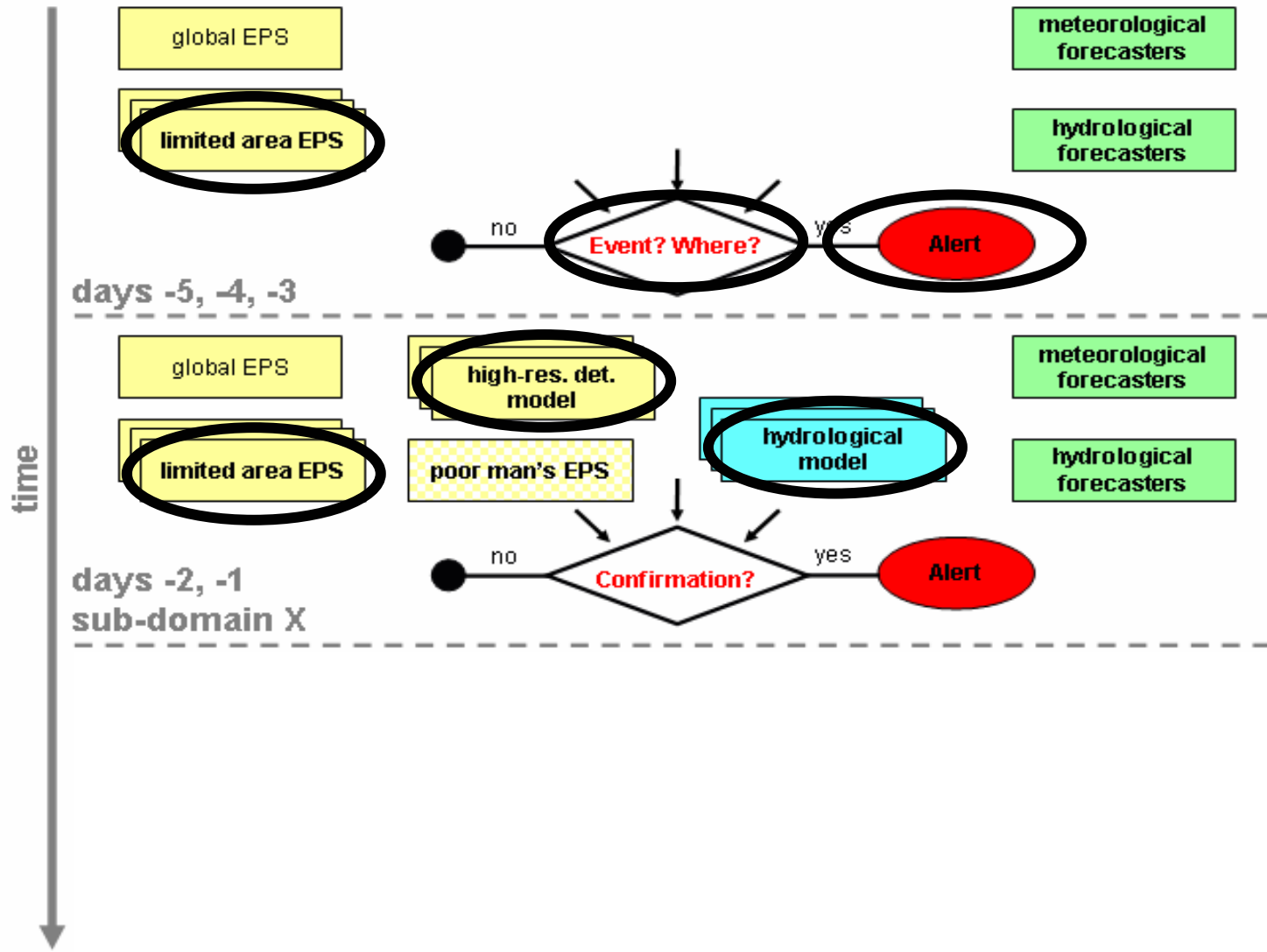


Atmospheric models





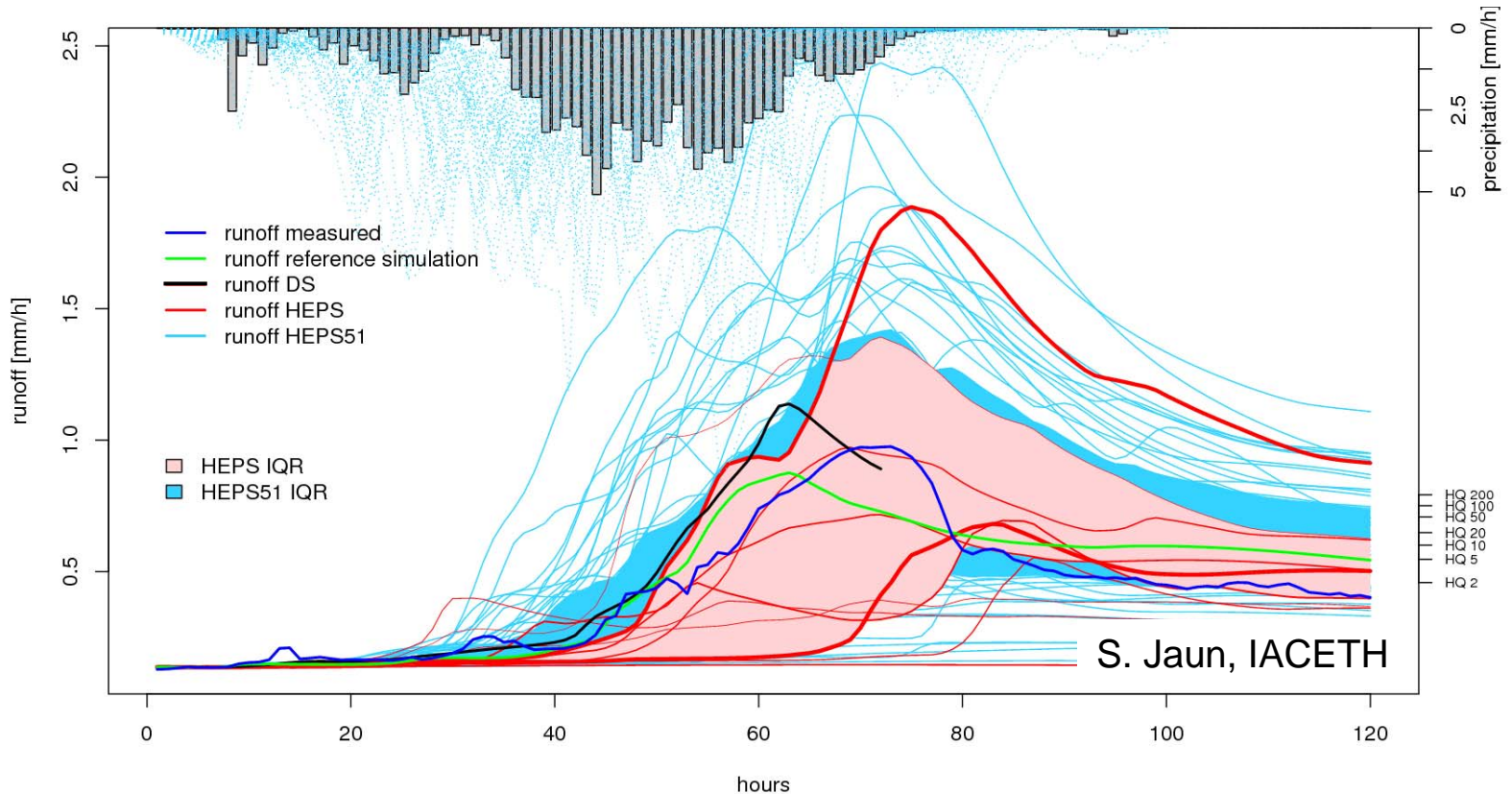
end-to-end forecasting system





August 2005 flood in Switzerland

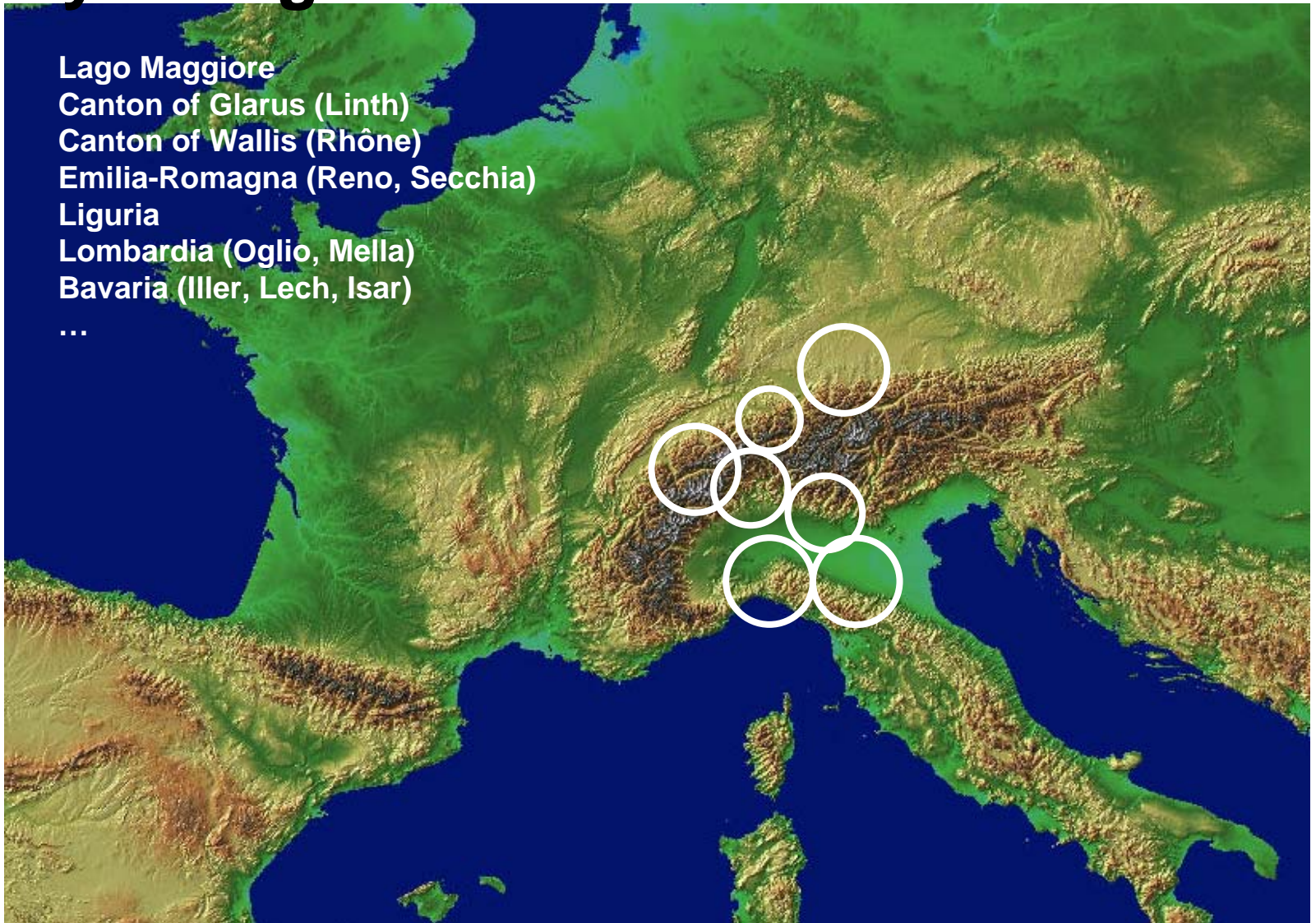
runoff at Hagneck (Aare, 5170 km²), IT: 20.8.2005, 00 UTC





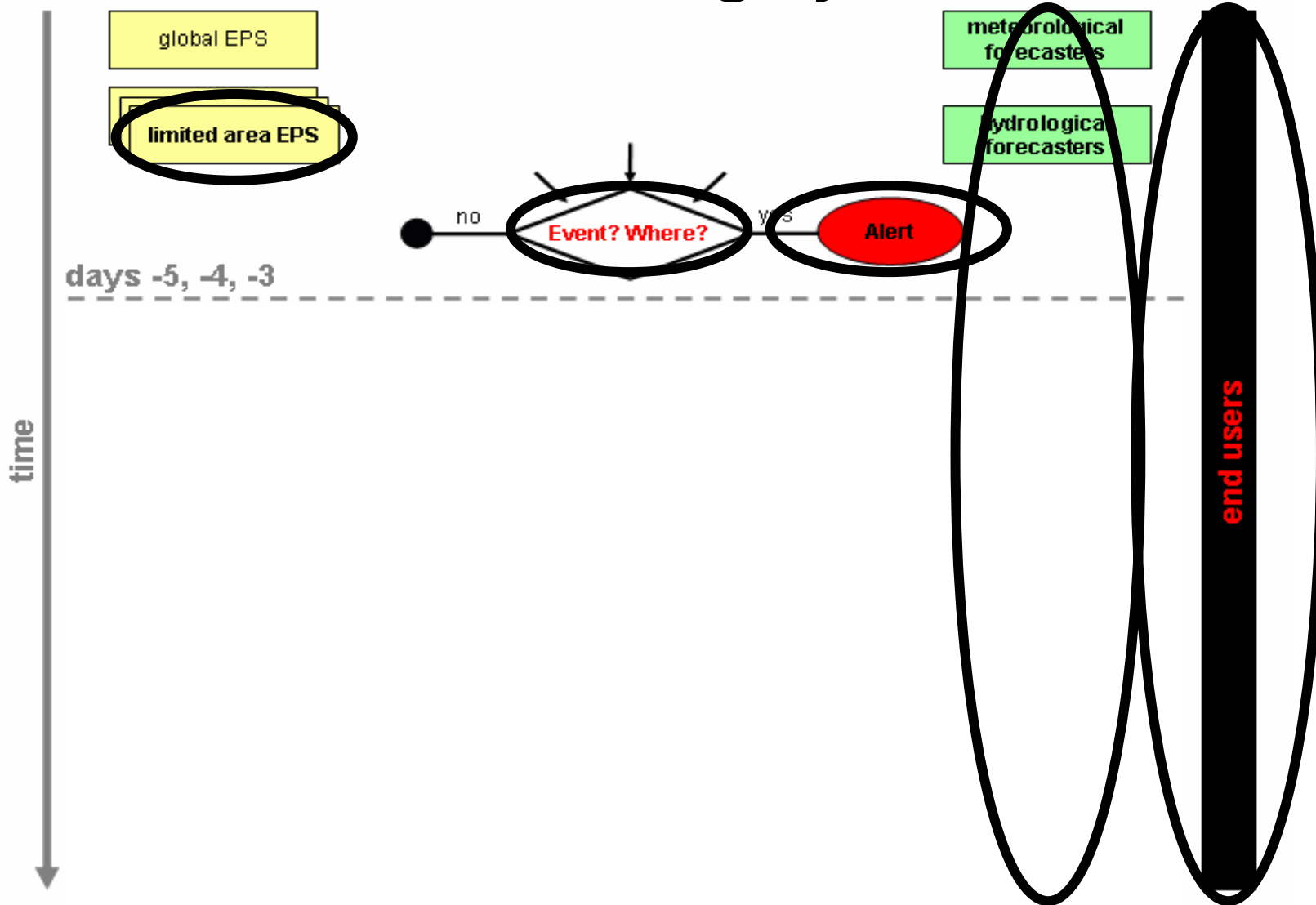
Hydrological catchments

Lago Maggiore
Canton of Glarus (Linth)
Canton of Wallis (Rhône)
Emilia-Romagna (Reno, Secchia)
Liguria
Lombardia (Oglio, Mella)
Bavaria (Iller, Lech, Isar)
...





end-to-end forecasting system



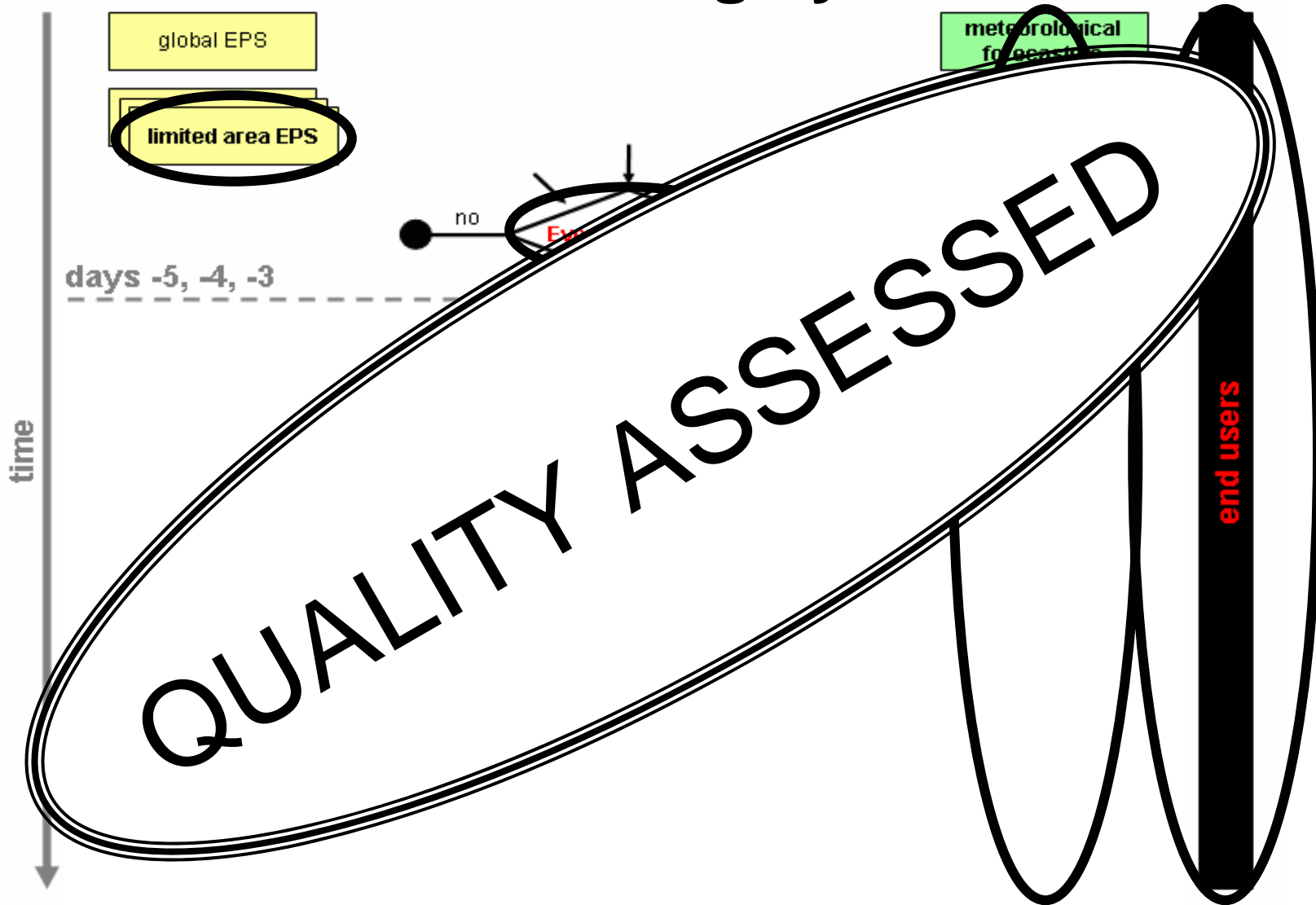


Hydrological end users

- Ticino water management agency
- Ticino regional civil protection agency
- Glarus natural hazards management agency
- Canton of Wallis
- Emilia-Romagna functional centre for civil protection
- Liguria functional centre for civil protection
- Consorzio dell'Oglio (Oglio River Water Authority)
- Bavaria regional civil protection authorities
- ...



end-to-end forecasting system



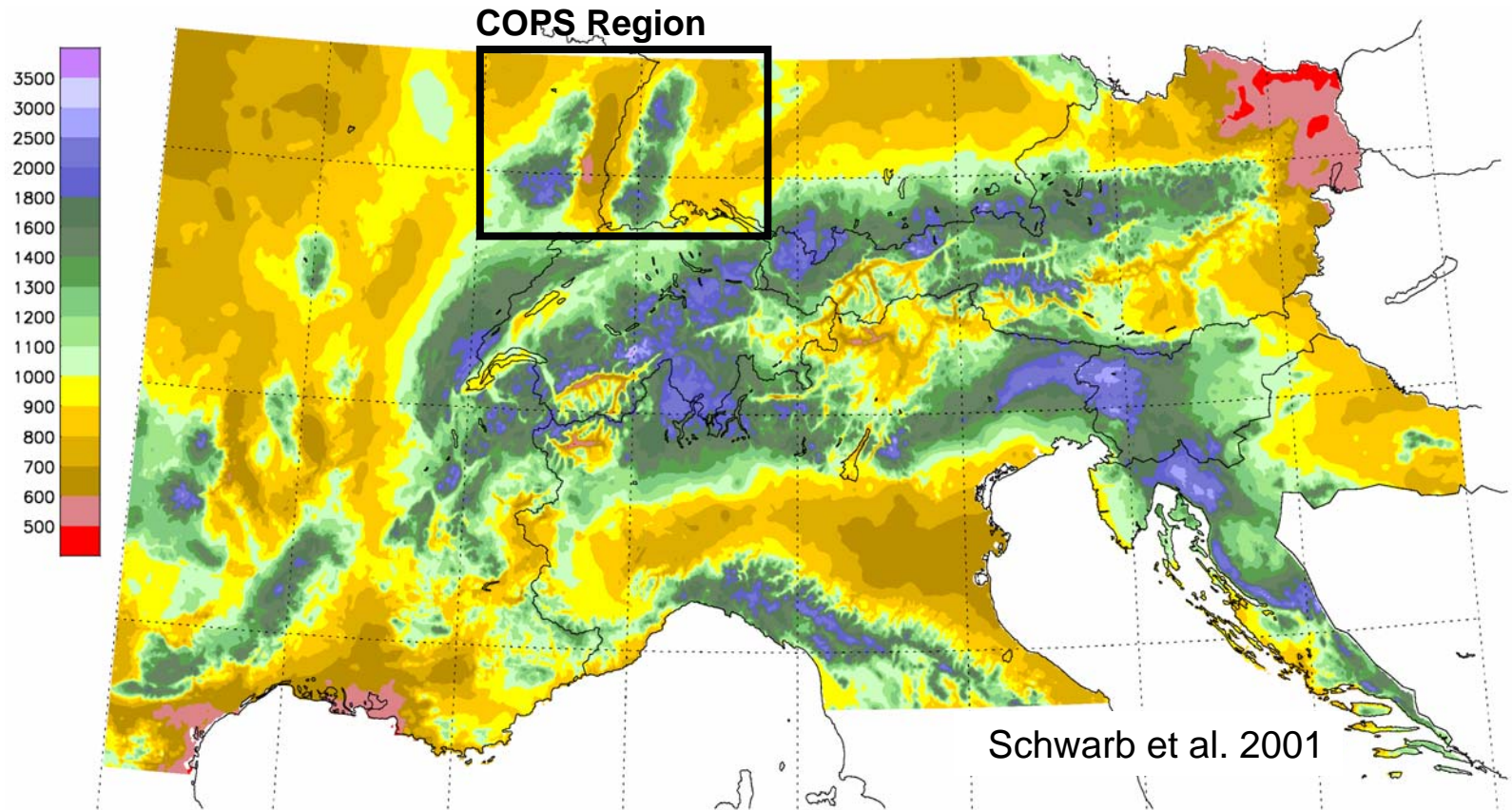


International collaboration

- COPS (*→ Kottmeier*)
 - WWRP RDP
 - June – August 2007



Average yearly precipitation sum in mm, 1971–1990





International collaboration

- COPS (*→ Kottmeier*)
 - WWRP RDP
 - June – August 2007
 - **Joint data archive**
 - **Joint data visualisation platform**
- Meteorisk (<http://www.meteorisk.info>)
 - **Joint warning and feedback platform**
- THORPEX: TIGGE (<http://tigge.ecmwf.int>)
 - Guidelines for variables to be stored
- ETReC07 (*→ Volkert, Kottmeier*)
- Beijing08 RDP/FDP
- COST 731 (*→ Nurmi*)



D-PHASE: Organisation

- International Steering Committee
 - Dorninger, Staudinger (A), Rotach, Schär (CH), Volkert, Wulfmeyer (D), Bouttier, Richard (F), Buzzi, Frustaci, Ranzi (I), Mylne (UK)
- Working Groups
 - **WG-DI**: Data interface
chair: Andrea Montani, ARPA-SIM (I)
 - **WG-HEU**: Hydrology and end users
co-chairs: Roberto Ranzi, U Brescia (I), Christoph Hegg, WSL (CH)
 - **WG-VER**: Verification
chair: Manfred Dorninger, U Vienna (A)
 - **WG-DP**: Data policy
chair Mathias Rotach, MeteoSwiss (CH)
- Project Coordinator: marco.arpagaus@meteoswiss.ch
- For details: <http://www.map.meteoswiss.ch>

