Hydrological Ensemble Prediction Experiment (HEPEX)

workshop, Reading, 8 – 10 March 2004

Evaluation of uncertainty propagation in an operational flash flood forecasting chain

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Important points for HEPEX

1) Scales of interest (temporal and spatial) different from problem to problem: here short-term targeted to F-F Forecasting

2) Although targeted to some specific needs sketches out some of the problems identified by a large research group working in the fields: portability

3) It is developed together with end users and the structure will become the model of the future Civil protection organization in Italy

VALIDATION

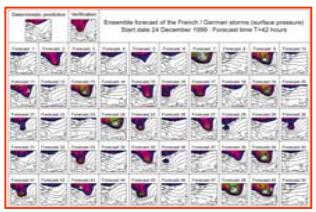
Brute force/COSMO-LEPS comparison

Best scale definition for rainfall representation

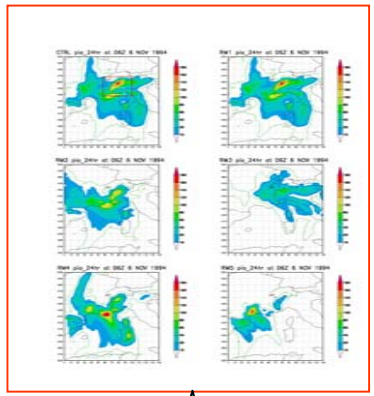
Regional & Single site approach

Targeted Model schematisation improvement

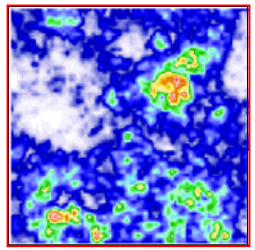
EPS



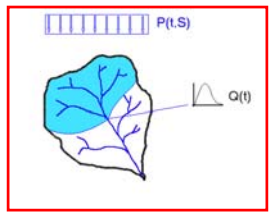
COSMO-LEPS



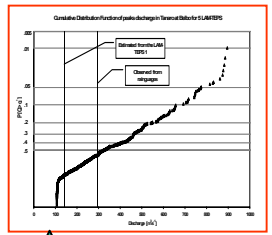
Downscaling



DHM/HM



CDF of peak discharges



How to convey information to decision makers & stakeholders

Real-time Bayesian modification of cluster probabilities

Parameterisation conditioned to weather conditions

More physical downscaling model definition

I.C. definition through Soil moisture retrieval (Data assimilation techniques)

OBSERVATIONS

CONCLUSIONS

1) Get a better grip on user requirements and identify common an specific problems: promote common and then specific ones

2) Identify the most profitable schematisations at different scales

3) Think in a probabilistic way & present the results in such manner

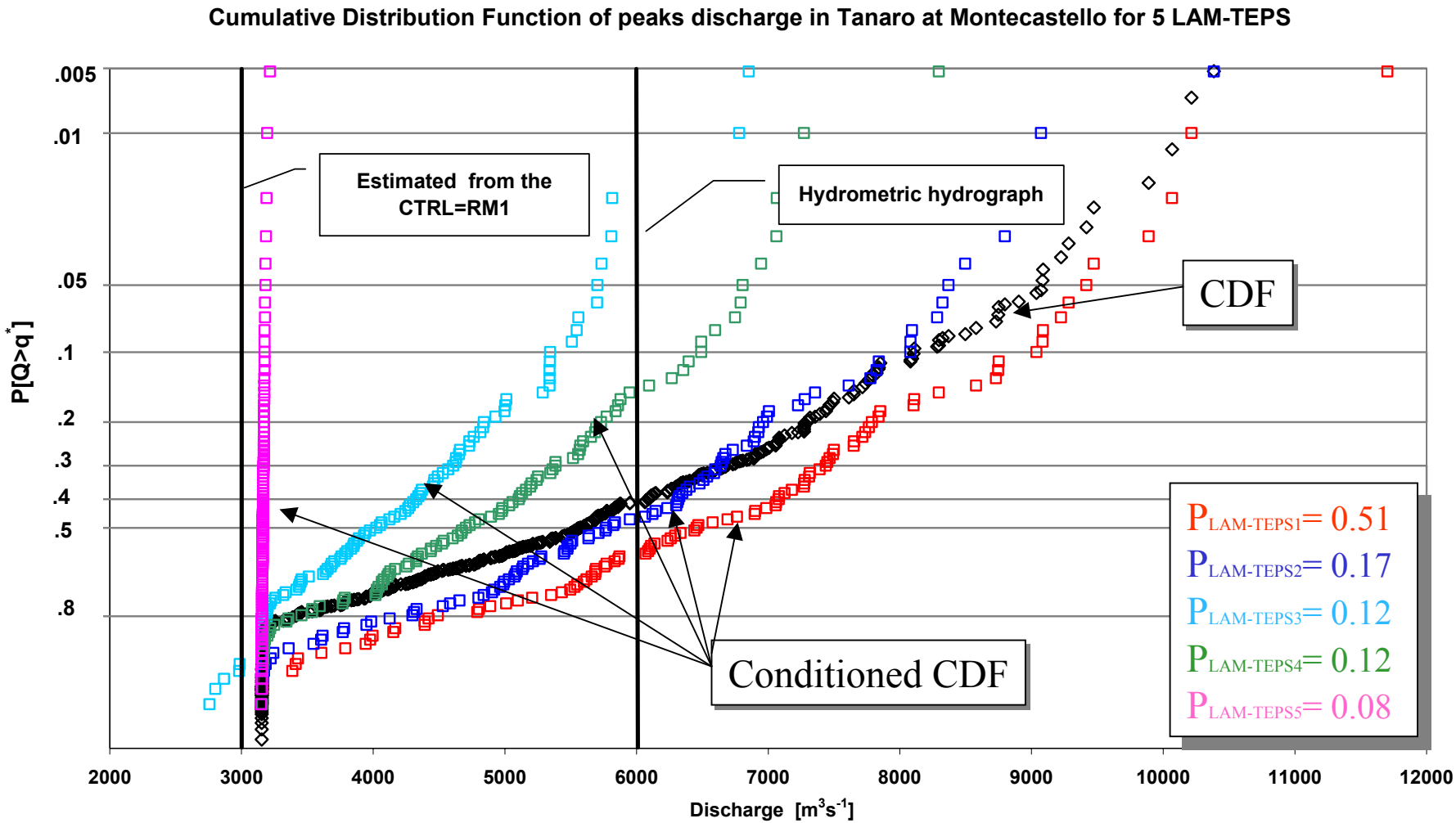
4) Extensive use of data at any scale to reduce uncertainty

5) Deliver the probabilistic information in a correct and usable way: two-way education

6) Evaluate the added value due to the use of ensembles

Example of single site

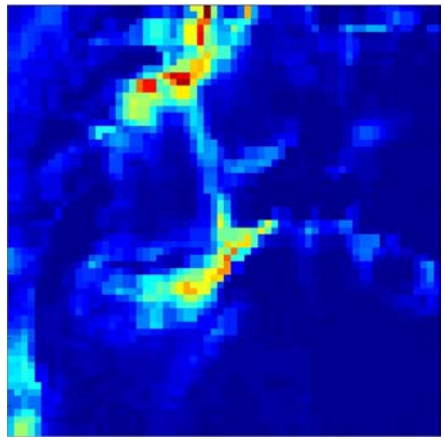
1994 Piemonte flood



Ferraris, L., Rudari, R. and F. Siccardi, 2002
The uncertainty in the prediction of flash floods in the northern Mediterranean environment,
Journal of Hydrometeorology.

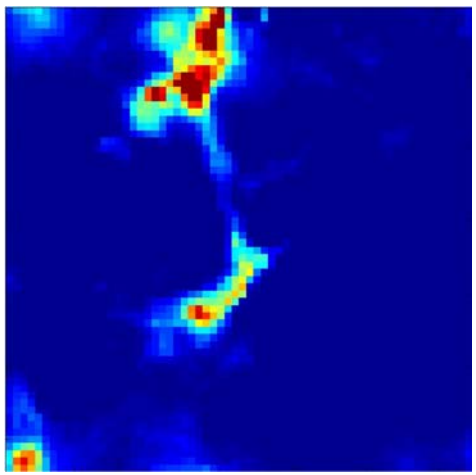
RAINFARM model with phases

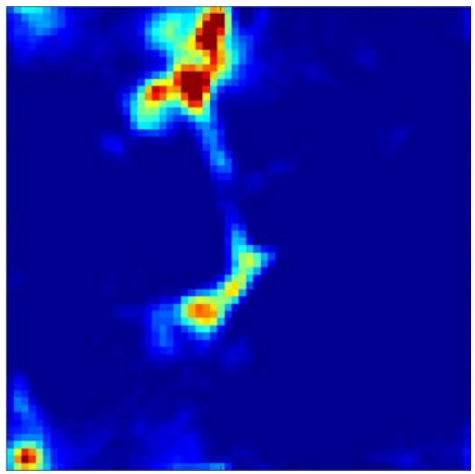
LOKAL

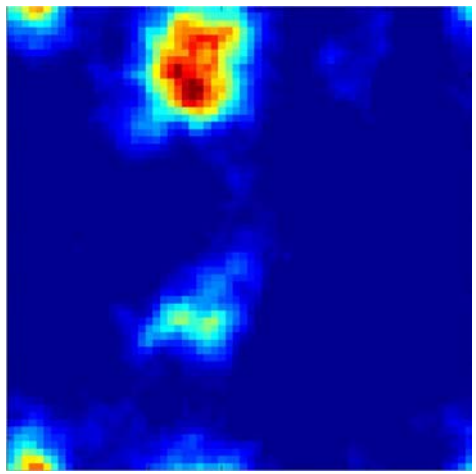


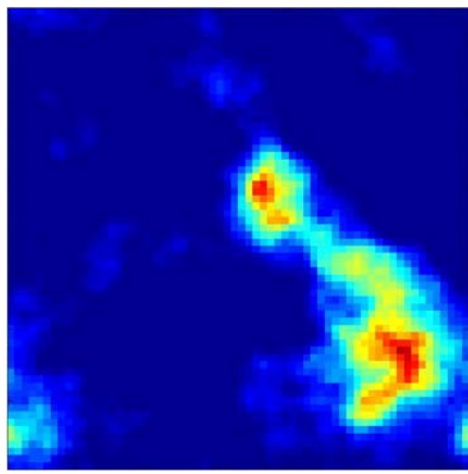
512 Km

RAINFARM model









All phases

16 phases (> 32 Km)

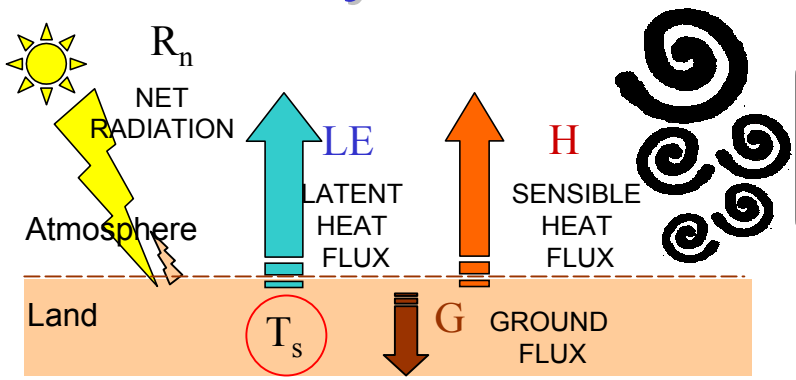
4 phases (> 128 Km)

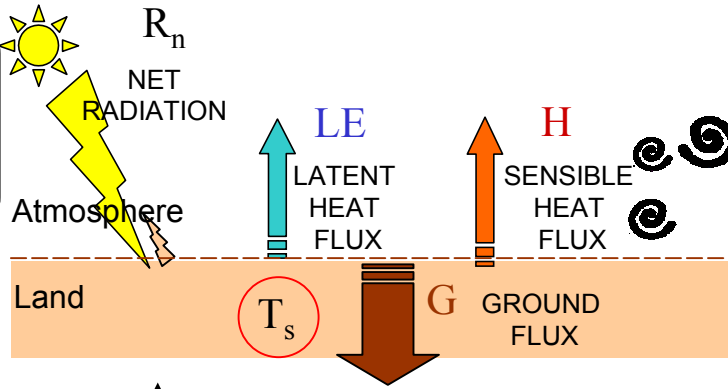
NO phases

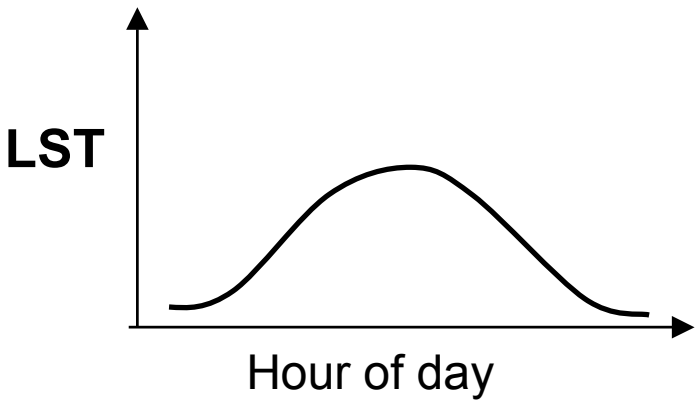
Signatures on LST dynamics

Data Assimilation is one way in which mdls can be used to optimise the use of data. DA describes a suite of techniques in which time-dependent mdls are used to extract info from a wide range of partial environmental data in a balanced and optimum manner. DA can be used to asses the value/impact of particular observing systems and therefore their design.

Efficiency of turbulent exchanges







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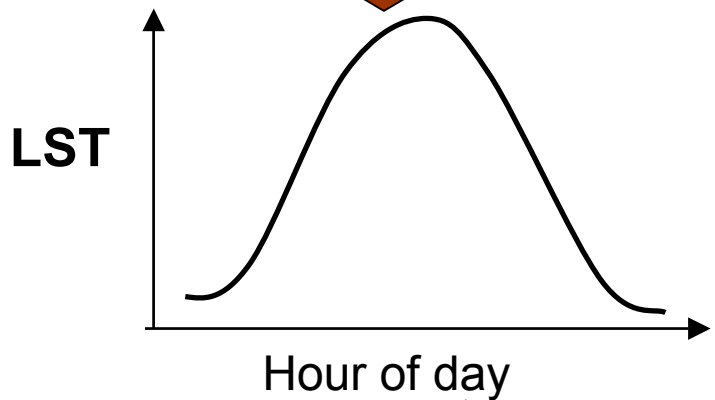
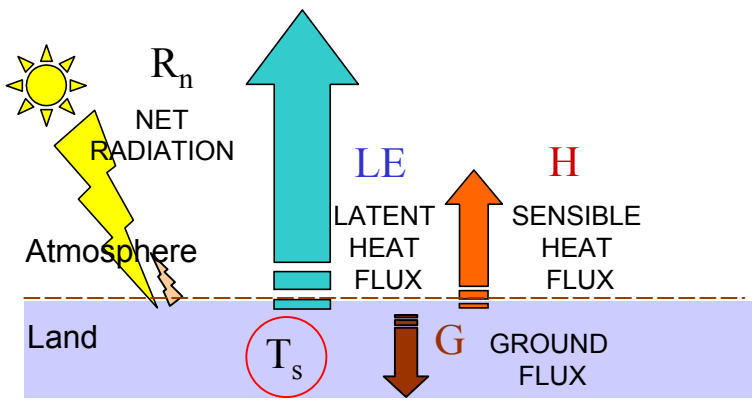
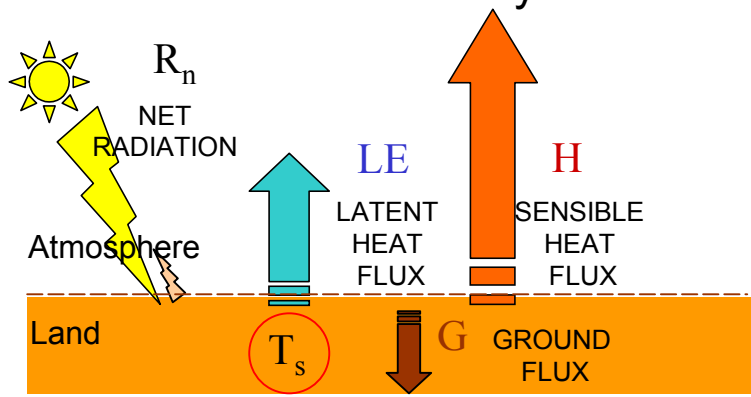


Partitioning due to moisture availability



WET



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