

Link with applications

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EWGLAM meeting Madrid, 20081006

- Applications using SR NWP models: a brief overview of the European zoo
- Why relevant in SRNWP context?
- Considerations of the ET

A very wide field...

- Many application areas
- Using a wide variety of techniques (both deterministic and probabilistic)
- Involving potentially many types of expertise other than NWP (some “close” to NWP, others not)
- Many user communities with widely different characteristics (NWP knowledge) and interests
- Different levels of involvement of the NMS's
- Types of use: non-profit or commercial?
- And so on...

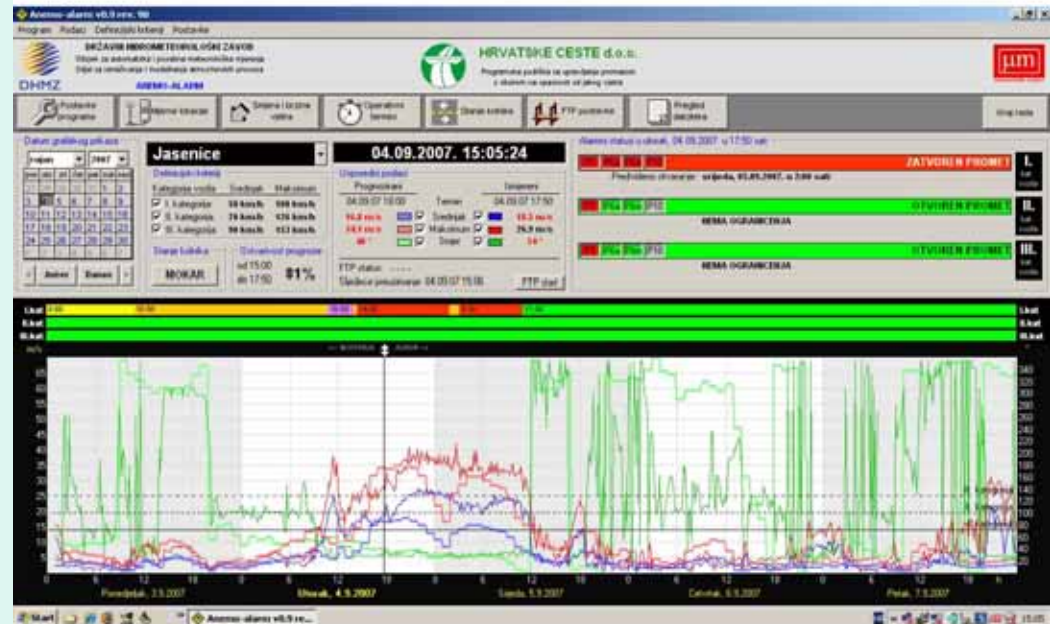
Hydrology

- Flood warning systems
- Drought conditions/ fire hazards
- River water levels for shipping
- Decision support systems for local water authorities
- Lake/river water temperature/icing conditions



Road conditions

- Relevant parameters: gusts, precipitation, road icing/snow conditions, visibility
- From DMO via 1D-modelling and statistical downscaling to coupling with detailed transport models



Energy

- Energy production forecasts for
 - Wind energy
 - Hydro-power
 - Solar power
- Weather info in support of oil/gas production
- Network load forecasting



Air quality

- Dispersion of toxic substances
- Trace gas concentrations in inhabited areas
- Summer and winter smog conditions

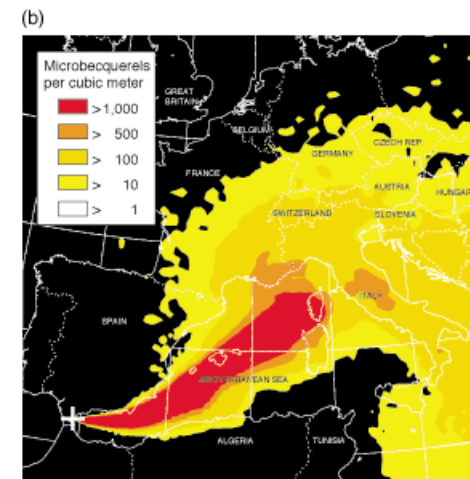
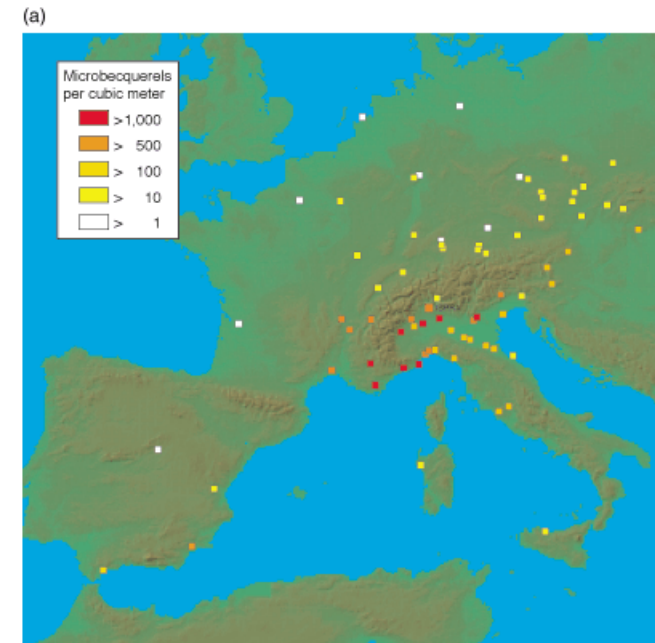
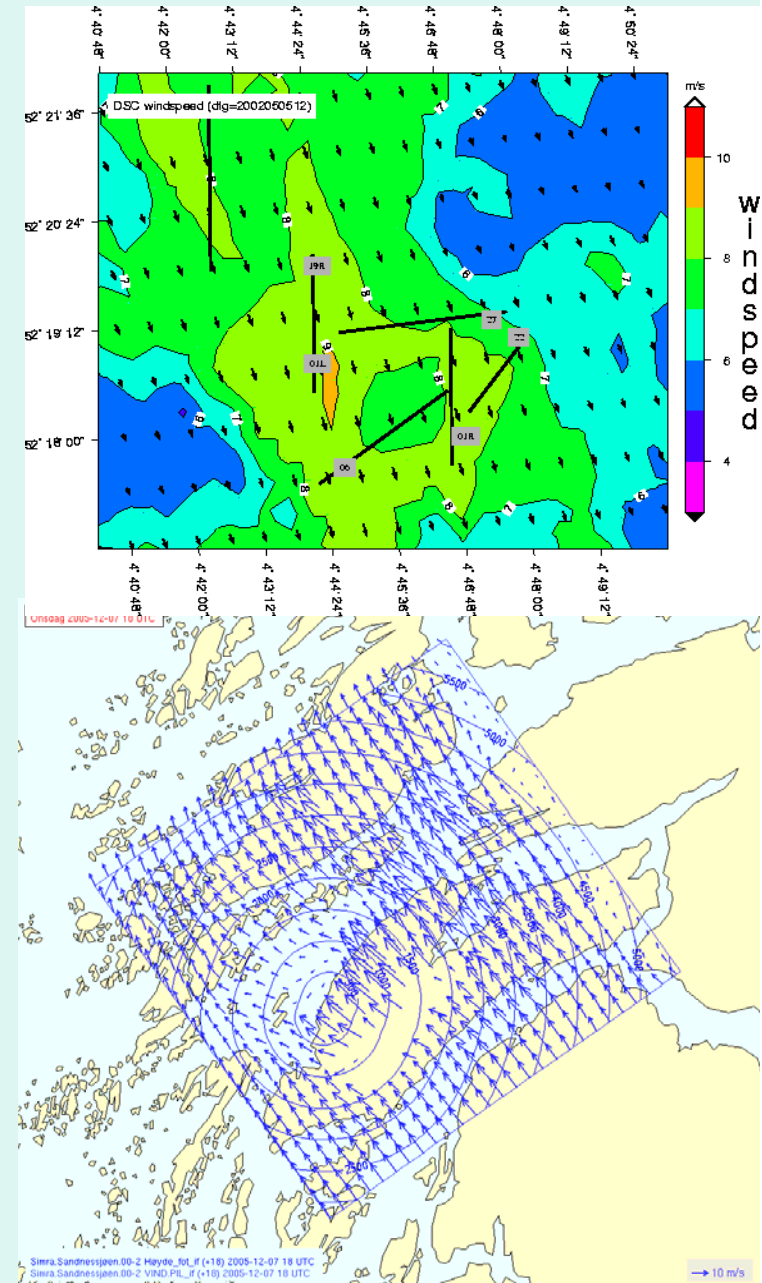


Figure 5. Following a cesium-137 release in southern Spain, ARAC received (a) measurements of elevated radiation levels from disparate European sources, which it superimposed on a terrain map of central and southern Europe. (b) Results from ARAC's third set of simulations for this release show the average air concentrations over a 7-day period. These results led to a good estimate of the original cesium release.

Aviation

- (Automated) production of routine METAR/TAF/TREND bulletins
- Nowcasting of visibility / gusts / severe convection
- En-route flight decision support (CAT, icing, volcanic plumes,...)
- Airport / airline management support systems



Maritime applications

- Storm surges and coastal protection
- Shipping safety: storms, surface waves, visibility, sea ice conditions, ...
- Ship routing
- Information for fishing



Health

- Risk of smog / high PM concentrations
- Risk of heat waves
- Pollen / allergy forecasts
- UVB forecasts
- Water temperature and impact on water quality



Agriculture

- Risk of spread of foot and mouth disease
- Frost near the ground
- Seasonal forecasts



Many types of applications...

- Statistical postprocessing to improve NWP output: MOS, PPM, KF, adaptive bias corrections...
- Physical postprocessing:
 - Production of externally derived fields
 - Downscaling to local conditions
 - Downstream models for non-atmospheric aspects
- Nowcasting applications – coupling with observations (SAF's, INCA, ...)

... but where does it all end?



An important “application” to consider,
when it comes to severe weather?

Why relevant to SRNWP

- Ensure that SR NWP has/ retains committed end users
 - “Proven” value of SR NWP in end user applications = justification of efforts/means put into it towards funding authorities
- More effective application R&D through exchange of ideas/experiences/tools(?) on applications of common interest
- Feedback to SRNWP R&D:
 - items to improve in the SR NWP models
 - See where applications/products should become incorporated into NWP models somehow.

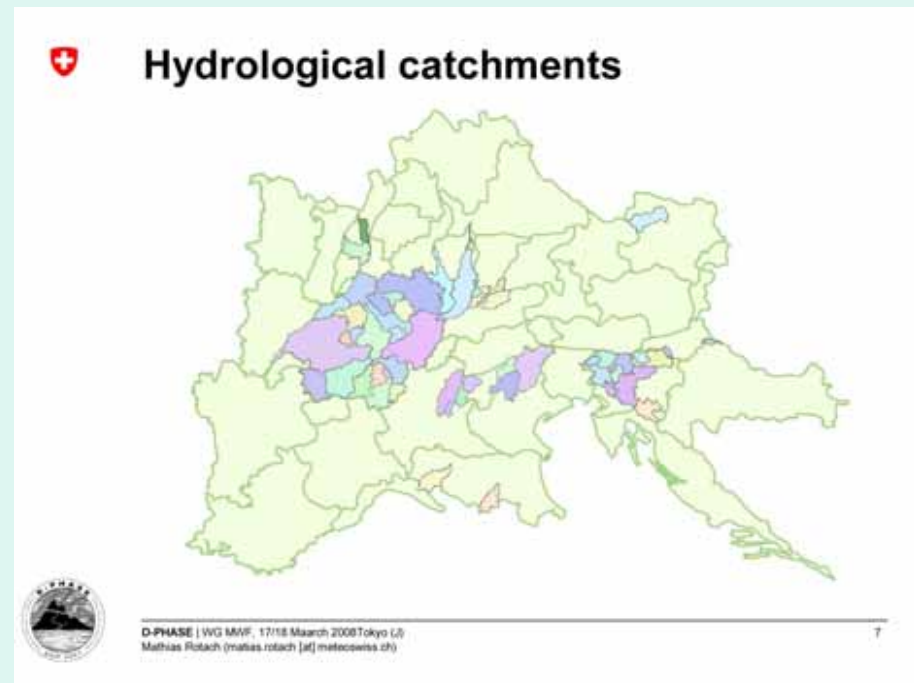
Deterministic versus probabilistic

Which has greater forecast value (in the eye of the beholder)?

- **Deterministic information:**
 - Is usually what users feel they need
 - Appears more “accurate” (more spatially detailed)
 - Appears (and sometimes is) more appropriate to use on the (very) short range
- **Probabilistic information:**
 - More difficult for end user to handle
 - To use optimally, requires insight into user’s decision process
 - More and more experienced users are beginning to understand the added value of uncertainty information
- **Objective verification and communication of forecast value needed for both!**

Value for users: an example from hydrology (MAP D-PHASE)

- MAP D-PHASE: demonstration phase of MAP (2007)
- 23 deterministic atmospheric models, 7 ensembles, 7 coupled hydrological models
- Warning products at pre-agreed alarm levels for hydrological catchments in Switzerland
- Close contacts with hydrological user community during IOP and analysis phase





Concept of "Relative Value"

Economic point of view:



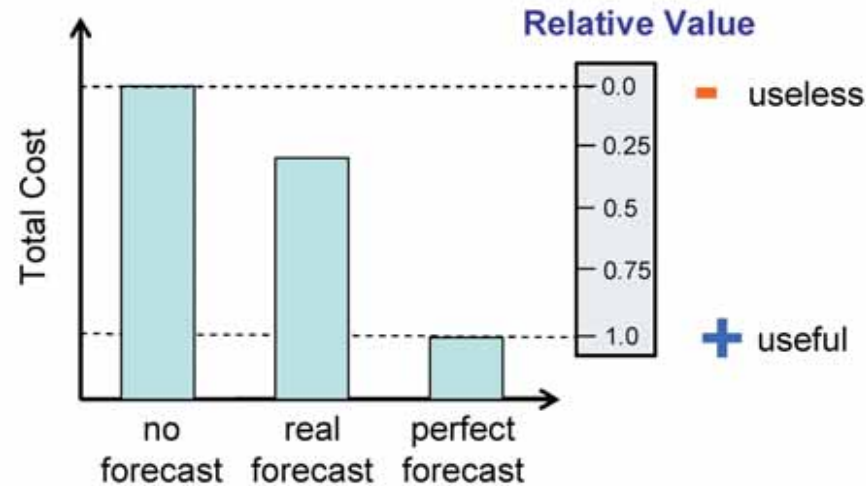
Precautions causes Costs



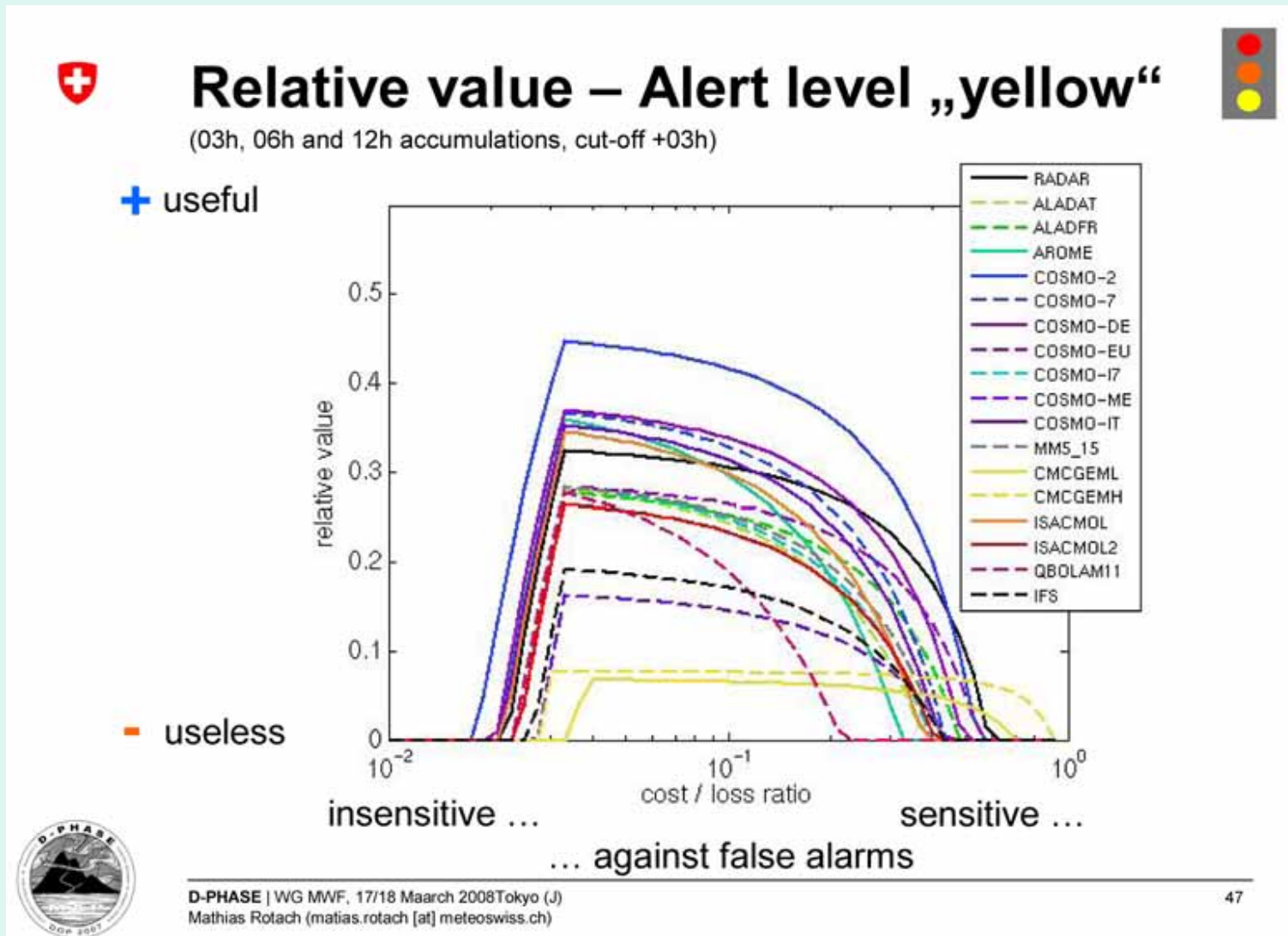
Having no protection results in Losses



		Event	
		Yes	No
Precaution	Yes	C	C
	No	L	0



User-specific verification and determination of value



User-specific products/verification

- Needed to “translate” NWP to user interests
- Essential for determination of value of information for end user
- But:
 - Requires “institutional” user
 - Requires intensive and regular contacts with user
 - Which users are important enough to merit specific treatment?
 - To what extent is user-specific verification on European scales possible?

Feedback for improvement of NWP

- Requirements for user-specific output to be incorporated in routine NWP postprocessing (e.g. gusts, RVR)
- Requirements for improving specific weather parameters (e.g. ddd for dispersion models)
- Helping users to find out what is possible and what they should be asking for (e.g. wind energy)
- Help decide where to incorporate specific PP/ applications into NWP

Existing cooperation

- In some application areas, extensive cooperation already exists (within EU projects, COST actions, SAF's, EUMETNET, ...):
 - Hydrology
 - Air quality
 - High impact weather in general
- Some fields are relatively new (health)
- Some fields are generally considered commercial: agriculture, aviation, ... But this does not necessarily exclude cooperation!

What are the consequences of this for cooperation in SRNWP context?

Dilemma's/considerations for the ET

- How to make scope manageable? When are activities still within the remit of SRNWP, when not?
 - Where does postprocessing cease to be NWP?
- Cooperation in what?
 - Concentrate on NWP aspects only (feedback, value), or on applications themselves? If the latter, then focus on few areas?
 - Information exchange or application development?
 - Competition vs. cooperation: what is shareable?
 - Precompetitive or non-commercial applications only?
- Applications usually “organized” at national, not consortium level, and often by people outside NWP => how to get the right expertise / knowledge / permissions?
- Links with ET/verif activities?