

Improvement of Flood Forecasting Reliability by Employing Ensemble Meteorological and Hydrological Forecasts

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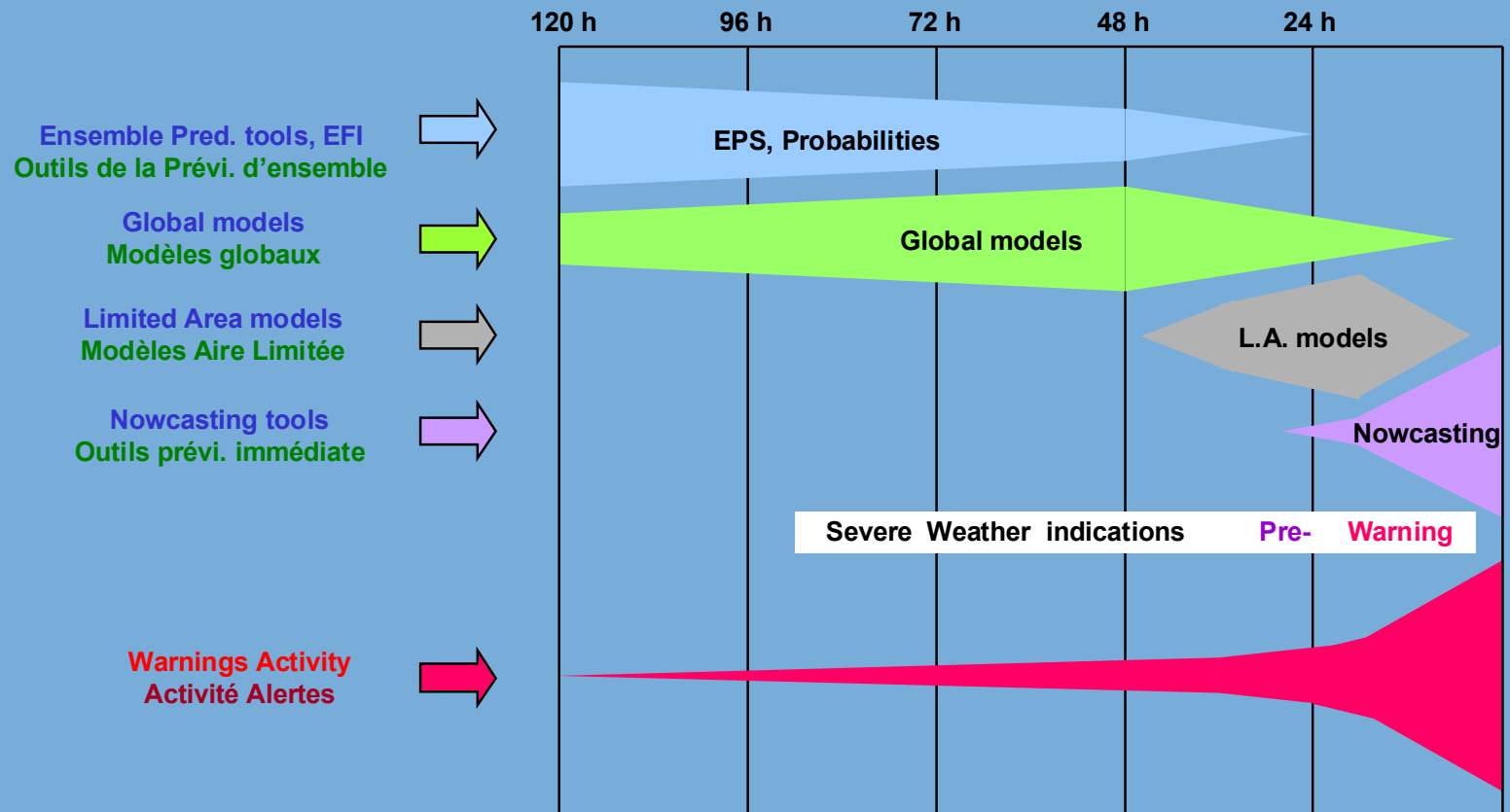
Objectives

- > Enhancement of meteorological limited area modelling by generating ensemble predictions and considering forecast uncertainty.
- > Linking meteorological forecasts and hydrological models under consideration of the probabilistic nature of meteorological predictions and hydrological modelling.
- > Demonstrating the benefits of meteorological ensemble forecasts by applying operational hydrological water level and discharge models and providing guidelines/recommendations for an appropriate use of probabilistic forecasts in operational flood warning.

Scientific and strategic objectives

- > Development of methods for generating ensemble forecasts based on meteorological limited-area models
- > Investigation of the accuracy of limited-area meteorological model forecasts
- > Design of methods and interfaces for integrating the probabilistic features of ensemble meteorological into hydrological forecasts
- > Hydrological modelling based on watershed and flood routing models using probabilistic data from meteorological ensemble forecasts
- > Investigation of the optimum ensemble forecast for hydrological modelling with regard to different flood regimes
- > Development of methods for incorporating uncertainty inherent in both weather forecasts and hydrological modelling into operational flood forecasts
- > Support the use of probabilistic flood forecasts for operational flood warning
- > Elaboration of recommendations for flood warning centers and dissemination of results to end-users

USE OF VARIOUS TOOLS TO PREPARE WARNINGS UTILISATION DE DIVERS OUTILS POUR PREPARER LES ALERTES



Time dependency of forecast methods used for the preparation and maintenance of warnings at
DWD

Méthodes utilisées en fonction de l'échéance pour la préparation et la maintenance des alertes
au DWD

TRAINING OF THE VARIOUS ACTORS LA FORMATION DES DIVERS ACTEURS

- **Training of the Forecasters / Formation des prévisionnistes**

Training course on the use of the model products and nowcasting tools,
Workshops with modellers to better know model qualities and imperfections,
User's Guide and Computed Aided Learning.

Cours de formation à l'utilisation des produits et modèles et de la prévision immédiate,
Ateliers avec modélisateurs pour mieux connaître qualité et défauts des modèles,
Guide de l'Utilisateur et Enseignement Assisté par Ordinateur.

- **Training of the Partners / Formation des partenaires**

Organization of the meteorological warning procedures,
Forecast reliability of the heavy precipitation forecasts,
Concrete consequences of the heavy precipitations.

Organisation des procédures d'alerte météorologiques,
La fiabilité des prévisions des fortes précipitations,
Les conséquences sur le terrain des fortes précipitations.

- **Training of the Decision makers / Formation des Décideurs**

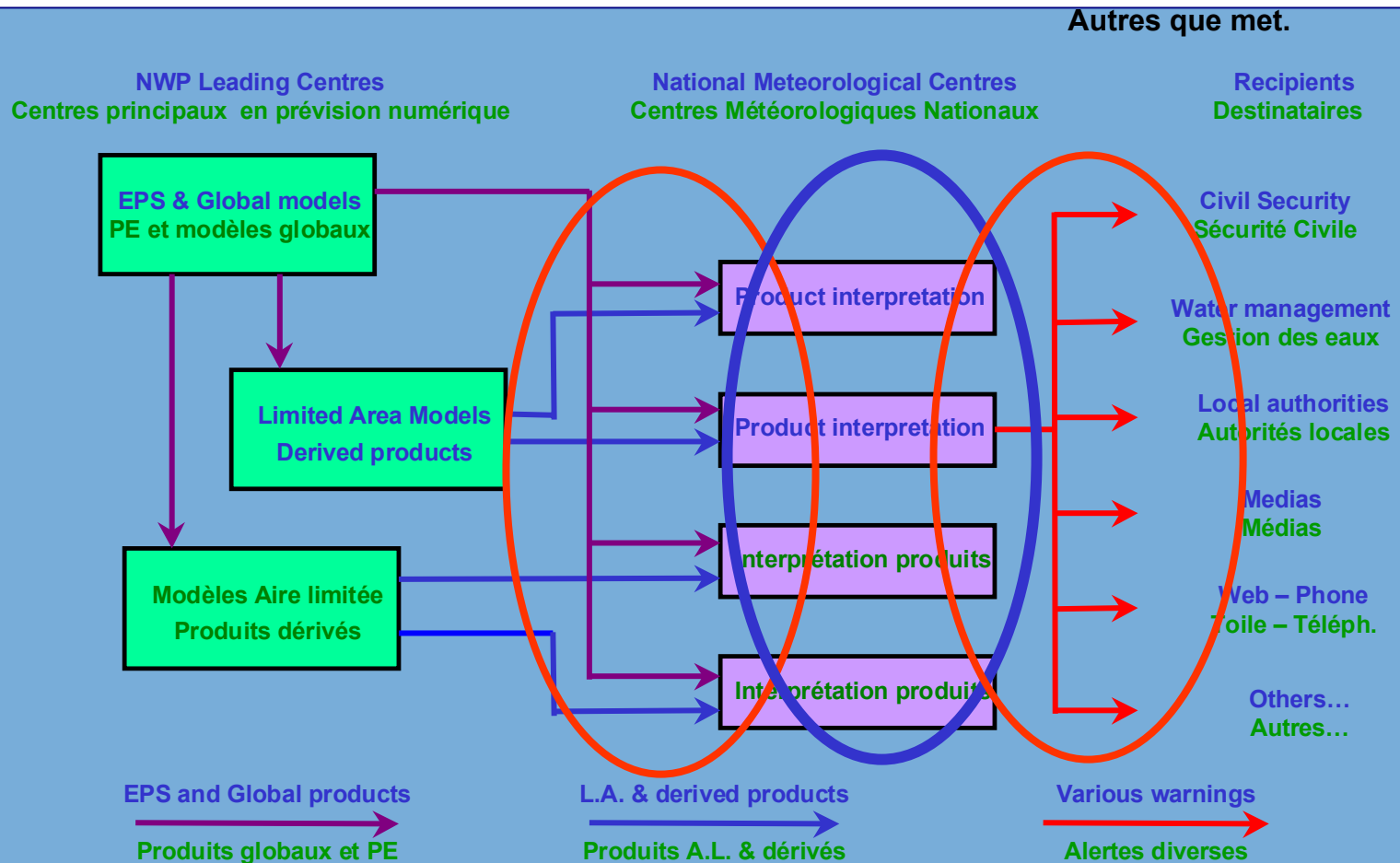
Dialog with Met. Services; protection measures to be established ; exercices
Dialogue avec les services météo ; mesures de protection à mettre en place ; exercices.

- **Training of Public / Formation du Public**

Promote risk awareness through Education and medias (TV, Web, School Enterprise).

Developper la culture du risque au moyen de l'Enseignement et des médias (TV, Web, Ecole, Entreprise).

A CASCADING PROCESS TO HELP ISSUING WARNINGS UNE CASCADE DE PROCEDURES POUR L'EMISSION DES ALARMES

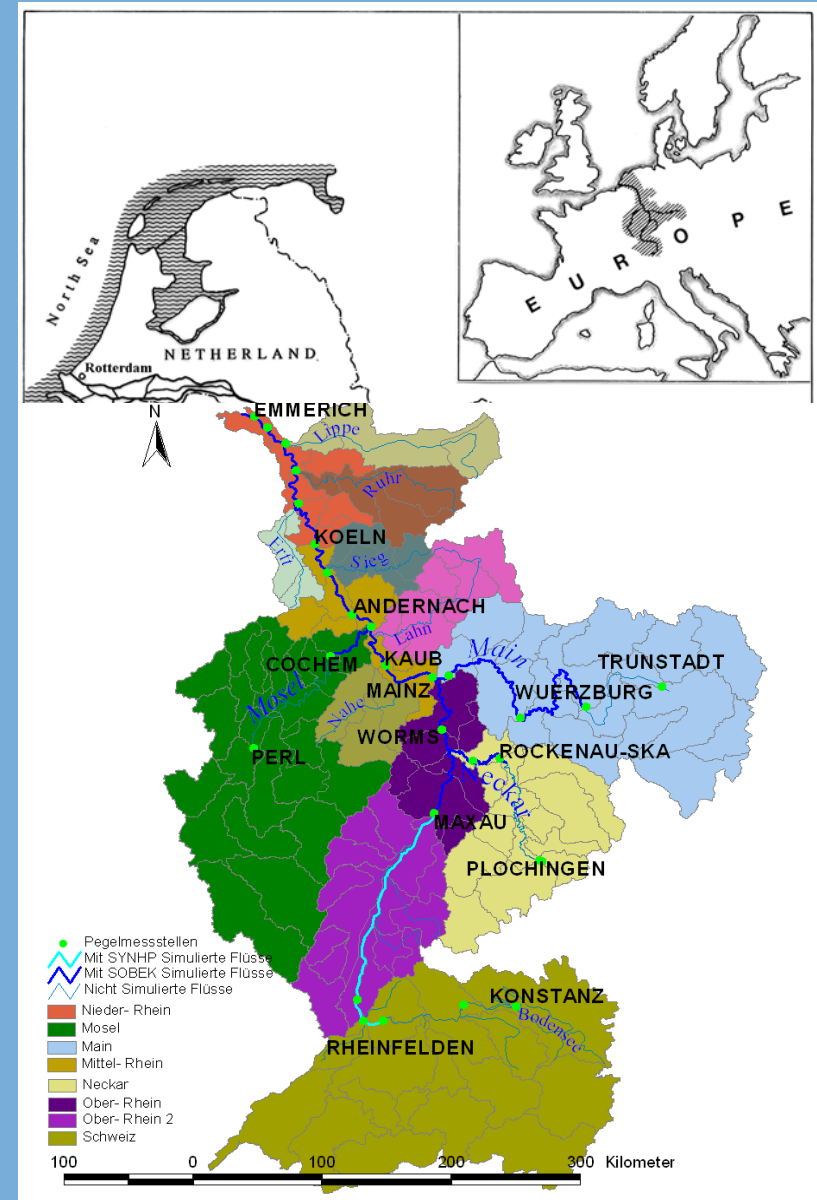


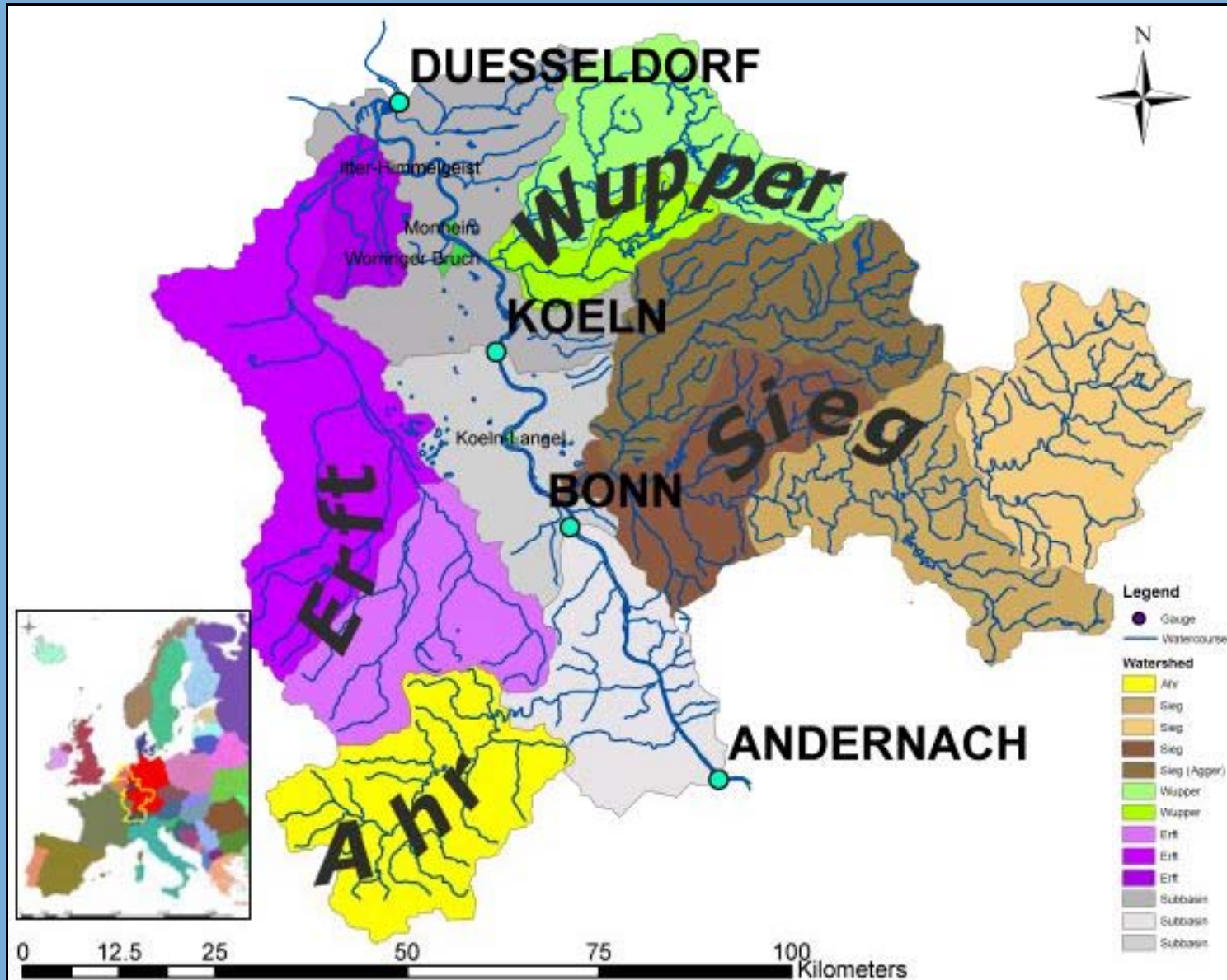


Rainfall-runoff modelling

Set up of

- semi-distributed
- distributed models
- mathematical-statistical models
(e.g. neural net, fuzzy models)

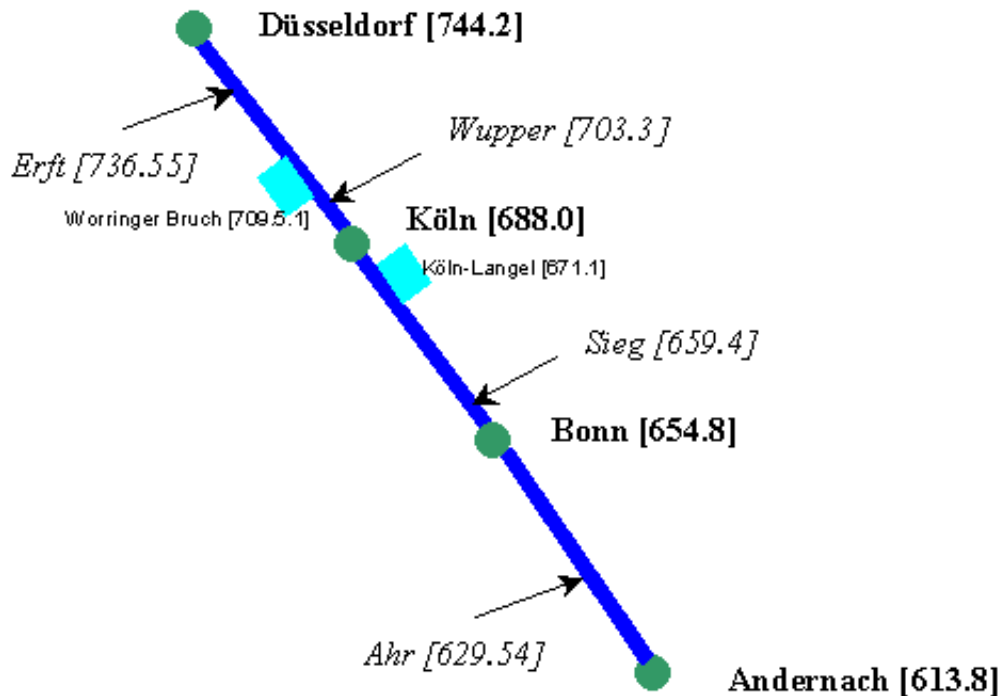




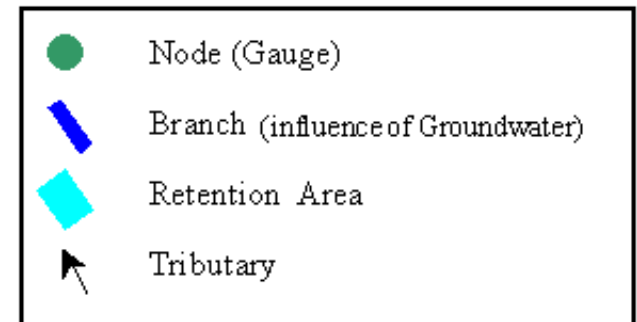


Hydrodynamic modelling

Set up of 1D-hydrodynamic model for the test area



130.4 km watercourse and
~ 8131 km² catchment area





HEPEX Workshop
ECMWF, Reading, March 8-10 2004



Flood warning and management

