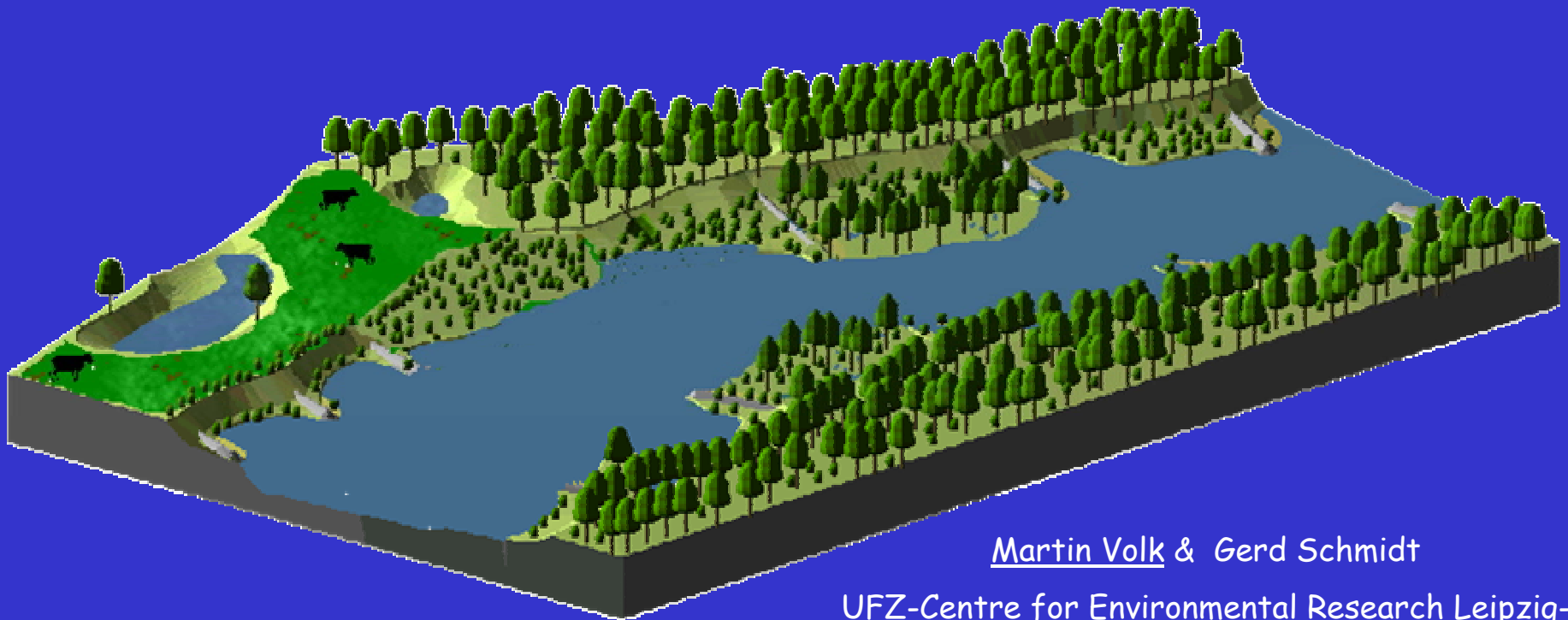


The model concept in the project FLUMAGIS: Scales, simulation and integration



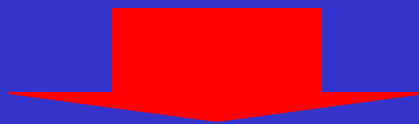
Martin Volk & Gerd Schmidt

UFZ-Centre for Environmental Research Leipzig-
Halle, Department of Applied Landscape Ecology ,
Permoserstraße 15, 04318 Leipzig, Germany



Introduction

- EC - WFD defines environmental targets for surface and groundwater
- Main instrument - management plan for River Basins
 - Environmental targets
 - Current conditions
 - Measure programm
- Consideration of whole River Basins
- Participation - „...active participation of all interested institutions...”



Water management
Forestry

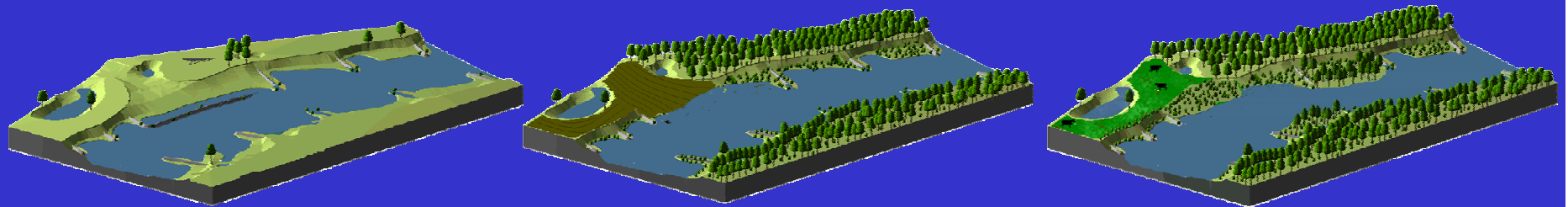
Nature protection
Interested public

Agriculture



FLUMAGIS

Interdisciplinary development of methods and tools for the planning and controlling of measures for river basin management with GIS



AIM

- Development of methods and computer-aided tools for the support of the planning and management of river basins

Visualization



Participation

Model link

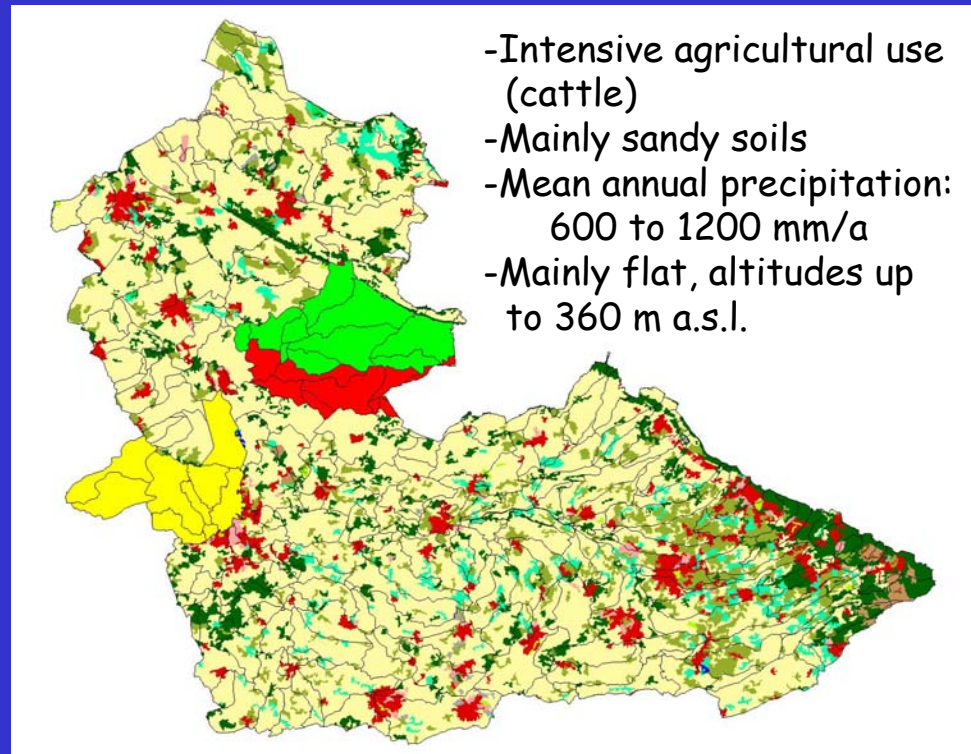
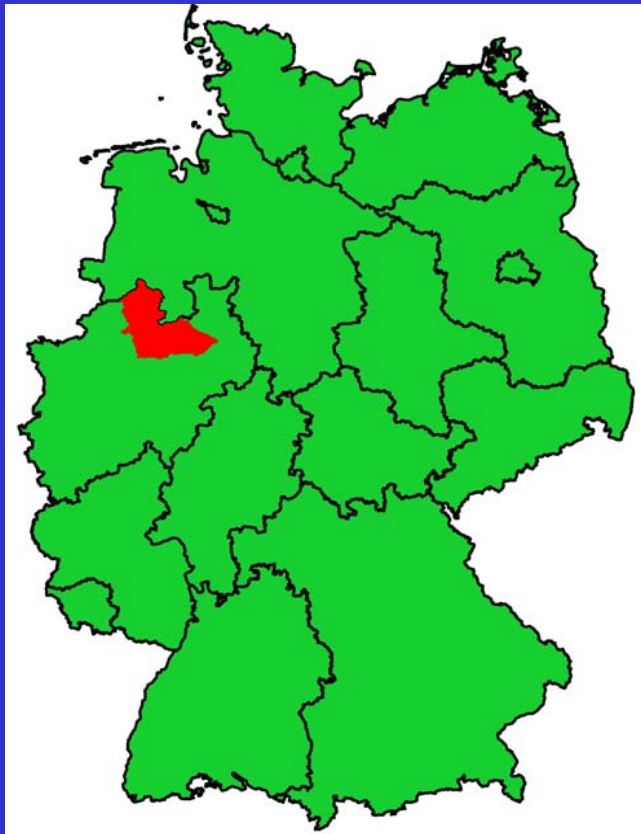


Decision support



Study area

- Unnavigable part of the Ems -
Upper Ems River (3.740 km²)



- Intensive agricultural use (cattle)
- Mainly sandy soils
- Mean annual precipitation: 600 to 1200 mm/a
- Mainly flat, altitudes up to 360 m a.s.l.

- Ladberger Mühlenbach $A_{EO} = 350 \text{ km}^2$
- Eltingmühlenbach $A_{EO} = 160 \text{ km}^2$
- Münstersche Aa $A_{EO} = 173 \text{ km}^2$

Model link in FLUMAGIS

- Who is the user of FLUMAGIS?

User group to reach - knowledge level: Hydrology, Modelling
Indicators, Parameters

- Which simulation results can and must be expected?

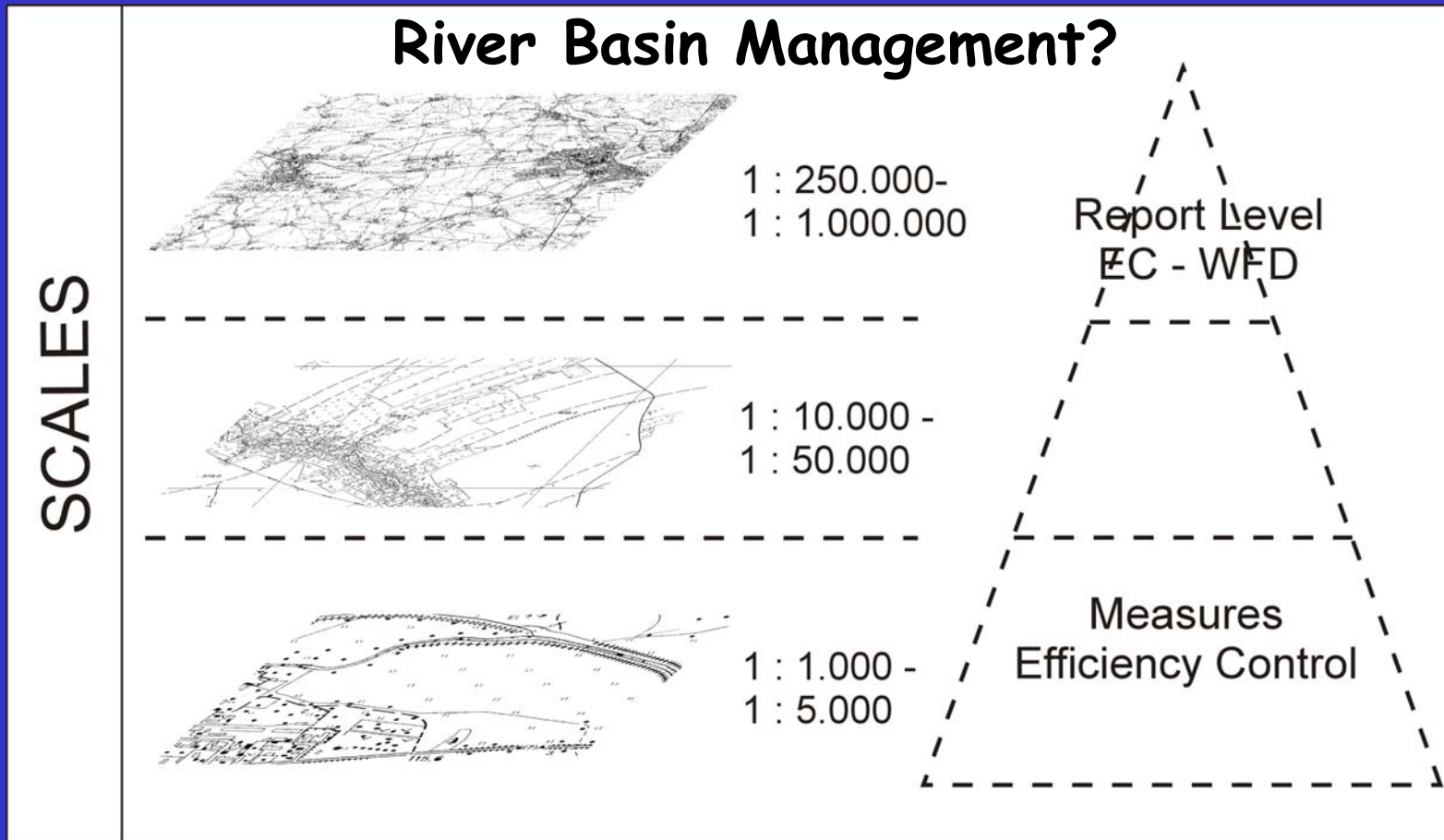
Specifics of the study areas, which results can be shown how?

- Level of link / integration?

Direct start of the models from the graphic user interface?
Databank for the models
Land and water use scenarios

- How to consider scales?

Definition of scale levels



INDICATORS AND PARAMETERS

IHA - Parameters

- MoMQ, HQ, NQ, calendar day, HQ, NQ
- Magnitude of the monthly runoff conditions
- Temporal sequences, seasons
- Rate of hydrographic changes
- .
- .
- .

Hydr. guidelines

- Mean annual runoff amount
- Variation coefficient
- MHQ/MNQ
- MQ/MNQ
- .
- .
- .

Parameters of BWK

- pot. nat. amount of flooding water
- Runoff dosis
- Runoff acceleration
- Dose of shear stress
- Flow velocity
- .
- .
- .

Further hydr. Parameters

PARAMETER AND INDICATOR POOL

Scale specifics
Relevance/
informative

Experts

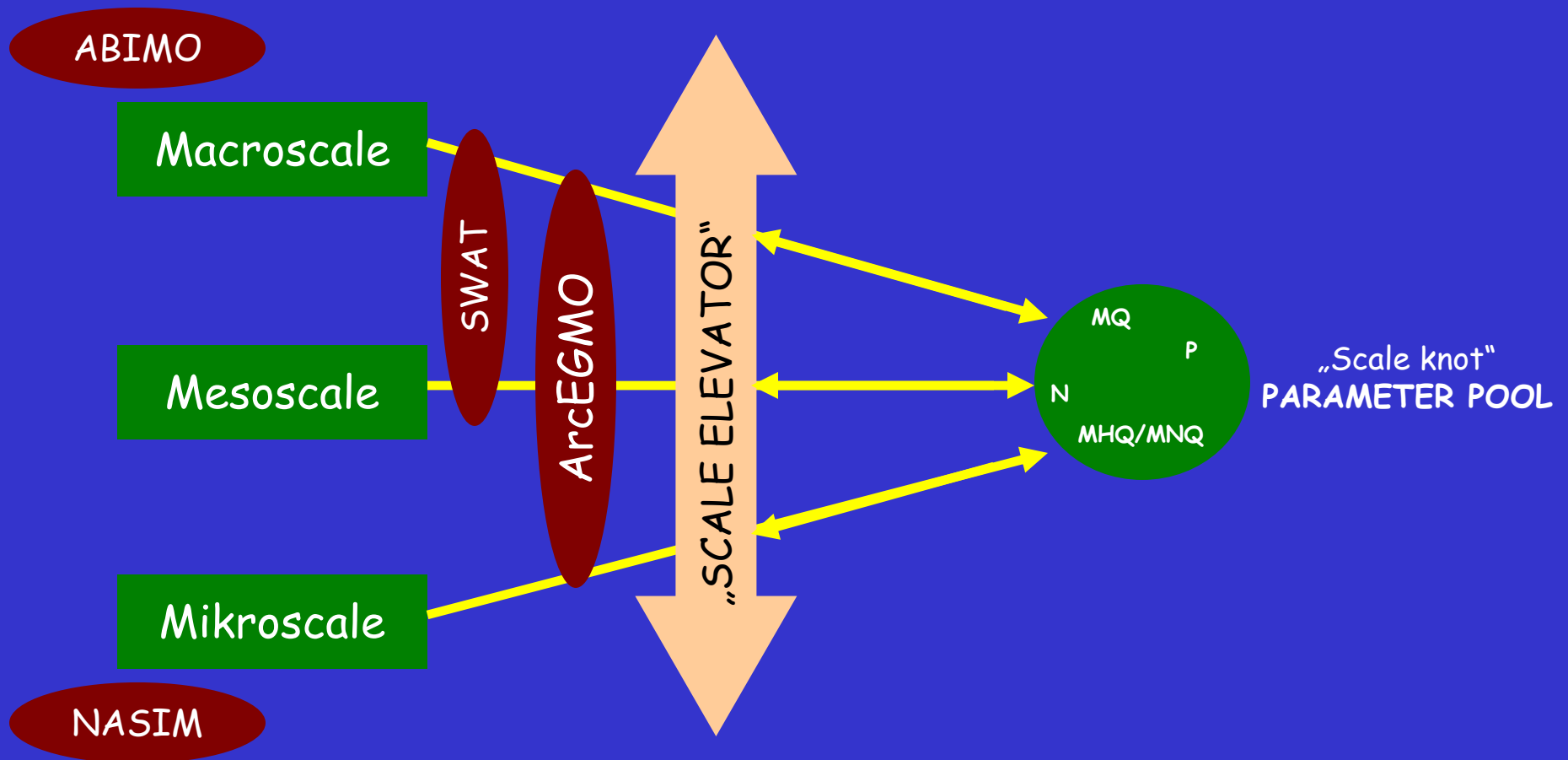
Interested
public

Model systems

Qualitative/
Quantitative
Indicators

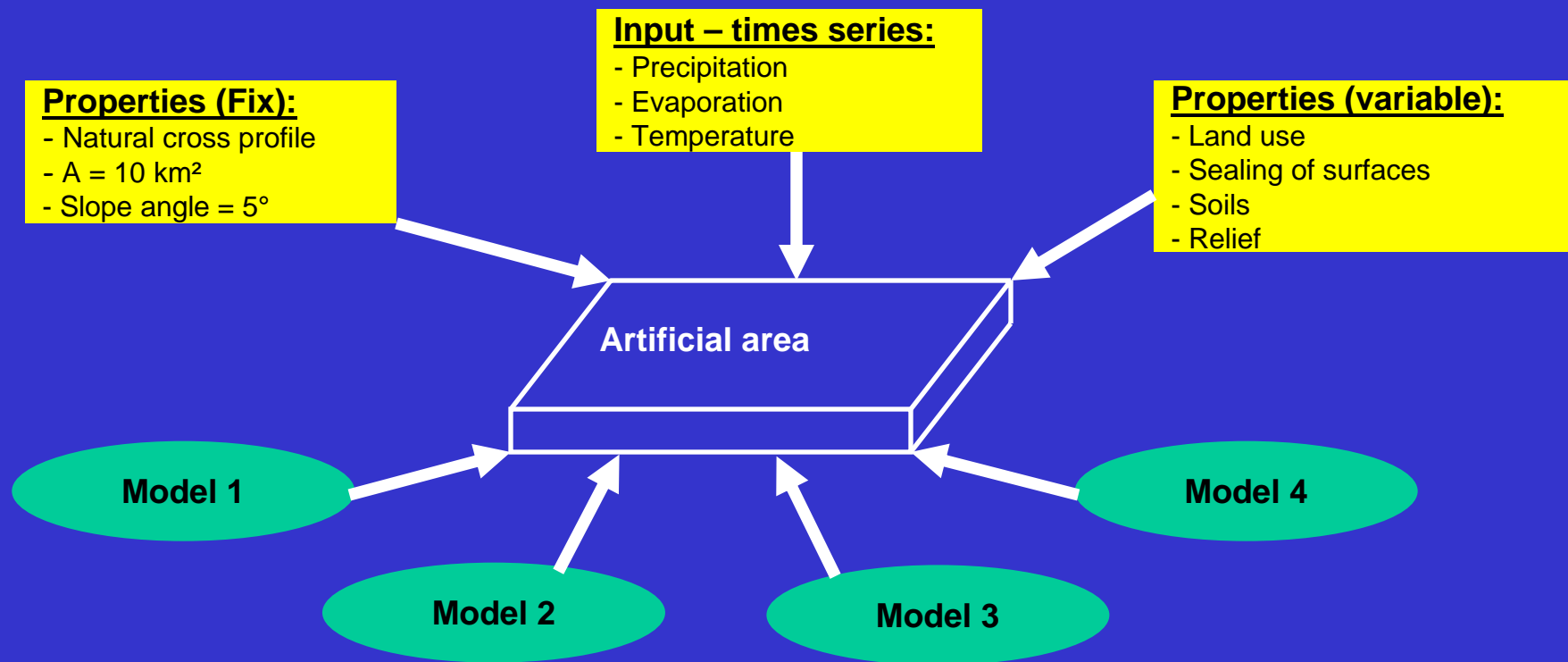


Scale-specific model application



Model comparison

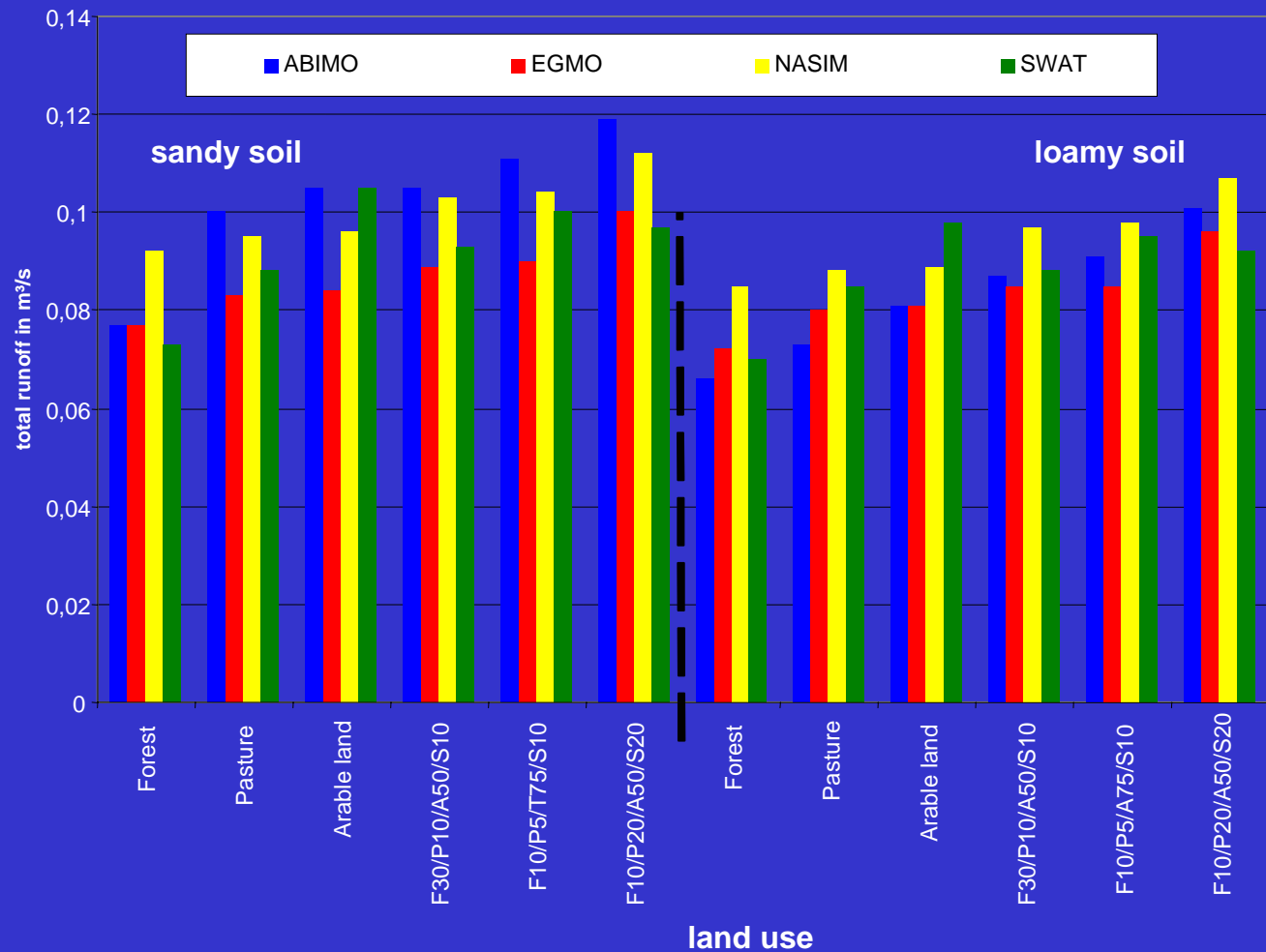
- Artificial areas



First results

Structure of the artificial areas

- B1 - Gleyic podsol from sandy river sediments
- B2 - Loess soil
- Forest (deciduous)
- Pasture
- Arable land
- Sealing of surface
- 5° Slope angle
- 1% River channel incline
- P, ETP - data: 1970 - 1993

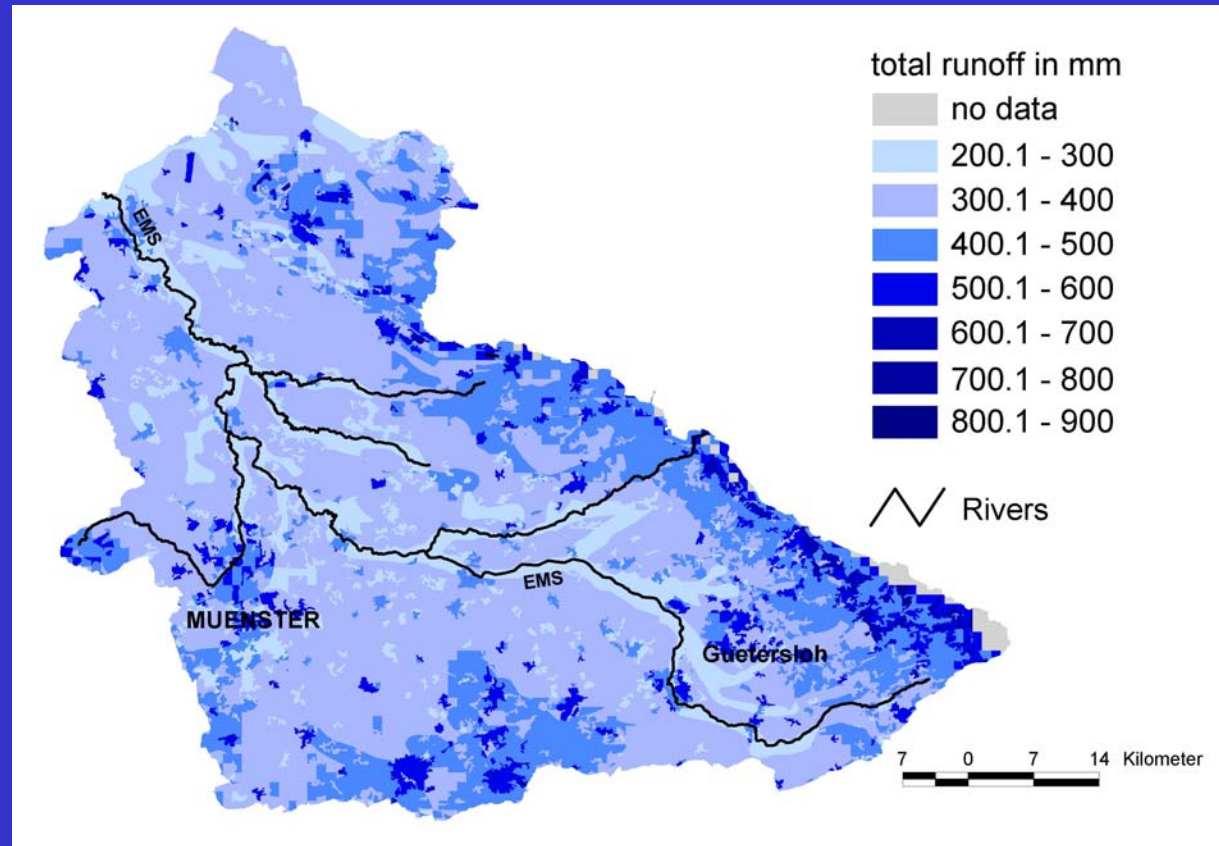


First results

First step:

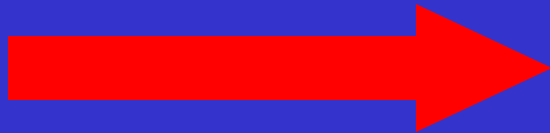
Total runoff of the study area simulated with a simple conceptual Model (ABIMO):

- Longterm mean annual values of precipitation and PET
- Soil parameters (AWC, Sand, Silt, Clay, Loam, organic)
- Land use types (Forest, Gardens, Arable, sealed surfaces, Water, yield classes)
- GWH
- Degree of canalization



Outlook - further steps

- Model adjustments - artificial and study areas
- Required complexity - simplicity of models due to the scale levels
- Visualization of hydrology- and matter-related topics, Linkage/integration of models
- Transferability of the concept



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