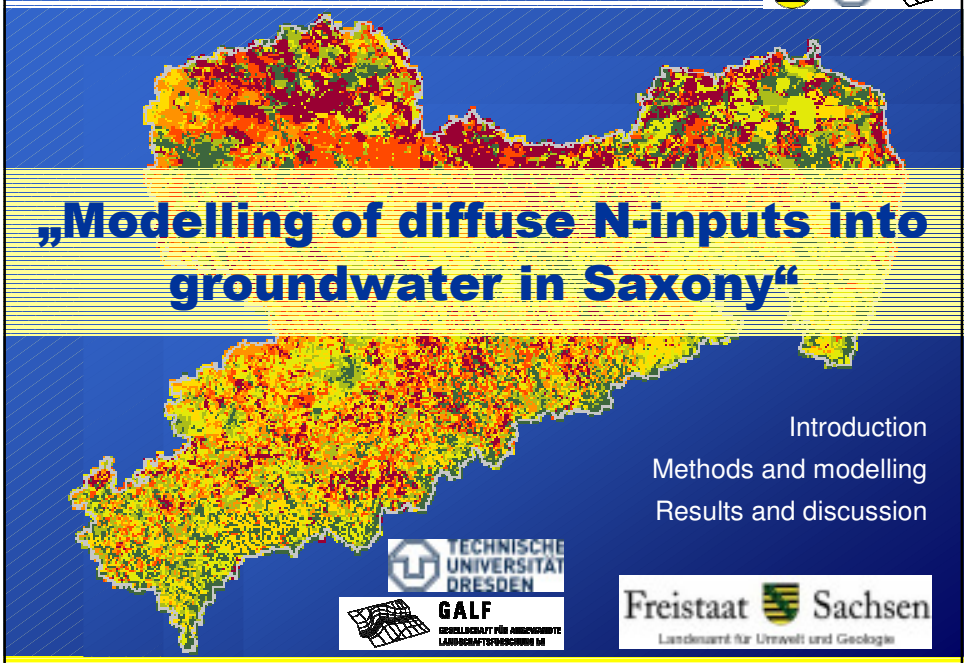


„Modelling of diffuse N-inputs into groundwater in Saxony“

Introduction
Methods and modelling
Results and discussion

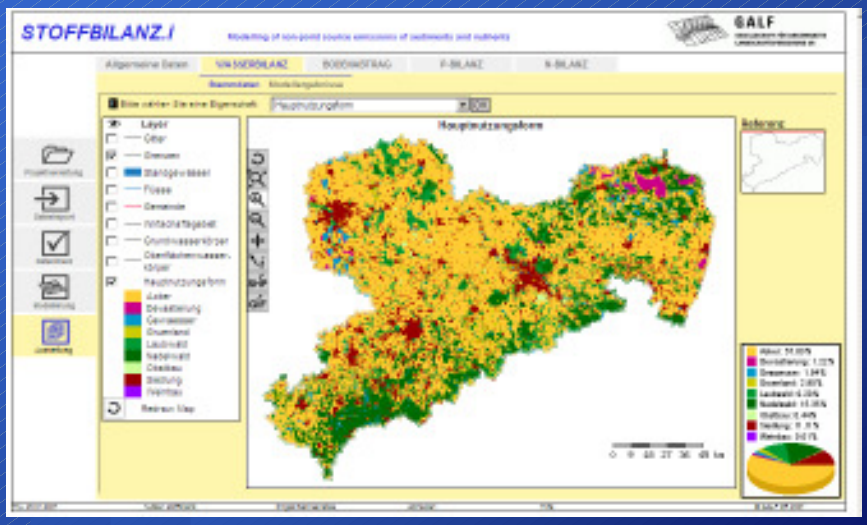
TECHNISCHE UNIVERSITÄT DRESDEN
GALF
Freistaat Sachsen
Landesamt für Umwelt und Geologie

Presented subject is part of the project „Atlas of diffuse nitrogen and phosphorus inputs in surface waters in Saxony“

Ordered by the Agency for geology and environmental protection
In close cooperation with:
- agency for agriculture
- agency of forest management
- agency of water reservoir management

Modelling results as a regional database for:

- management of catchment areas according to the water framework directive.
- set up of criteria for european funding (ELER).



- Web-GIS-based modelling tool
- calculation of diffuse emissions of sediment, nitrogen and phosphorus in catchment areas

Time scale:

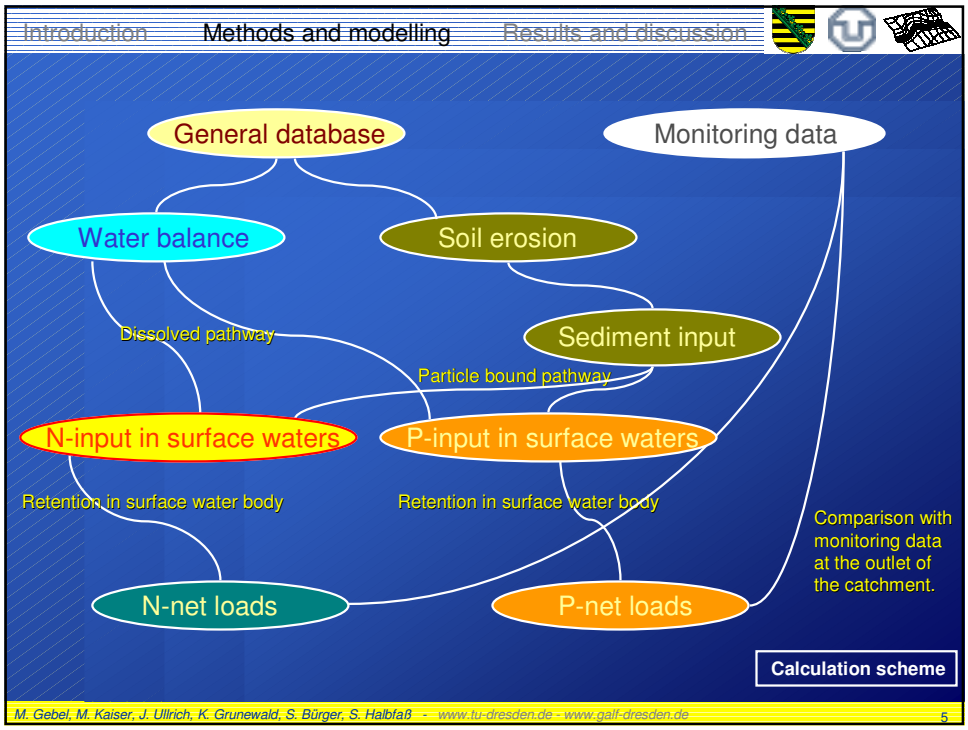
- calculation as annual balance

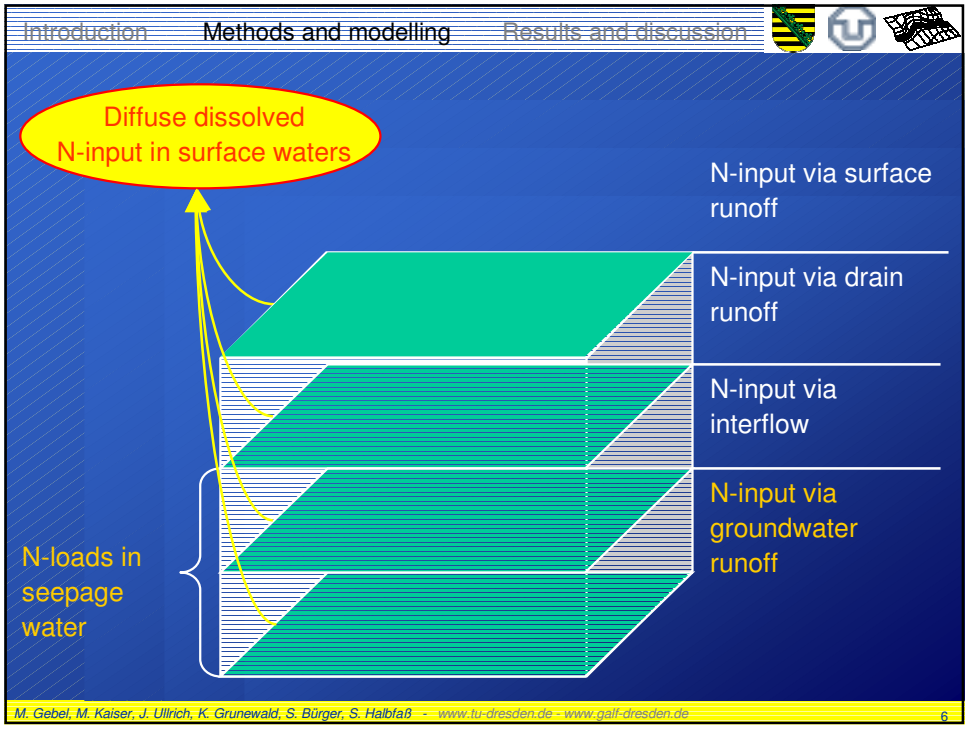
Spatial scale:

- Atlas-maps (scale 1: 600.000)
- 500 x 500 m-raster, 75.293 raster cells

Spatial levels for data evaluation:

- raster cells,
- municipalities, surface water bodies, groundwater bodies ...


General database
Monitoring data
Water balance
Soil erosion
Dissolved pathway
Sediment input
Particle bound pathway
N-input in surface waters
P-input in surface waters
Retention in surface water body
Retention in surface water body
Comparison with monitoring data at the outlet of the catchment.
N-net loads
P-net loads
Calculation scheme


Diffuse dissolved N-input in surface waters
N-input via surface runoff
N-input via drain runoff
N-input via interflow
N-input via groundwater runoff
N-loads in seepage water

Diffuse dissolved N-input in surface waters:

N-input is calculated under consideration of denitrification (soil), N-deposition and balance-specific N-surplus.

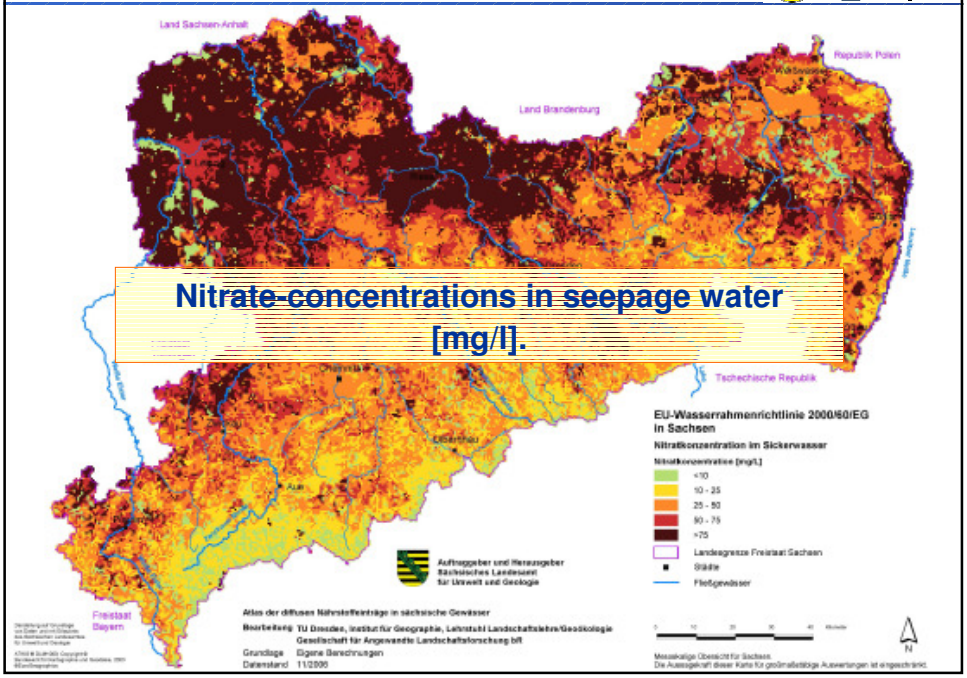
N-surplus is calculated for arable land according to the fruit type-specific spectrum per municipality.

⇒ Balancing includes parameters of input, output and transformation.

Management practices are considered more differentiated.
⇒ scenario calculations !

+ mineral fertilizer
+ farm manure
+ N-fixing
+ mineralisation summer / winter (soil matrix)
+ mobilisation of crop residues

- immobilisation in main product
- immobilisation in by-product



Nitrate-concentrations in seepage water [mg/l].

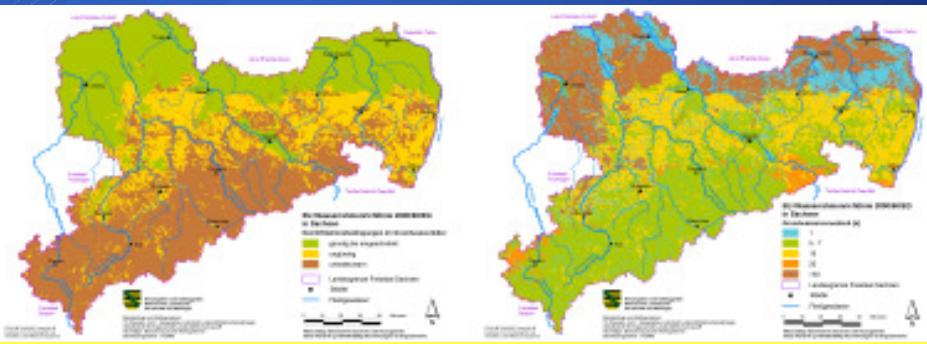
Denitrification in groundwater :
(estimation according to Wendland & Kunkel 1999, Schwarze 2004, modified by Ullrich 2006, using datasets of groundwater monitoring)

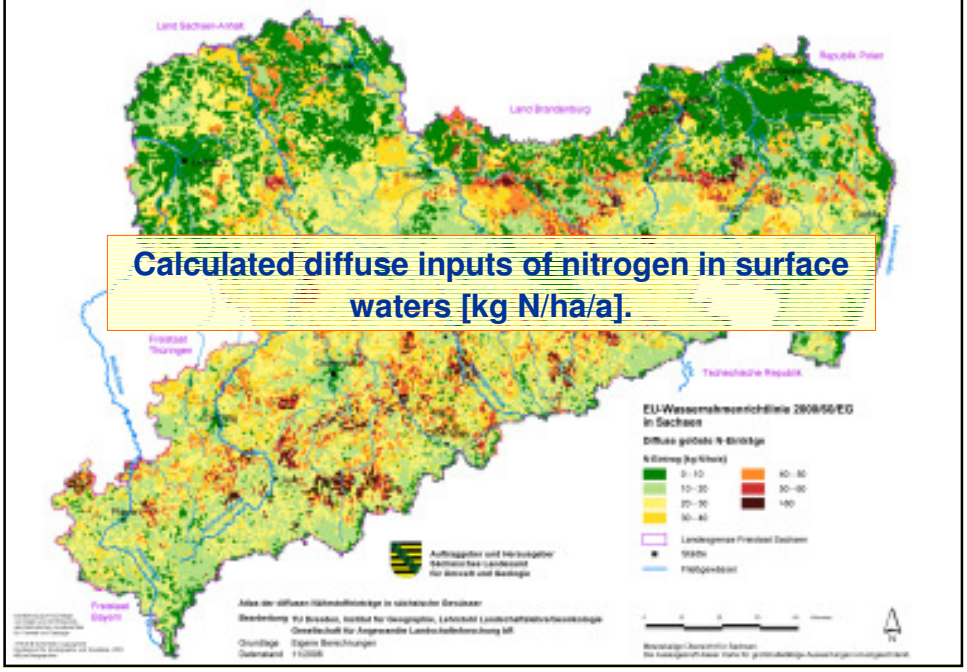
Determination of the hydro-chemical status of the groundwater bodies by monitoring datasets:

→ intensity of denitrification

Analyses of isotopic data and literature data:

→ groundwater residence time





„Atlas of diffuse nitrogen and phosphorus inputs in surface waters in Saxony“

- Atlas offers multiple possibilities to analyse and evaluate questions of water management in catchment areas.
- The Web-GIS-based technology brings many advantages for the user, esp. the state agencies, who have to work with the data.
- Discussion about results and their plausibility is not yet finished at the moment.
- Work will go on in 2007/2008: adaptions and modifications will be necessary, scenarios shall be implemented, investigations about uncertainty of parameter values and results are necessary.