ls@tem : A modelling & simulation framework to monitor mining activity

Fenintsoa Andriamasinoro

EO-MINERS project kick-off

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Generalities IS@TEM

ISATEM

- Integrated System applied to Territory and Environmental Management
- For modelling and simulation
  - deals with complex socioeconomic and socio-environmental [$(SE)^2$] system

Complex $(SE)^2$ System

- Dynamic driven by the interaction between 3 entities
  - resources (mineral resources, water resources, forest, …)
  - actors (human, enterprise, …)
    which exploit resources for SE^2 purpose/constraints
  - georeferenced spaces
- Scale : micro-meso (spatial) in 20-30 years (temporal)

Thematic objective

- Help to solve territory development issues :
  - Monitor current situation and evolution trends (via scenarios)

Scientific objective

- Developing methodological tool
- Appropriation of the tool by stakeholders

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Analysis method (2)

> Socio-economic analysis: impact of the activity on

- the number of created jobs
- the incomes generated for the population
- distribution of the population (ex: rushes results,)

> Environmental analysis: impact of the activity on

- the forests: excessive usage of woods during the shaft extraction
- the fields: due to waste mining, they might become non-fertile
- water:
  - decreasing of the level due to pumping
  - water pollution

> Socio-environmental analysis

- impact of the activity on the health:
  - impact of the usage of mercury
  - drinking / using polluted water
- Women and children are more victims
- Cost of gas-oil, CO2, …

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The prospective modeling approach

> Prospective modeling & simulation: why?

- deals with the complexity of a system (reproduction, abstraction)
- the resulting decision-aid model and tool can help decision-makers to:
  1) answer questions
  2) integrate and consider the results when recommending policies for the future
  - via the building, analysis and simulation of scenarios

> The modeling approach used

- Geologic/hydrologic or (pure) economic dynamic
  ⇒ mathematical/physical/statistical models (*classic approach*)
- But to better deal with the social aspect
  ⇒ Multi-Agent System (MAS) models (*new approach*)

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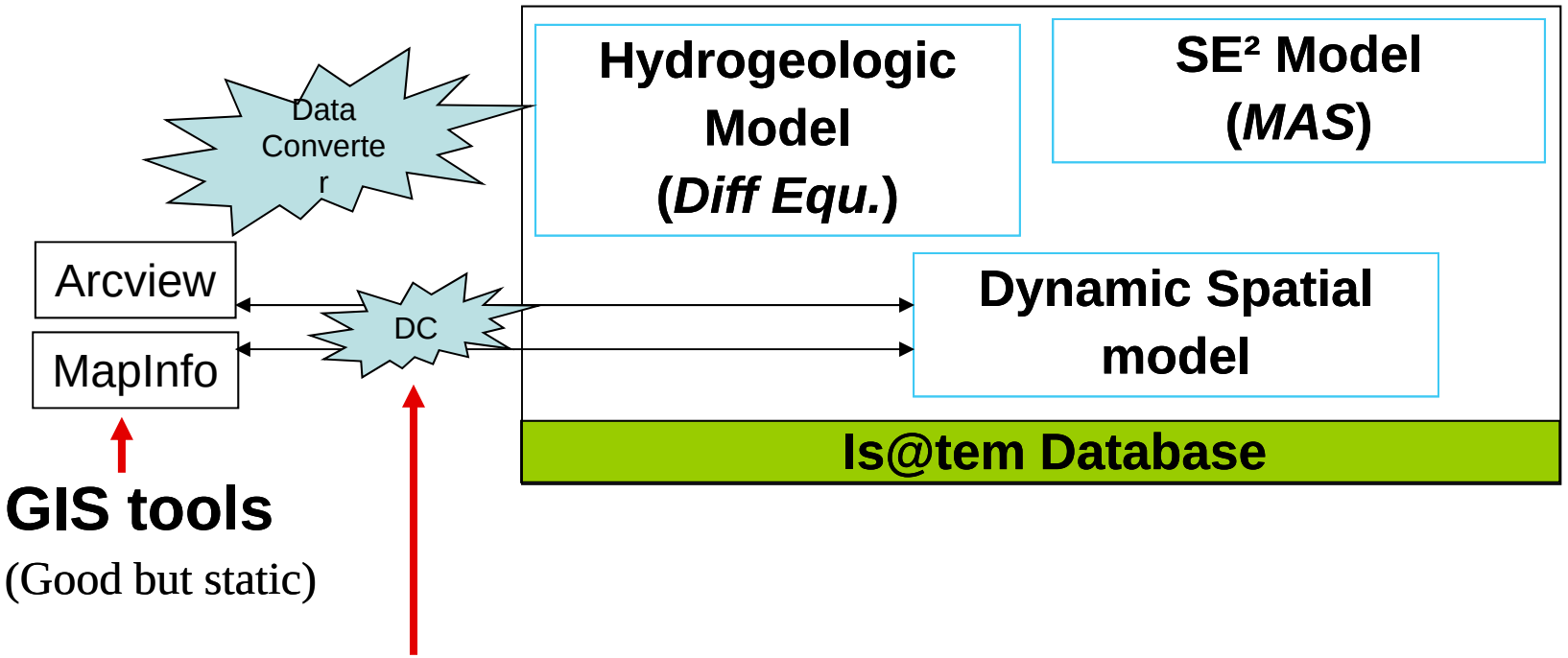
A meta-model



GIS tools

(Good but static)

Map transfer for simulation (interoperability)

The user interface (with the current BRGM application)