

POSCCE – ID660

Sedimentary media modeling platform for groundwater management in urban areas



# INTEGRATED GEOSPATIAL SOFTWARE PLATFORM FOR URBAN GROUNDWATER

D Gaitanaru, C R Gogu , A Priceputu, L Anghel, M A Boukhemacha, I Bica, A Ionita

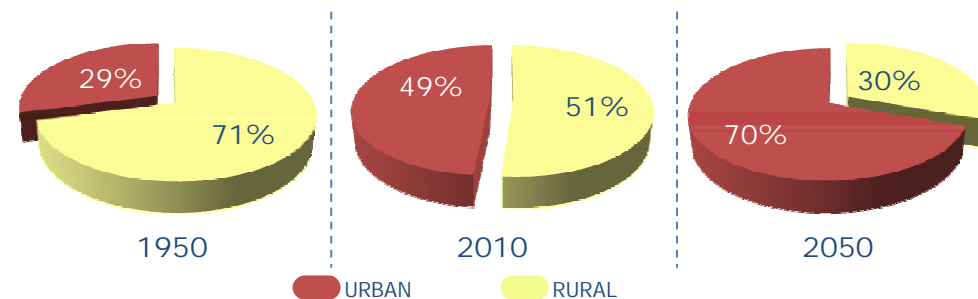
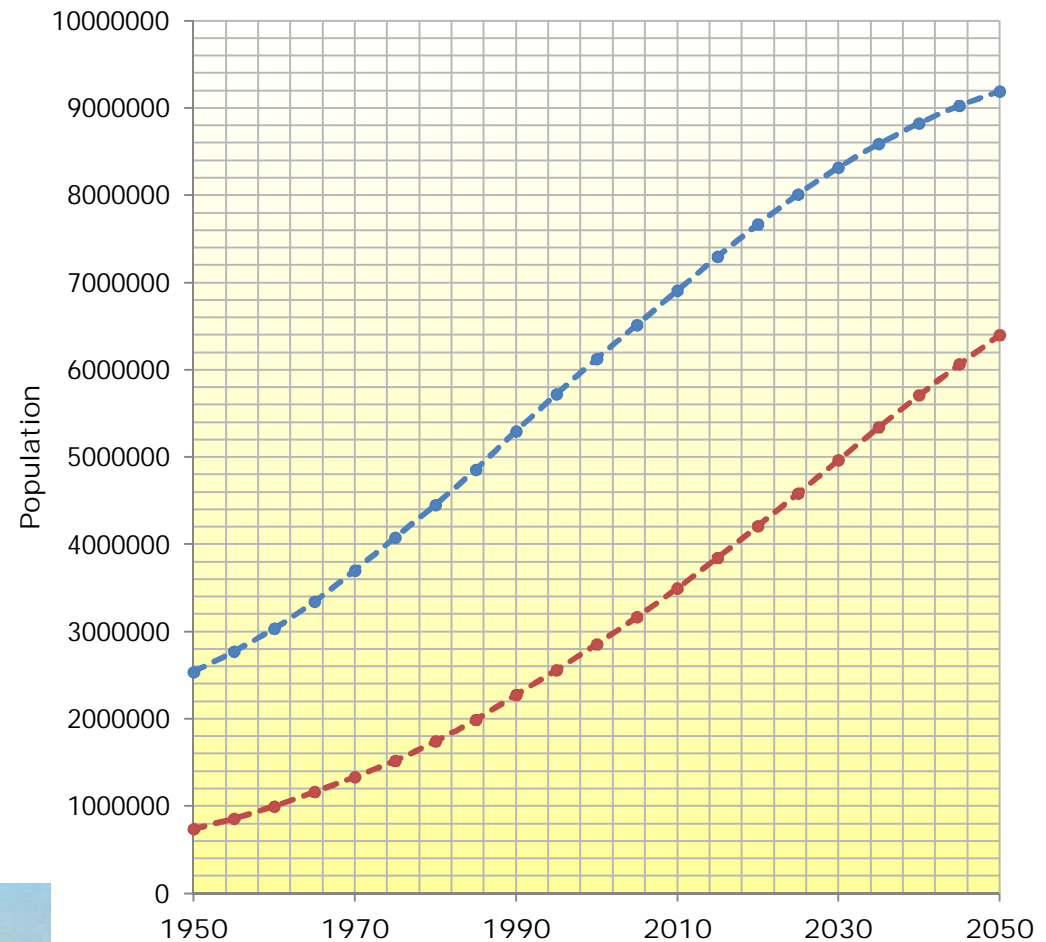


Technical University of  
Civil Engineering Bucharest  
Groundwater Engineering  
Research Center

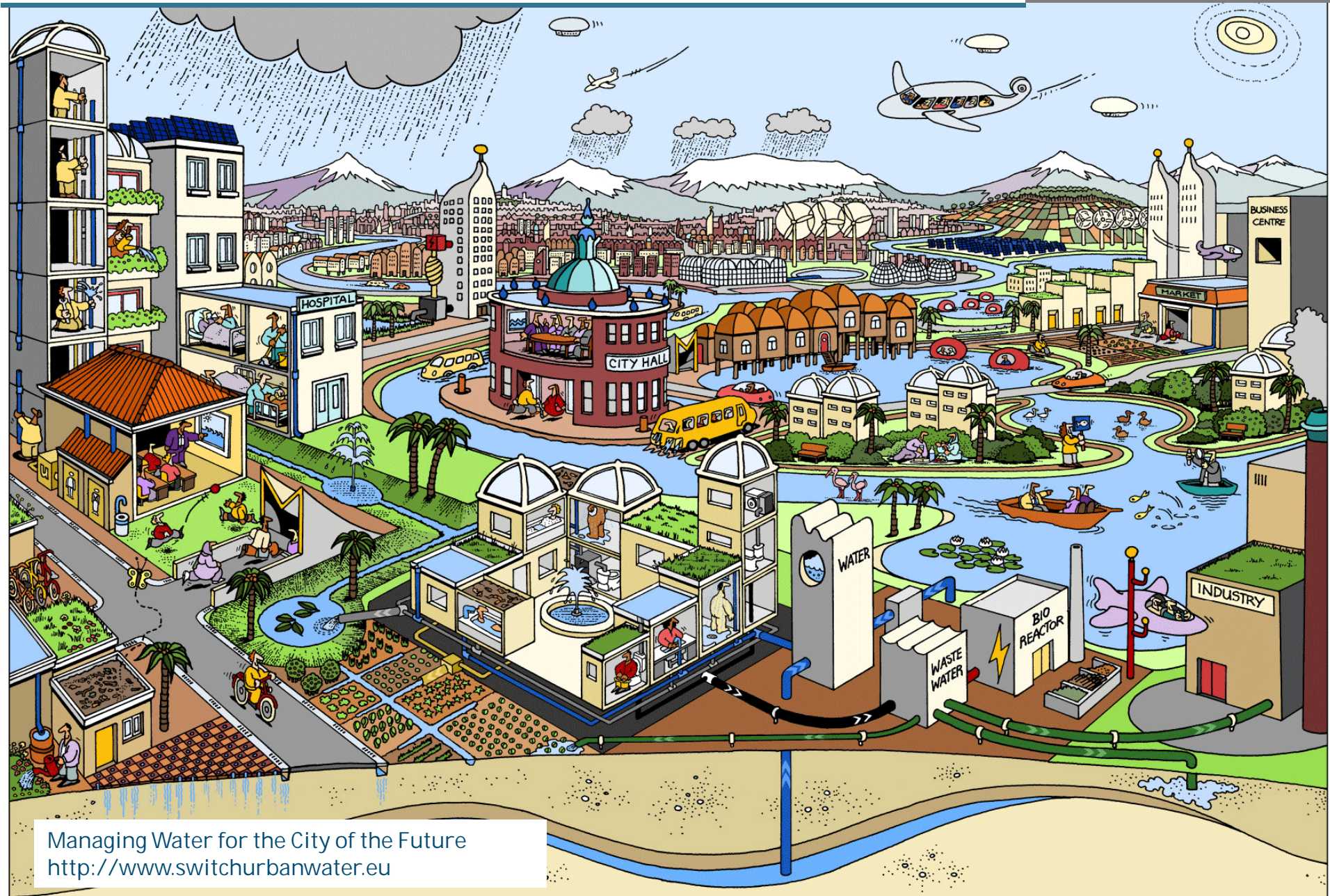
June 14, 2012  
Bologna, Italy

## INTRODUCTION

Urban population growth (for 2050 is foreseen that the urban population will be around 70% of total population - UN,DESA, 2011) implies a greater consumption of resources (natural or processed) like: electricity, gas and oil products, food and water. As consequence, the urban water management become an important aspect of urban sustainable development planning .



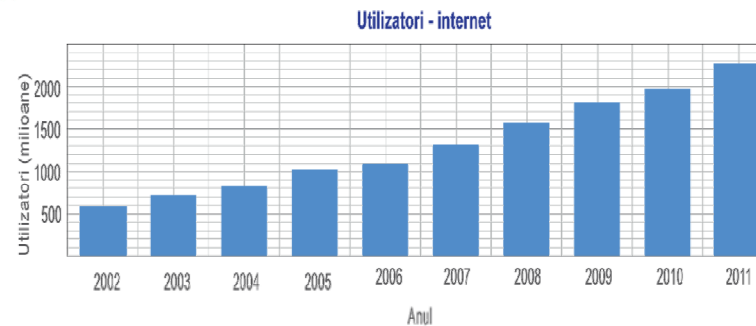
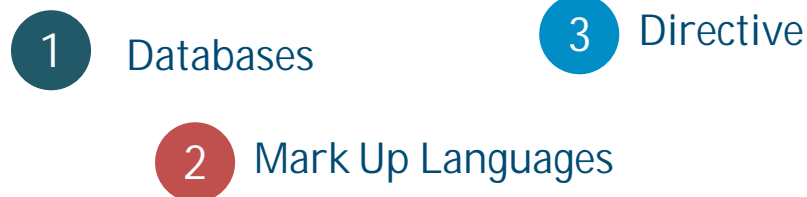
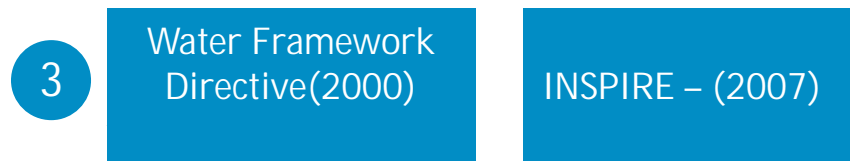
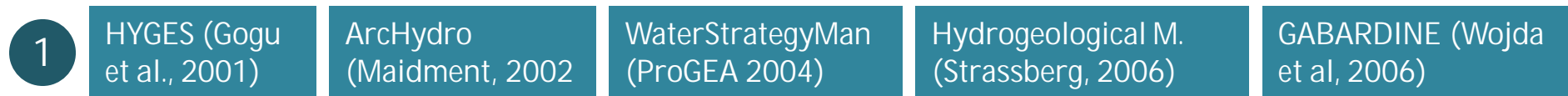




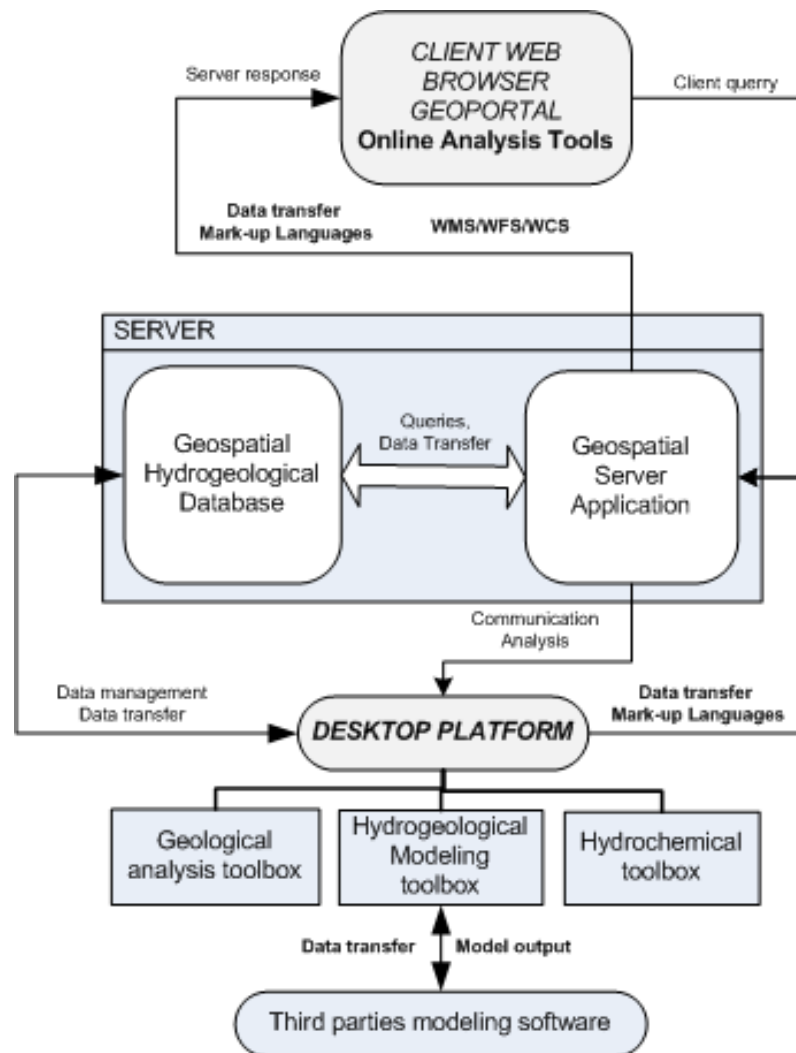
Managing Water for the City of the Future  
<http://www.switchurbanwater.eu>



## INTRODUCTION



## PLATFORM ARCHITECTURE



- 
**EXPERT** (specialists in geology, hydrogeology, water management, geotechnics).
- 
**DECISIONAL** (local stakeholders, local authority, etc. ).
- 
**PUBLIC**

The software platform architecture is based on three major components.

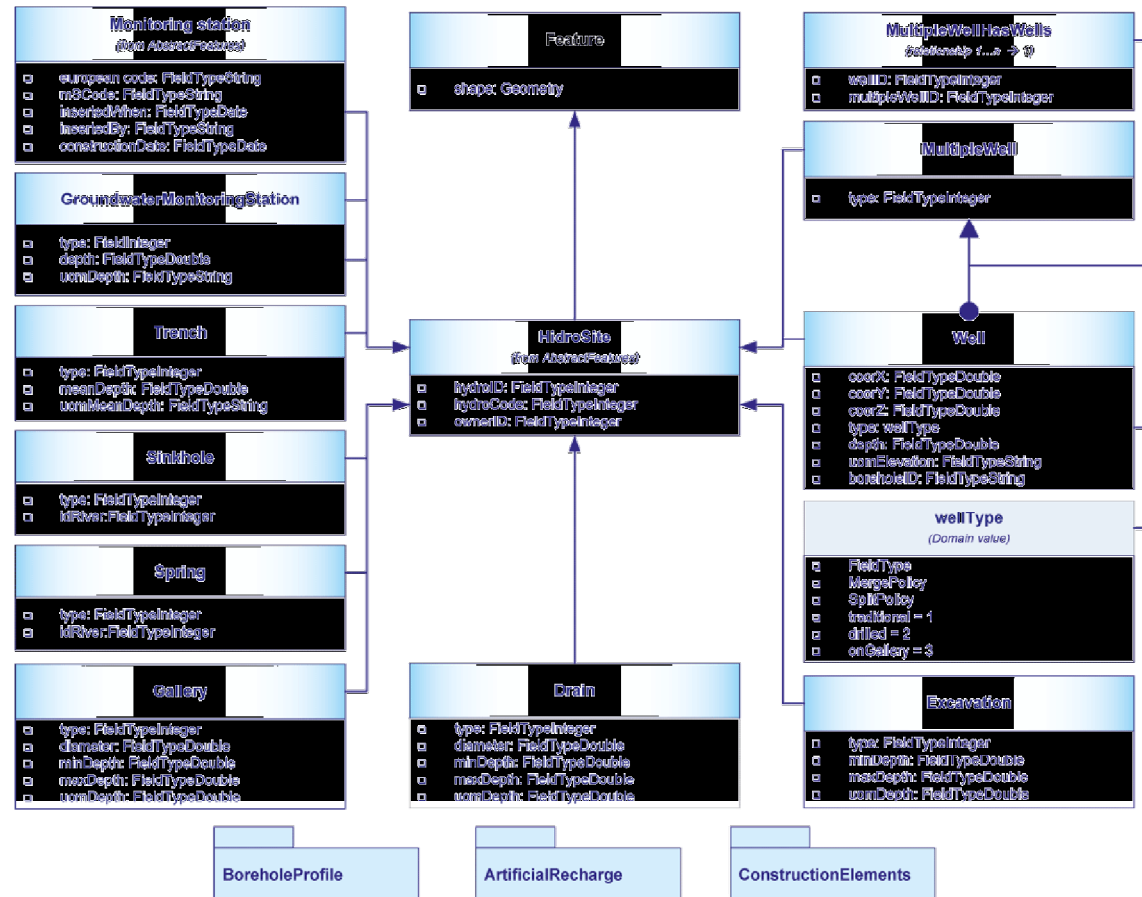
# SERVER APPLICATION Database



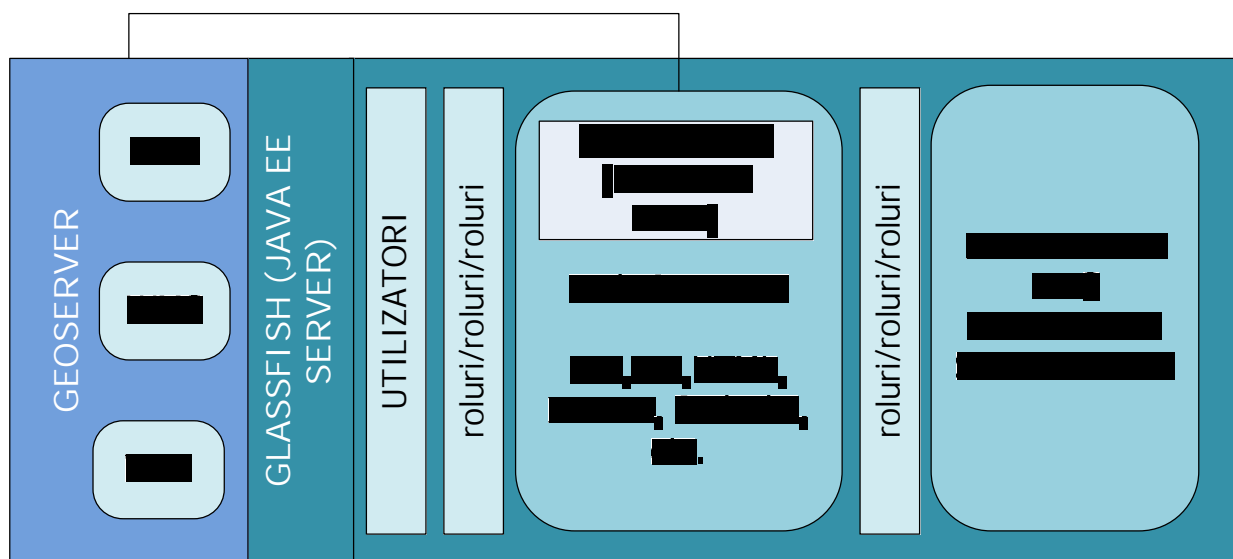
International standards for  
Geo-Spatial data transfer.

Object – Orientated  
approach.

Open Geospatial  
Consortium (OGC)



## SERVER APPLICATION



WMS

WFS

WCS

The geospatial server application allows the communication between the client side application (geoportal), the geospatial database and the desktop platform component.



# GEOPORTAL APPLICATION



Welcome, **001** | [Logout](#)
Save Session   Upload Session

Platforma de gestiune  
a apei subterane din mediul  
sedimentar in zone urbane

**GEOPORTAL**  
versiune beta

**Left Panel**

Visualization Module

Data tables

Data

Lithology

Stratigraphy

Binary\_Data

View

Spatial tables

Layer Name	View/Hide	Get KML
Well_data (point)	<input checked="" type="checkbox"/>	<a href="#">KML</a>

ICC/TSG Analysis

Risk Assesment

Guidelines

LBD
TSG
GVT
ICC
SEI

**Data Explorer**

Database Connections

- [localhost](#)
- [Not Implemented](#)
- [Not Implemented](#)

Connected at localhost-ejbPU

- Site\_info (polygon)
  - Well\_data (point)
  - Lithology
  - Stratigraphy
  - Binary\_Data

Display Selected

Files Upload



# GEOPORTAL APPLICATION



Welcome, i001 | [Logout](#)
[Save Session](#) [Upload Session](#)

Platforma de gestiune a apei subterane din mediul sedimentar in zone urbane

versiune beta

**Left Panel**

**Visualization Module**

**Data tables**

- Data
- Lithology
- Stratigraphy
- Binary\_Data

[View](#)

**Spatial tables**

Layer Name	View/Hide	Get KML
Well_data (point)	<input checked="" type="checkbox"/>	<a href="#">KML</a>

[ICC/TSG Analysis](#)

[Risk Assesment](#)

[Guidelines](#)

2.0  
2333443.0  
0.134  
23443.0  
123.0  
11.0

[Submit Depth](#)

- Param 2
- Param 3
- Param 4
- Param 5

[Submit Parameters](#)

[View Parameters Data Table](#)

### TSG Analysis Chart

Date	Param 1	Param 2	Param 3	Param 4	Param 5
01/01/2012	0	0	0	0	0
02/01/2012	2	2	2	2	2
03/01/2012	12	12	12	12	12
09/01/2012	110	110	110	110	110
11/01/2012	12	12	12	12	12

**Data Explorer**

**Database Connections**

- localhost
- Not Implemented
- Not Implemented

Connected at localhost-ejbPU

- Site\_info (polygon)
  - Well\_data (point)
  - Lithology
  - Stratigraphy
  - Binary\_Data

[Display Selected](#)

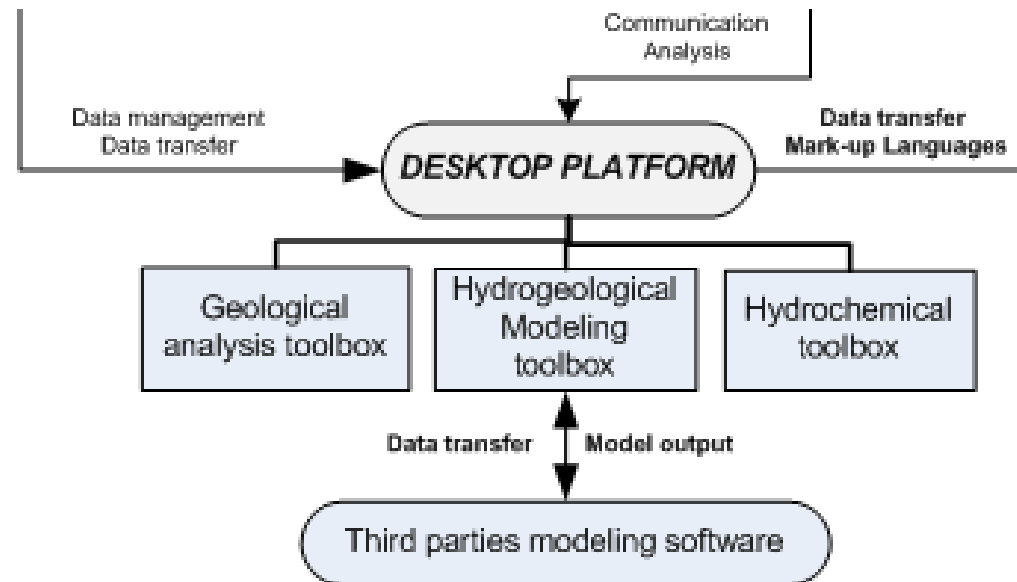
[Files Upload](#)

## DESKTOP PLATFORM



Data Management

Modeling and analysis.

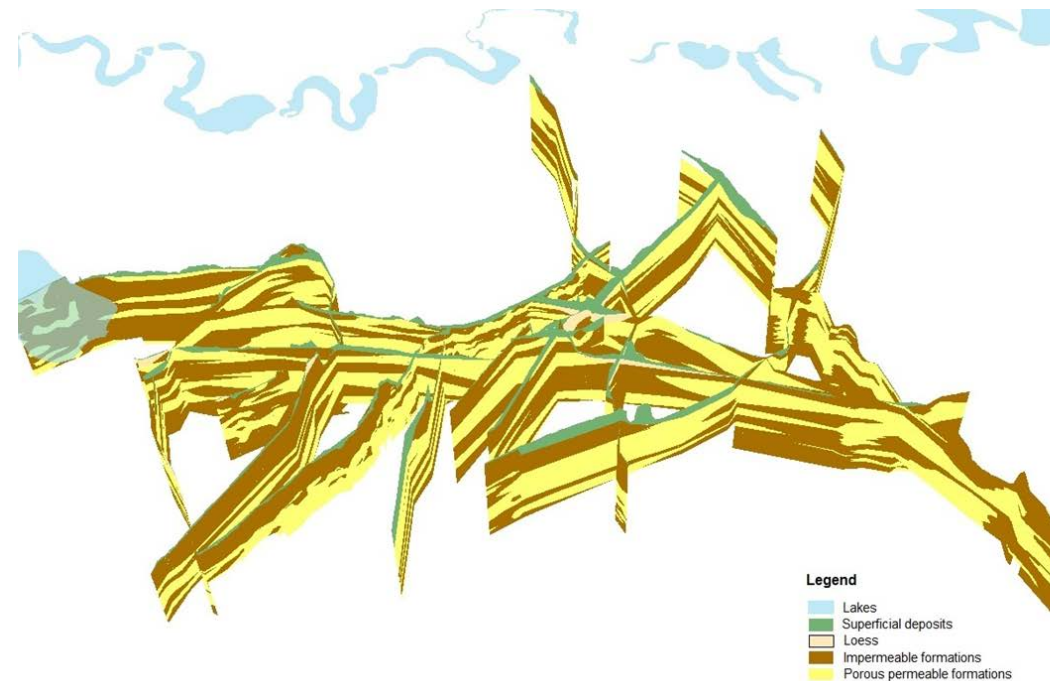
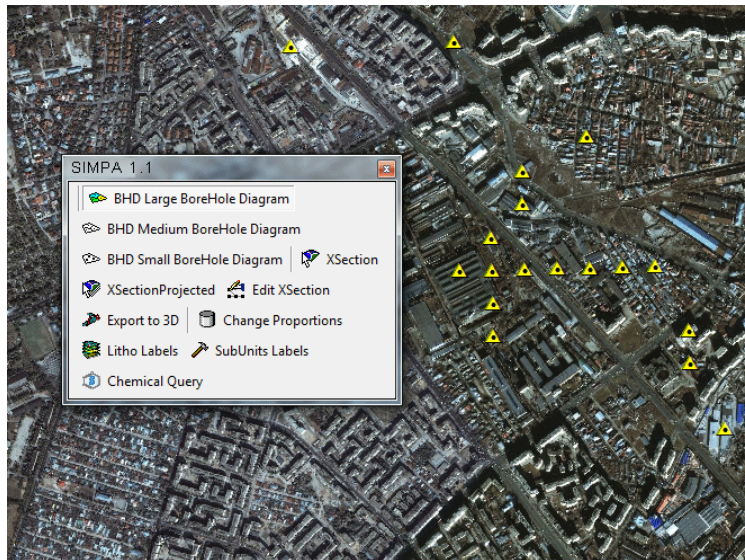


The desktop platform is designed to be used by **specialists** and **researchers**.

The platform is developed under a **GIS framework** (ArcGIS).

## DESKTOP PLATFORM

### Geological analysis

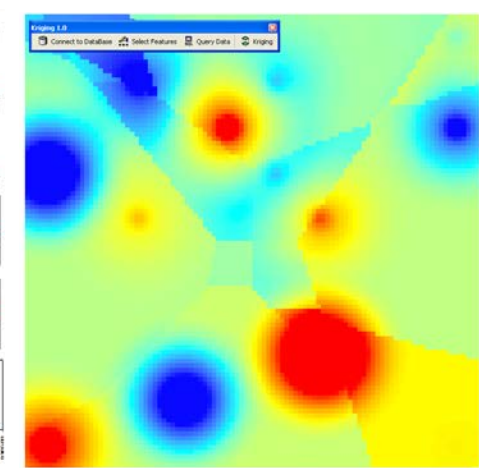
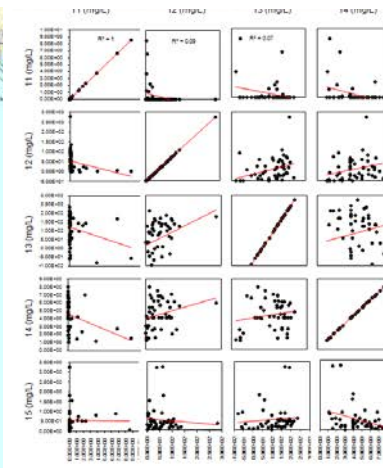
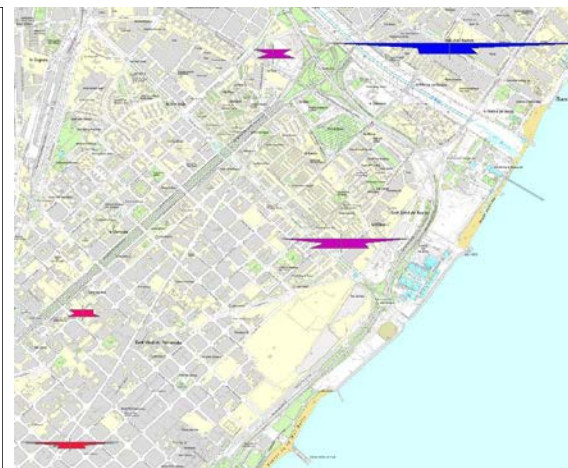
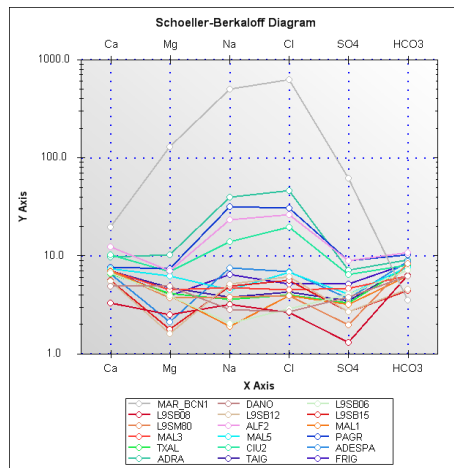
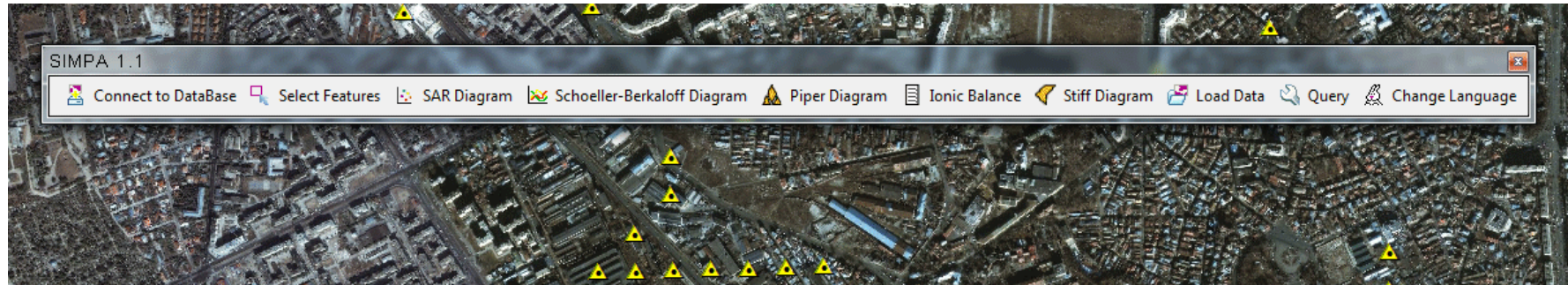


The geological toolbox allows the specialist to manage litology, geophysical, and petrological data. Analysis such as: borehole diagram, geological cross-sections, defining hydrogeological units, can be easily made and exported in 2D and in 3D environment.



# PLATFORMA DESKTOP

## Hydro Chemical analysis

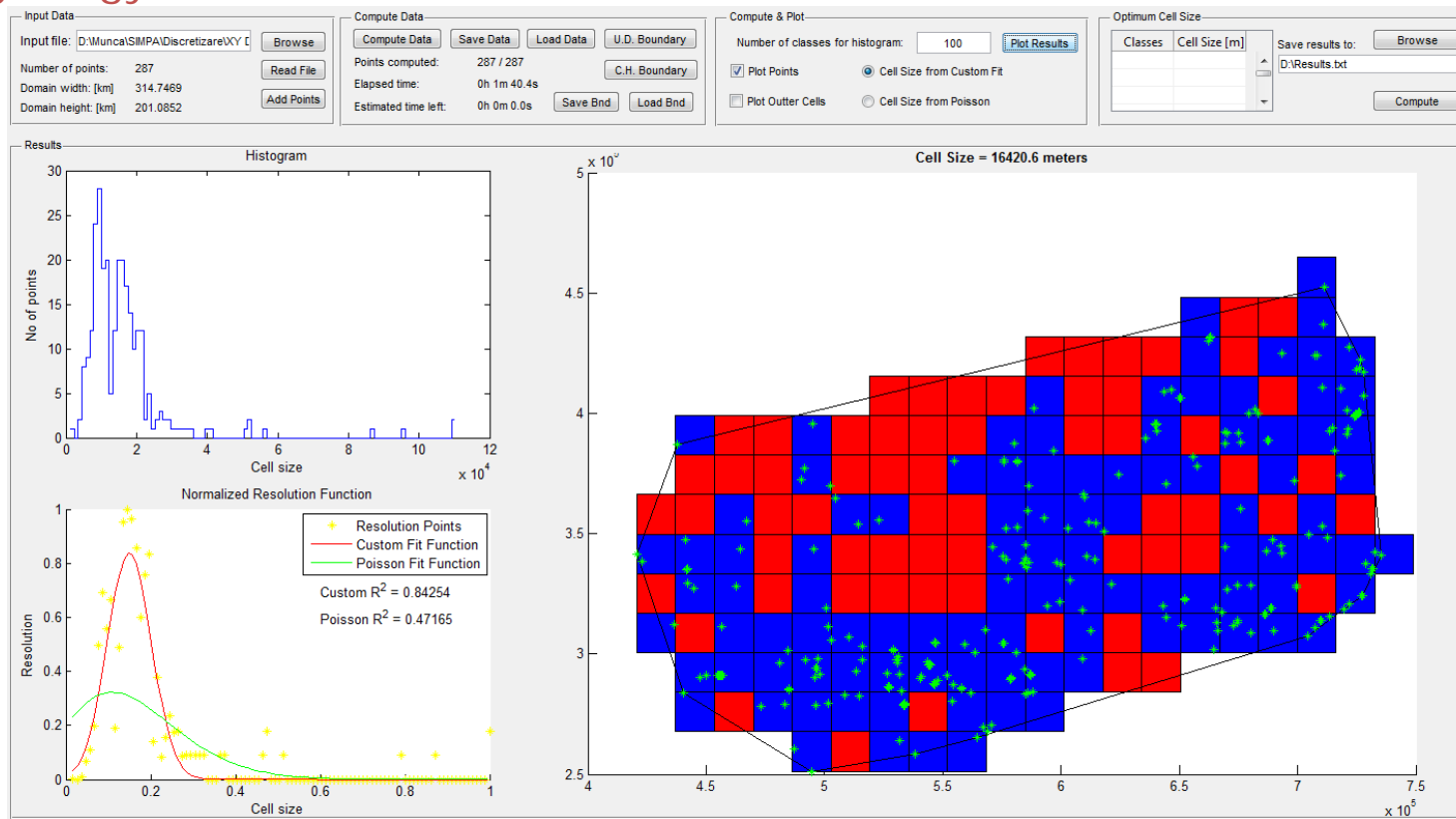


The hydrochemical toolbox performs a series of hydrochemical analysis for groundwater quality data: hydrochemical parameter statistics (univariable, bivariable, analysis), geostatistics (using GSLib library), general chemical diagrams, charts and maps (Stiff Map, Wilcox diagram, Ionic Balance, Piper Diagram) and a series of parameter orientated maps.



# DESKTOP PLATFORM

## Hydrogeology



The third toolbox is an interface between the platform and other third parties software (such as GMS - Groundwater Modelling System). Data from the geospatial database are exported to the modelling software and the outputs of model can be imported back to the platform. Beside the communication capabilities, the toolbox can generate an optimal cell-size modelling grid on the basis of the hydrogeological data spatial distribution.



## CONCLUSIONS

STANDARD TRANSFER LANGUAGES.

MULTI CRITERIA QUERIES.

HYDROGEOLOGICAL DATABASE

NEW MARK-UP LANGUAGE.



Thank you !