

OPEN-SOURCE WEB GIS COOPERATIVE INFORMATION SYSTEMS FOR TRANSBOUNDARY GROUNDWATER MANAGEMENT

by

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UN WATER

Παγκόσμια Ημέρα Νερού



Διεθνές Έτος
Συνεργασίας για
το Νερό

HOW COOPERATION CAN BE EFFECTIVE ????

THE CASE OF TRANSBOUNDARY GROUNDWATERS: DATA-MODELING-MANAGEMENT



ENHANCING COOPERATION

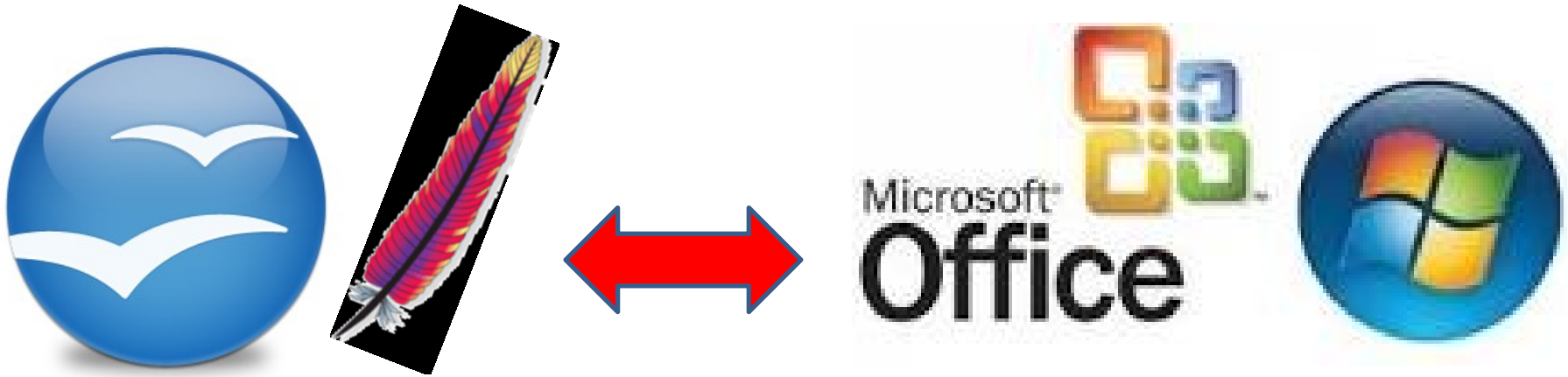




**HOW TO DEAL WITH
THE COMPLEX REAL WORLD OF
"COOPERATION"**

Or how to resolve the Greek Debt

WHY OPEN-SOURCE SOFTWARE ??



- **1** Open Software can be downloaded and used entirely free of any **license** fees
- **2** Open development process means that anyone can **enhance the software**, report bugs, request new features
- **3** Open Software is **easy** to learn, available and **supported** in your own language



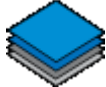
GeoWebPublisher

COMMERCIAL WEB-MS PRODUCTS



OPEN SOURCE
Web map
SERVICES

[Open Layers](#)

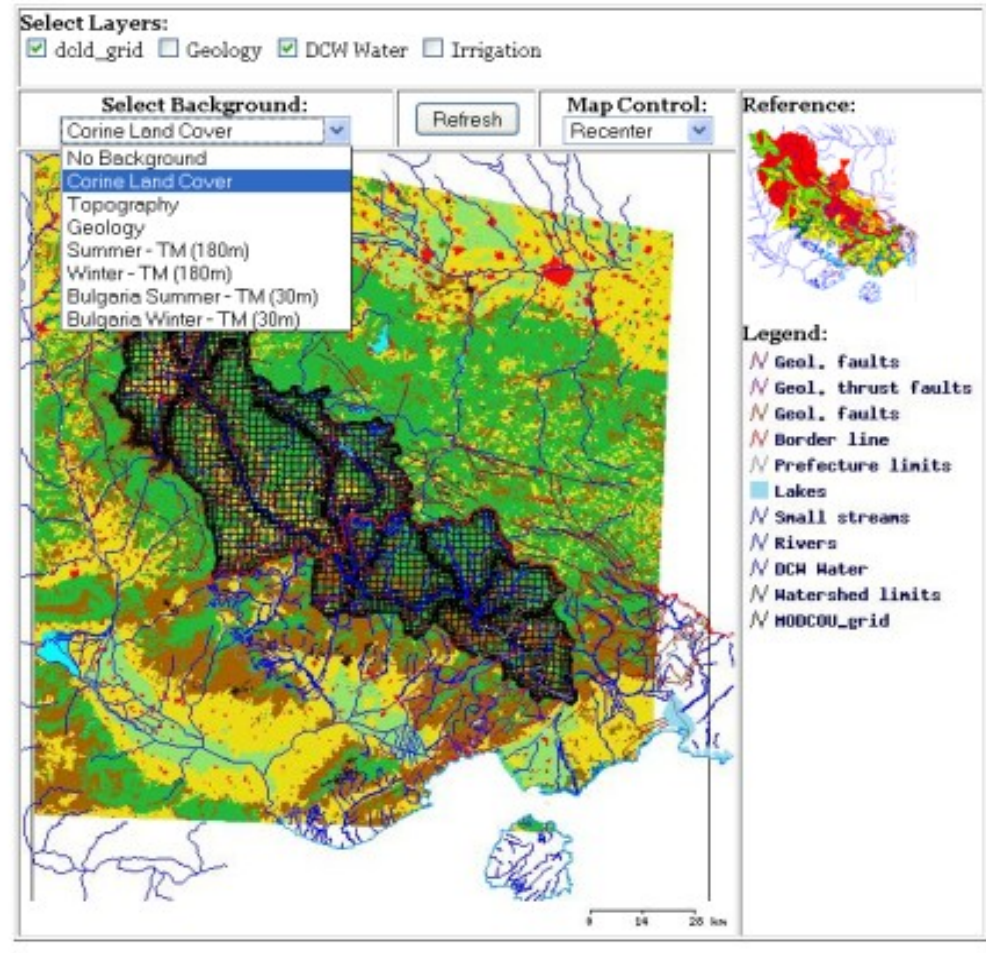


INWEB's experience on map serving technologies

- **2002:** Extensible Markup Language (XML) for managing and publishing geographic data on the Internet.

- **2004:** Mapserver CGI program for interactive mapping applications on the Web. Creation of dynamic maps.

Mesta-Nestos HELP UNESCO Basin Project



Fusion tables technology for the coastal aquifers in the Mediterranean

The proposed technology aims at combining databases, GIS and collaborative tools

Based on the open source concept:

- **WEB mapping technologies (Google maps)**
- **Collaborative WEB services (Google fusion tables)**
- **WEB programming languages (HTML 5, JavaScript)**



**Creation of interactive mapping applications
on the Web**

INWEB's Spatial Databases in SE Europe

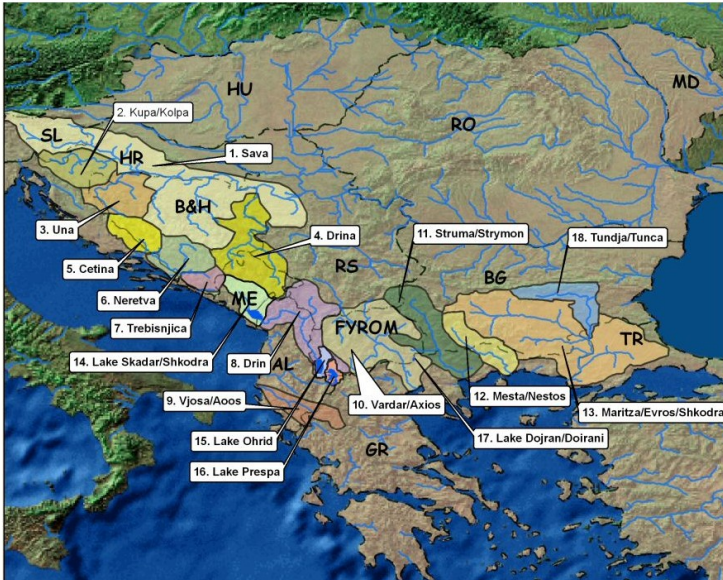
Shared Surface Waters

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- Shared Aquifers in South East Europe
- Shared Surface Waters in SE Europe
- Shared Aquifers in N. Africa
- Shared Aquifers in the Middle East

Shared Surface Waters in SE Europe



A map of Southeast Europe showing 18 shared surface water systems, each labeled with a number and name. The systems are: 1. Sava, 2. Kupa/Kolpa, 3. Una, 4. Drina, 5. Cetina, 6. Neretva, 7. Trebisnjica, 8. Drin, 9. Vjosa/Aoos, 10. Vardar/Axios, 11. Struma/Strymon, 12. Mesta/Nestos, 13. Maritza/Evros/Shkodra, 14. Lake Skadar/Shkodra, 15. Lake Ohrid, 16. Lake Prespa, 17. Lake Dojran/Doirani, and 18. Tundja/Tunca. The map includes country codes: HU, MD, RO, SL, HR, B&H, ME, RS, BG, FYROM, TR, AL, GR.

Shared Aquifers

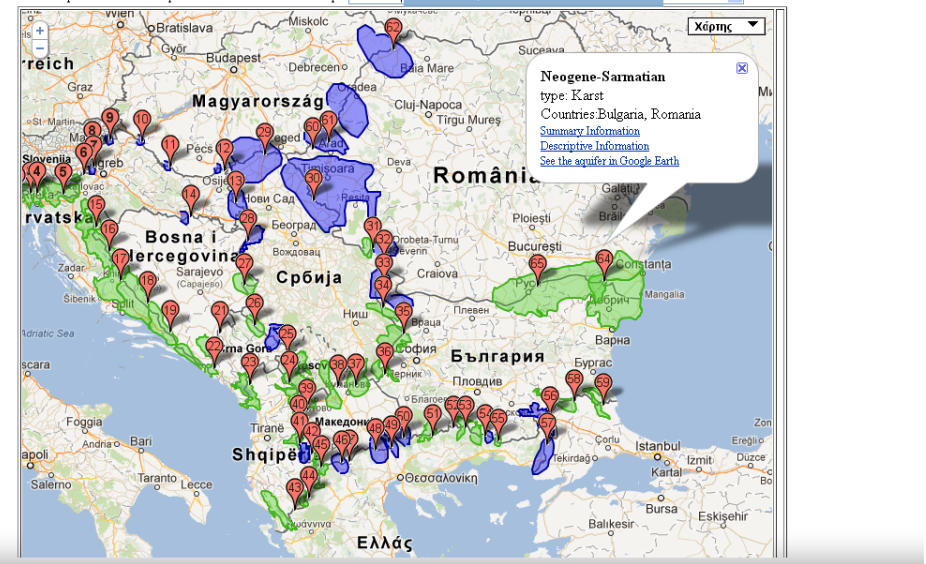
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Take a virtual tour in Google Earth

Select aquifer from the dropdown list or click on the map. List of aquifers

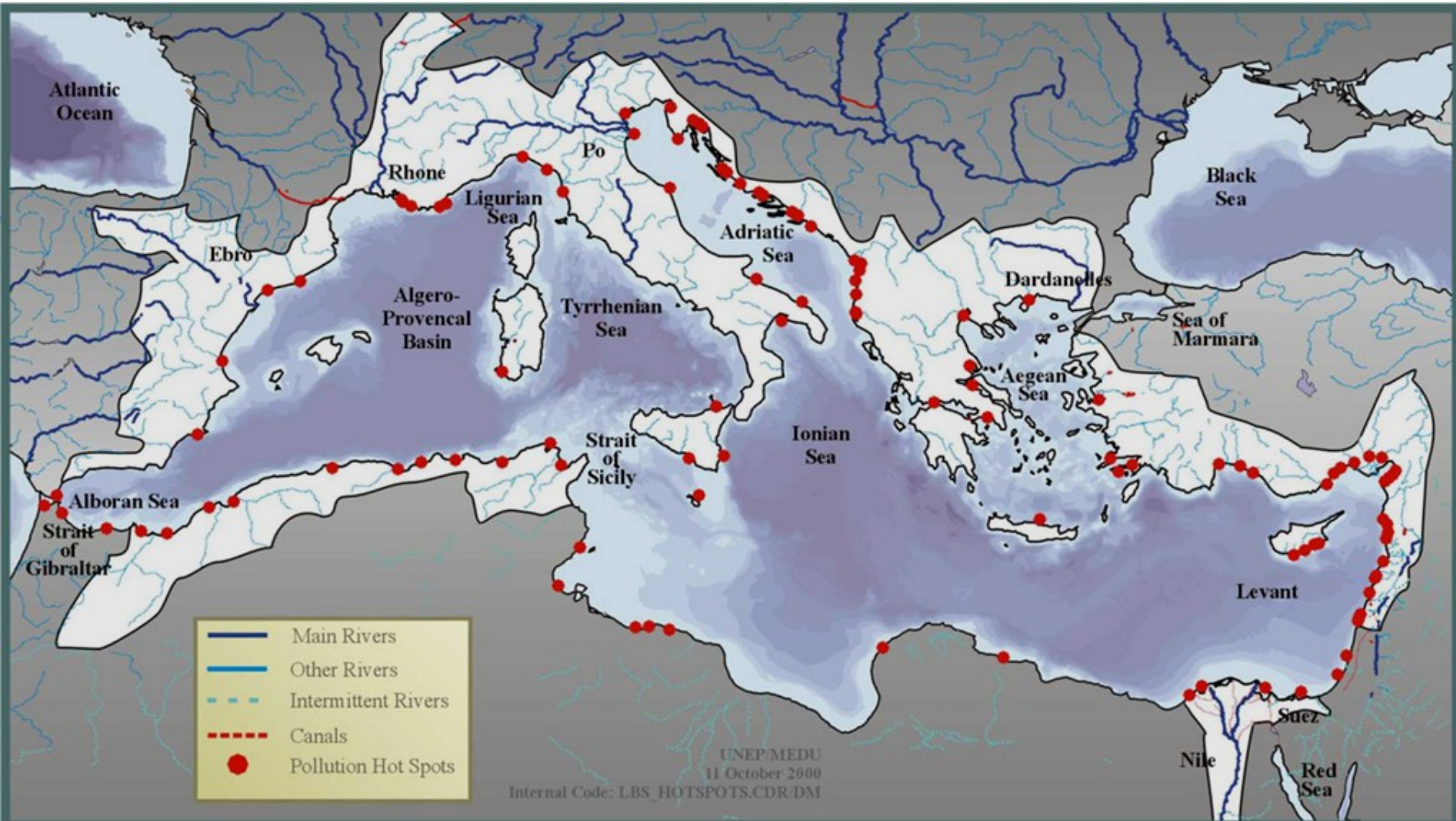


A map of Southeast Europe showing 57 shared aquifers, each marked with a red pin and a number. A tooltip for aquifer 30 is visible, showing: Neogene-Sarmatian type: Karst, Countries: Bulgaria, Romania, Summary Information, Descriptive Information, See the aquifer in Google Earth. The map includes country names in various languages: Magyarország, Románia, Bosna i Hercegovina, Srbija, Бългaрия, Македонија, Шqipëri, and Ελλάδα. Major cities like Budapest, Belgrade, Sofia, and Bucharest are also labeled.

21 MED COUNTRIES



LAND-BASED ACTIVITIES AND THREATS TO WATER AND ECOSYSTEMS



COASTAL AQUIFER OVEREXPLOITED



© Blue Plan 2003

Source: RIVM RIZA 1991. National sources compiled by Blue Plan

Application in coastal aquifers in the Mediterranean

Dynamic map and interactive database

Geo-referenced information system for coastal aquifers in the Mediterranean

Preliminary platform developed by the IWEW/UNESCO Chair

The screenshot displays a web-based GIS application. On the left, a 'Data Catalog' panel lists GIS Layers: 'Coastal Aquifers' (checked), 'Mediterranean basin bounda...', 'FEM southern countries', and 'FEM northern countries'. Below it is a 'Search' bar. The central map shows the Mediterranean region with countries labeled, including Ireland, France, Italy, Greece, Turkey, and others. Coastal aquifers are highlighted in yellow and blue. On the right, an 'Information' panel contains a 'Summary information' section. The interface is framed by a red dashed border.

1. Data catalog
2. View window
3. Information window
4. Search tool

Application in coastal aquifers in the Mediterranean

The screenshot displays a GIS application interface. On the left, the 'Data Catalog' shows layers for Coastal Aquifers, Mediterranean basin boundaries, and FEM southern/northern countries. Below it, search filters include Country (Select Country), Aquifer Type (Select Aquifer Type), Areal extent (km²), Population (million), and Coastal boundary length (km). A 'Search' button is at the bottom. The central map shows the Mediterranean Sea region with a tooltip for a Quaternary aquifer in Libya. The tooltip contains the following information:

Name: Quaternary
Country: Libya
Type: Porous

Descriptive Information

Sedimentary	
FID	22
Id	74
Id_1	2
Name_En	Sedimentary
Name_Fr	Sedimentaires
color	#097054

On the right, the 'Information' panel shows 'Summary information' for the selected aquifer:

Name: Quaternary
Country: Libya
Type: Porous

Descriptive Information

1. NAME OF THE COASTAL AQUIFER, LOCATION & COUNTRY

Country	Libya
Name of aquifer:	Quaternary
Location:	North west Libya
Entity responsible for management:	General water Authority

2. AQUIFER CHARACTERISTICS

Aquifer hydrogeological type:	Porous
Predominant lithology:	sandy Limestone
Stratigraphic age:	Mio-Quaternary
Areal extent (km ²):	20000
Population in this area:	2.75 M
Area of coastal area concerned by the aquifer (km ²):	5000

Information windows:

- Displays summary results and descriptive information for each aquifer
- Dynamic update of the values by the author!




Application in coastal aquifers in the Mediterranean

View of Metadata of Aquifer 27 example case study

File Edit Tools Help Rows 1 Cards 1

Filter No filters applied

1-42 of 42

Aq...	Category	Field	Value
27	1. NAME OF THE COASTAL AQUIFER, LOCATION & COUNTRY	Country	
27	1. NAME OF THE COASTAL AQUIFER, LOCATION & COUNTRY	Name of aquifer:	  
27	1. NAME OF THE COASTAL AQUIFER, LOCATION & COUNTRY	Location:	
27	1. NAME OF THE COASTAL AQUIFER, LOCATION & COUNTRY	Entity responsible for management:	
27	2. AQUIFER CHARACTERISTICS	Aquifer hydrogeologic type:	
27	2. AQUIFER CHARACTERISTICS	Predominant lithology:	
27	2. AQUIFER CHARACTERISTICS	Stratigraphic age:	
27	2. AQUIFER CHARACTERISTICS	Areal extent (km2):	
27	2. AQUIFER CHARACTERISTICS	Population in this area:	
		Area of coastal area	

Dynamic update:

- Editing possibilities to the authors in order to enhance or renew the data which are presented in the “Information Window”
- Each partner will have access to a specific data set and any potential changes are automatically being transferred to the platform

COOPERATION FOR WATER: A VERY OLD STORY



COLLABORATIVE SCIENCE/KNOWLEDGE
FOR GOOD GOVERNANCE

A scenic sunset over a lake with reeds and a boat. The sun is low on the horizon, casting a golden glow over the water and the surrounding landscape. The sky is a mix of blue and orange. In the foreground, there are tall reeds and a small boat on the water. The overall mood is peaceful and serene.

Danke schön!

Ευχαριστώ!