

OVERVIEW OF EXISTING SITUATION ON SHARED WATERS IN SEE

by

Prof. J. Ganoulis, Coordinator

UNESCO Chair/INWEB

International Network of Water/Environment Centres for the Balkans

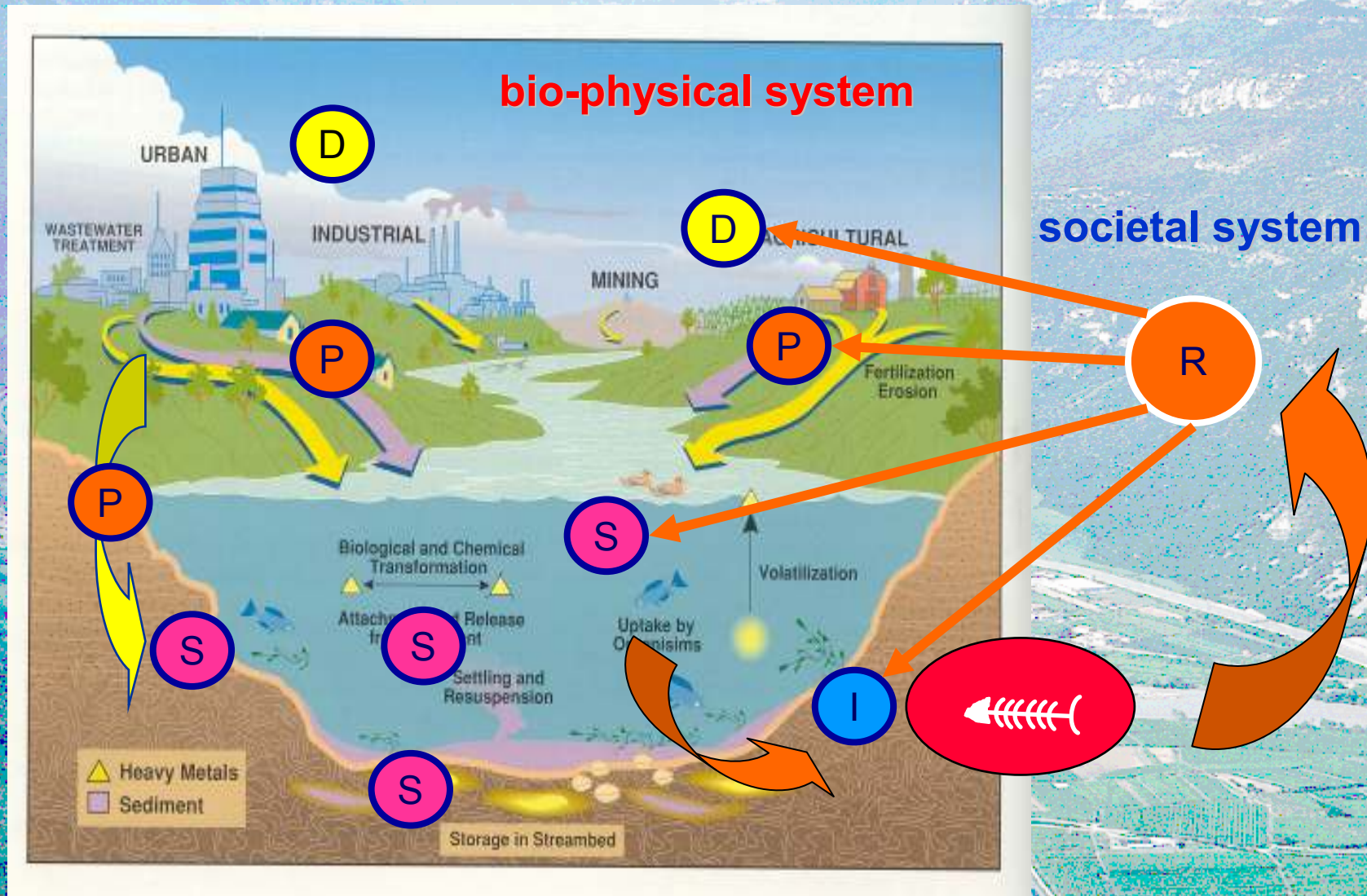
Aristotle University of Thessaloniki, Greece

<http://www.inweb.gr>



MONITORING & EU-WFD: use of DPSIR

for achieving "a good status of water by 2015"



Base sketch from Meade (1996) and DPSIR from EEA

MONITORING OF SHARED AQUIFER RESOURCES

MONITORING STATIONS

BORDER
LINE

SHARED
AQUIFER

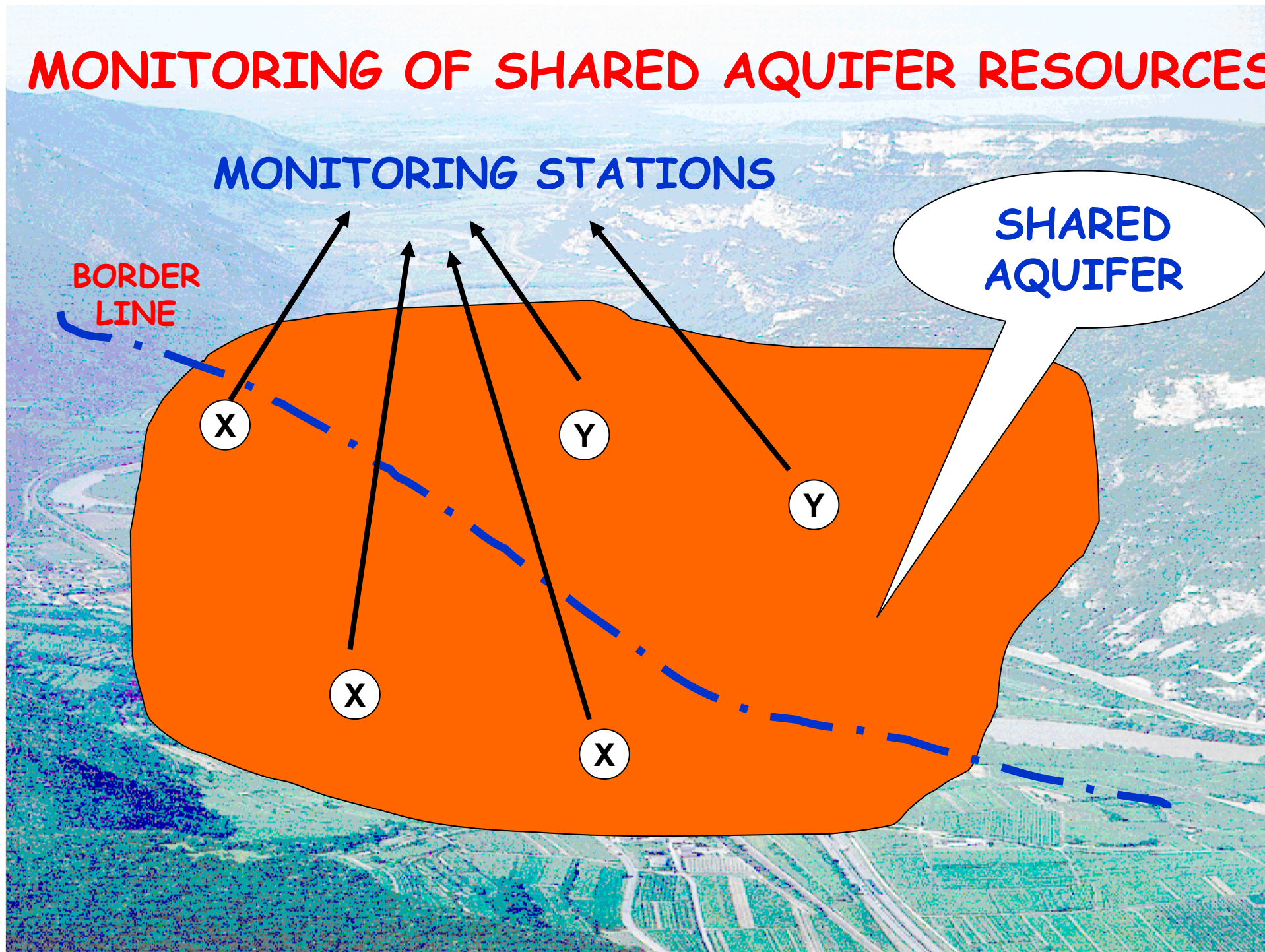
X

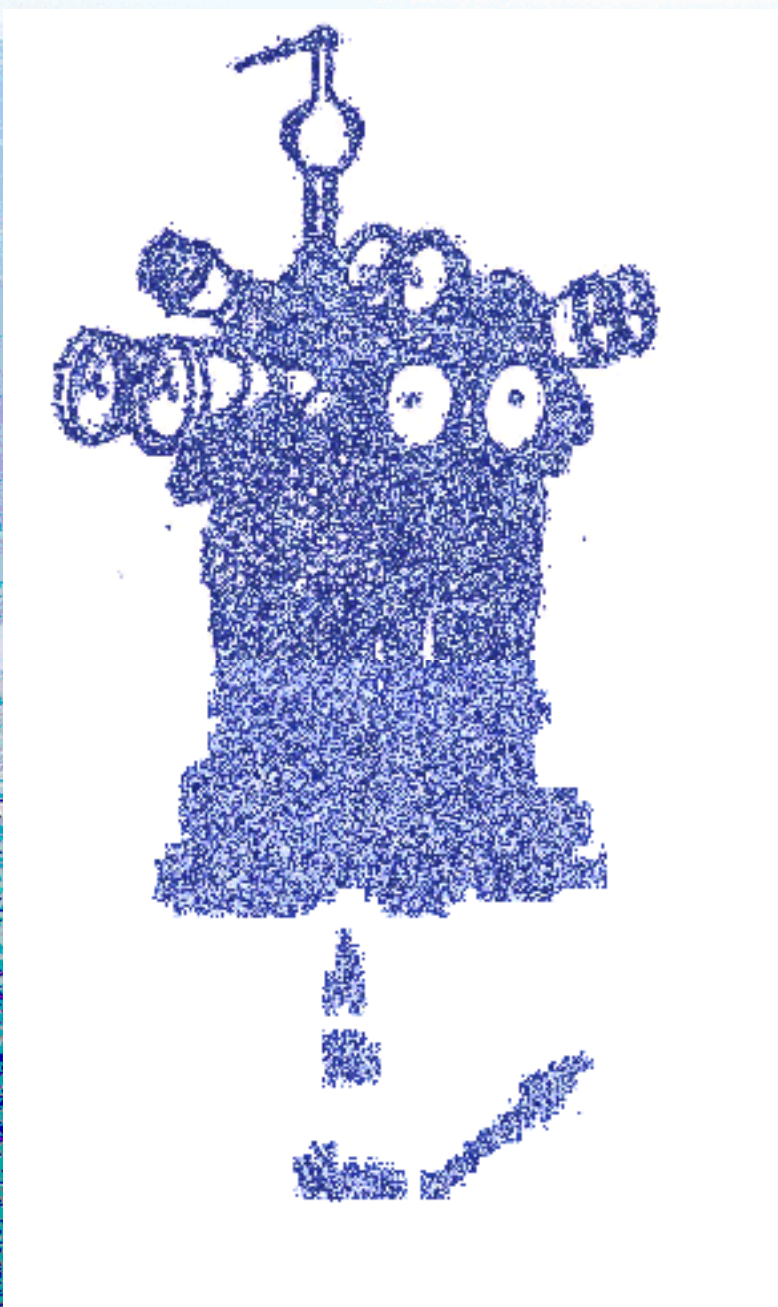
Y

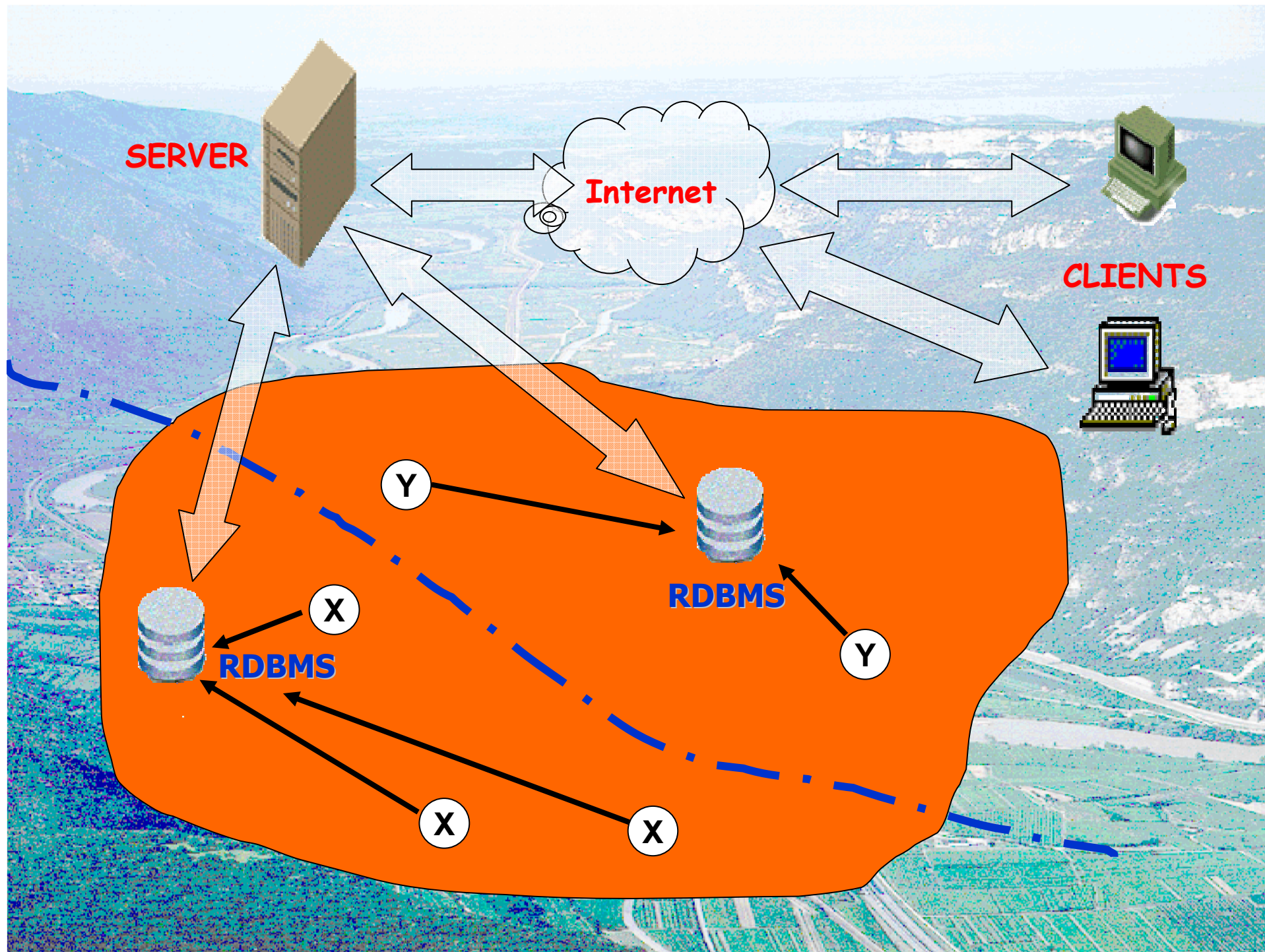
Y

X

X







**UNESCO-INWEB
shared waters
in the Balkans (SEE)**

**shared aquifers
database
in the MEDA region**



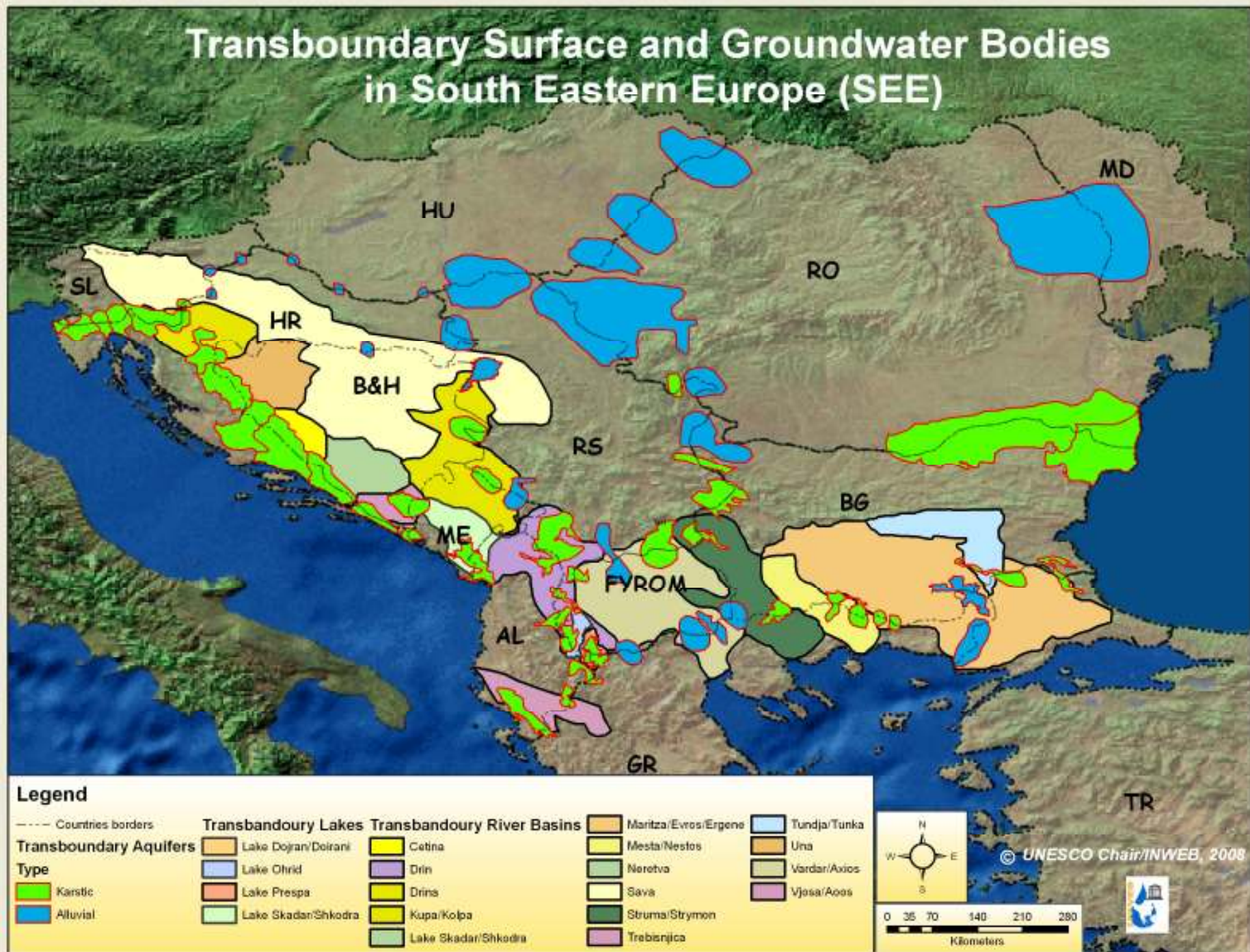
UN-ESCWA



Transboundary Aquifers in South Eastern Europe (SEE)



Transboundary Surface and Groundwater Bodies in South Eastern Europe (SEE)



Background

Aims

SHARE RELIABLE DATA AND INFORMATION ON
TRANSBOUNDARY WATERS

Level

ELECTRONIC INVENTORY
BASIC HYDROLOGICAL INFORMATION
WATER USE & ASSESSMENT

Target Groups

- DECISION MAKERS • WATER PROFESSIONALS
- EDUCATORS • STUDENTS • ALL CITIZENS.

International Framework

UNESCO IHP

ESCWA: ECONOMIC & SOCIAL COMMISSION
FOR WESTERN ASIA

ECA: ECONOMIC COMMISSION FOR AFRICA

ECE: ECONOMIC COMMISSION FOR EUROPE

NEW!

The deadline for the submission of abstracts has been extended to 15th June 2008

NEW!

IV International Symposium on Transboundary Waters Management

Thessaloniki, Greece

15th - 18th October 2008

 Transboundary Waters Management

Take a virtual tour in Google

Select aquifer from the dropdown menu

Transboundary Aquifers

Internationally Shared Surface Waters

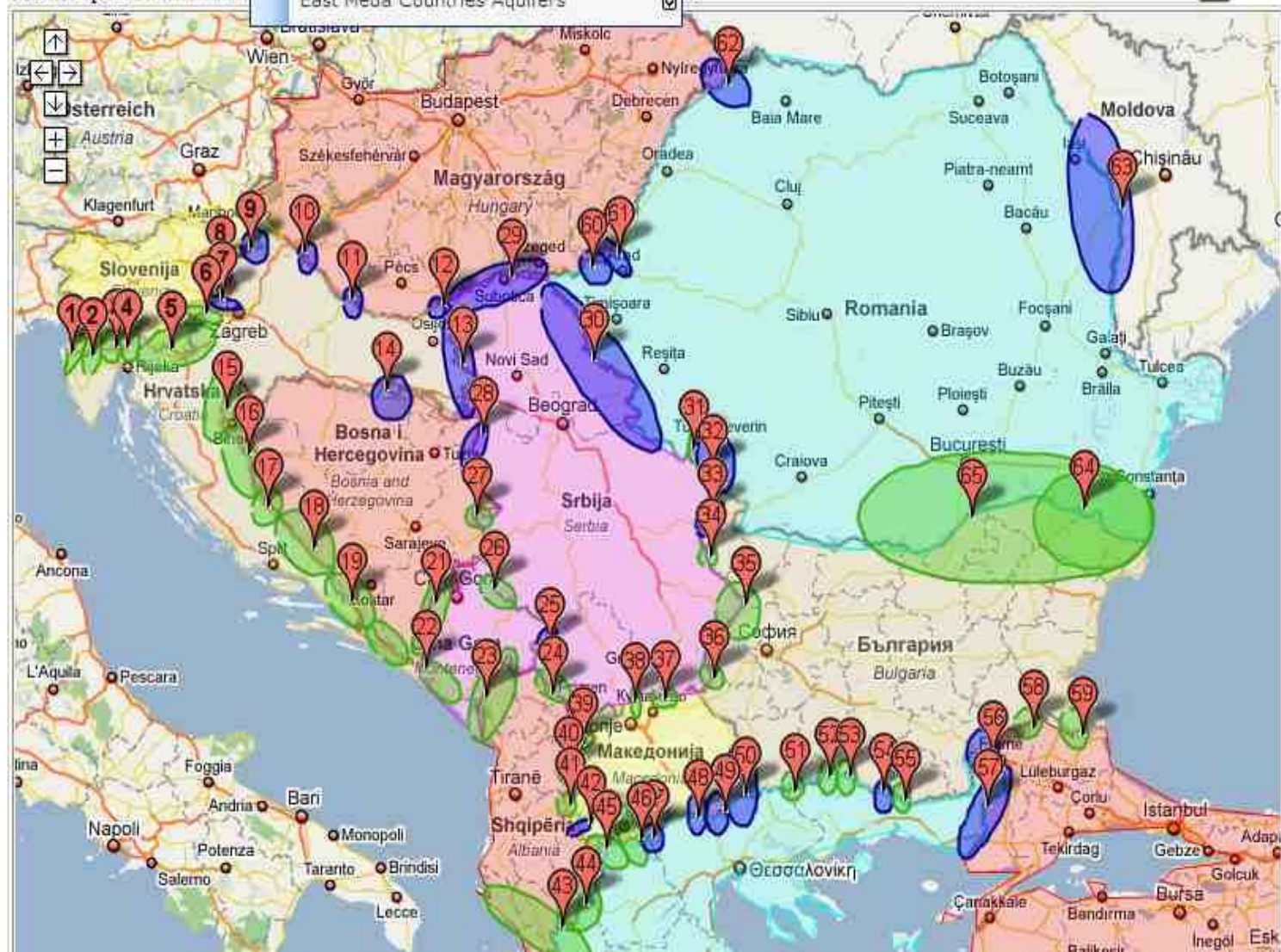
South Meda Countries Aquifers

East Meda Countries Aquifers

Interactive Map

Aquifers Database

Descriptive Information





NEW!

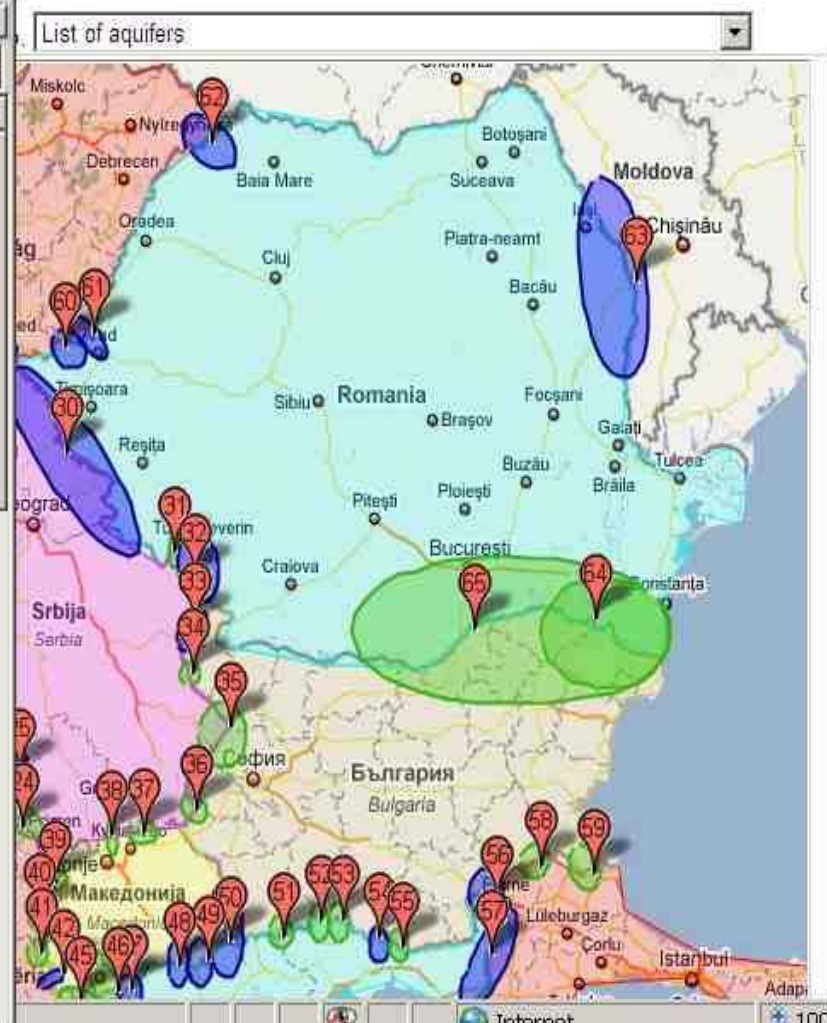
Take a virtual tour in Google Earth

See the list of Aquifers

http://www.inweb.gr/aquifer_list.php - Plaisio computers

http://www.inweb.gr/aquifer_list.php

| Aquifer id | Aquifer Name | Countries |
|------------|------------------------------|--------------------------------|
| 1 | Secovlje-Dragonja Dragonja | Slovenia / Croatia |
| 2 | Mirna-Istra | Croatia / Slovenia |
| 3 | Opatija | Croatia / Slovenia |
| 4 | Rijeka | Croatia / Slovenia |
| 5 | Cerknica Kupa | Croatia / Slovenia |
| 6 | Radovic-Metlika Zumberak | Slovenia / Croatia |
| 7 | Bregana-Obrezje Sava-Samobor | Croatia / Slovenia |
| 8 | Bizeljsko Sutla | Slovenia / Croatia |
| 9 | Dolinsko-Ravensko Mura | Croatia / Slovenia |
| 10 | Mura | Croatia / Hungary |
| 11 | Drava/Drava West | Hungary / Croatia |
| 12 | Baranja Drava East | Croatia / Hungary |
| 13 | West Serbia Backa/Sava | Serbia / Croatia |
| 14 | Sava/Posavina I | Bosnia & Herzegovina / Croatia |
| 15 | Kupa | Croatia / Bosnia & Herzegovina |
| 16 | Una Pleševica | Bosnia & Herzegovina / Croatia |
| 17 | Krka | Croatia / Bosnia & Herzegovina |
| 18 | Cetina | Bosnia & Herzegovina / Croatia |





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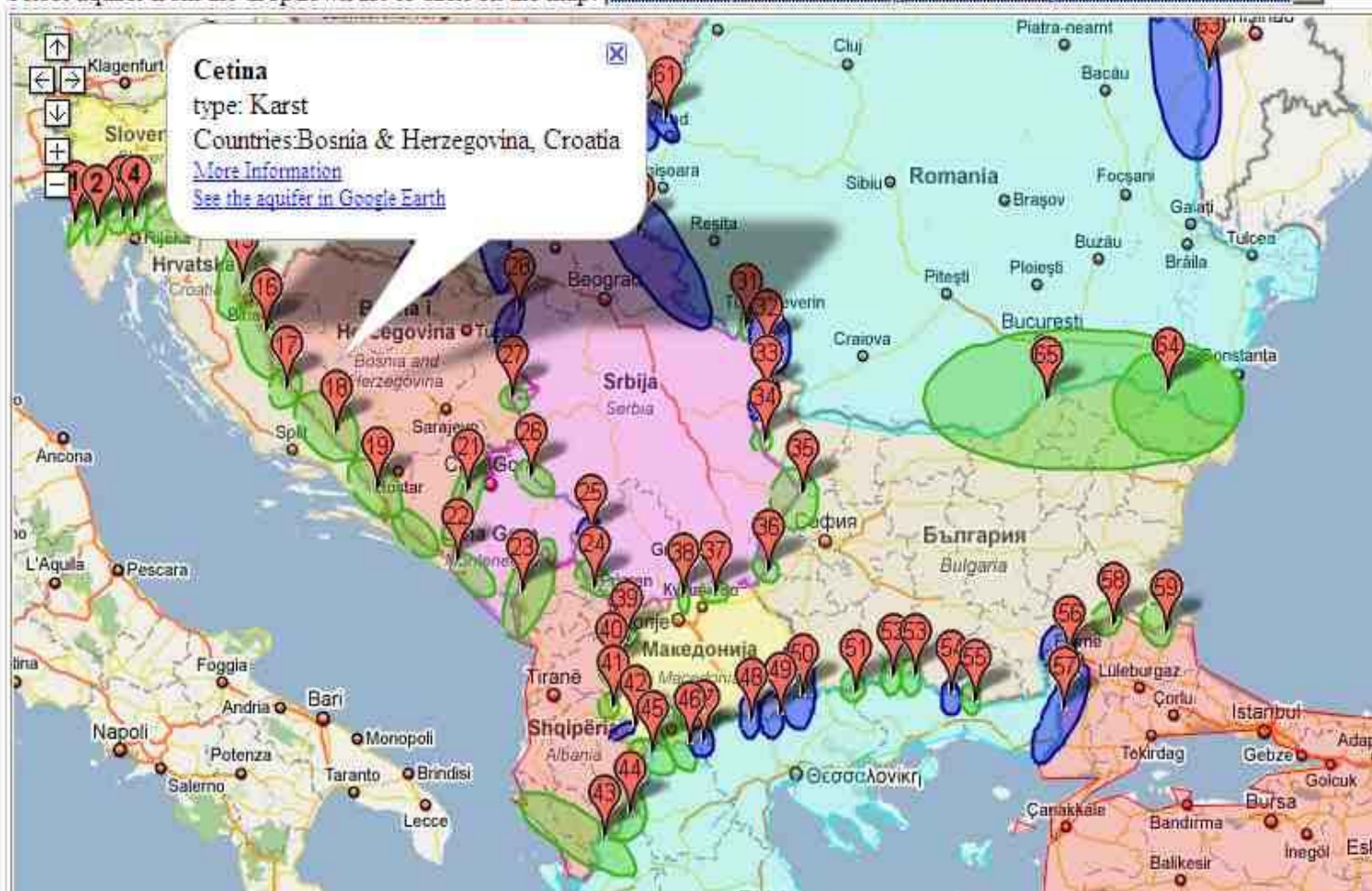
15th - 18th October 2008

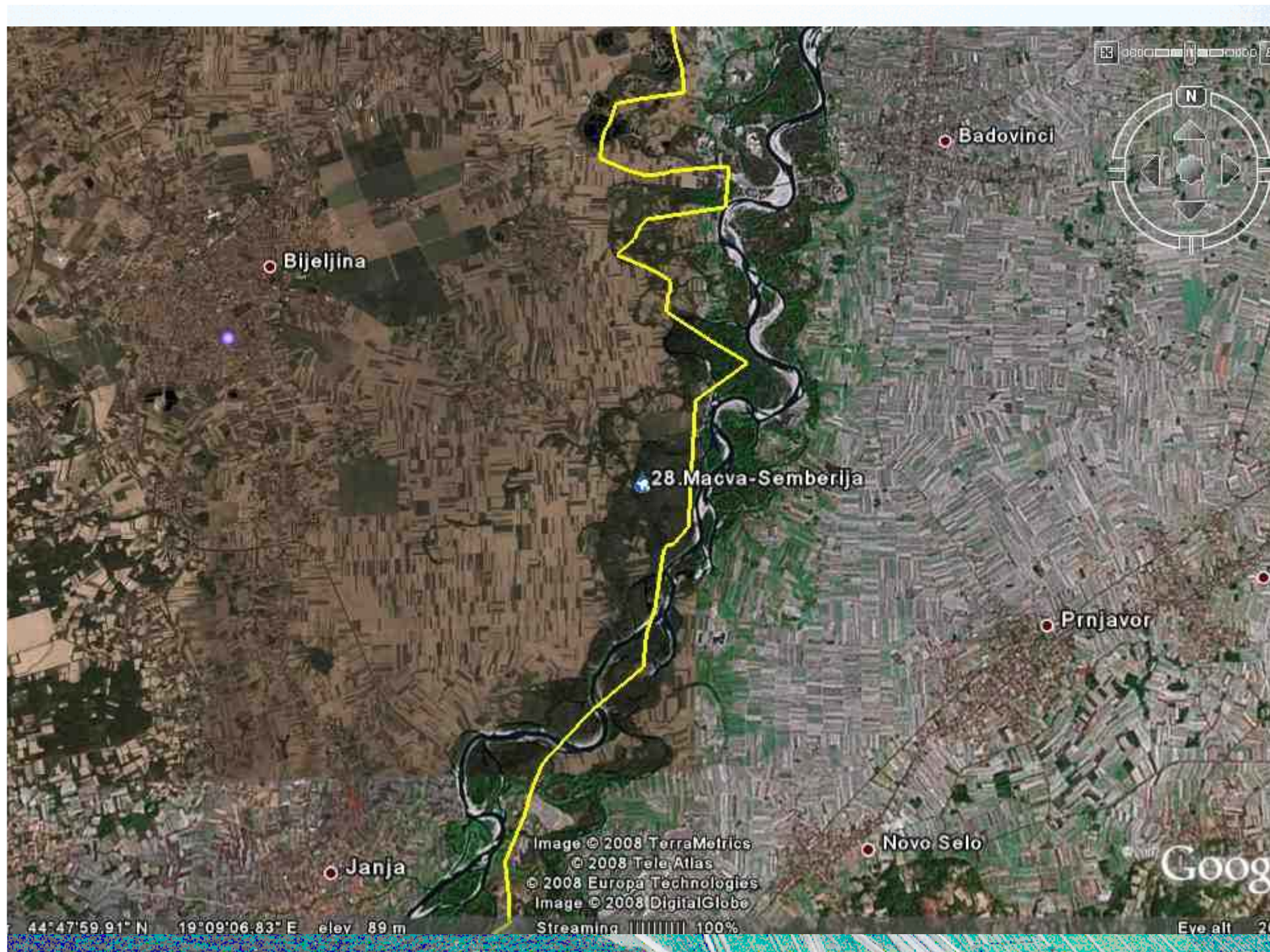


Take a virtual tour in Google Earth

See the list of Aquifers

Select aquifer from the dropdown list or click on the map: 18 - Cetina (Bosnia & Herzegovina / Croatia)





Bijeljina

Badovinci

28. Macva-Semberija

Prnjavor

Janja

Novo Selo

Image © 2008 TerraMetrics
© 2008 Tele Atlas
© 2008 Europa Technologies
Image © 2008 DigitalGlobe
Streaming 100%

Google

44°47'59.91" N 19°09'06.83" E elev 89 m

Elev alt 20



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2008

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/ International
Symposium on
Transboundary Waters
Management


Thessaloniki, Greece

18th October 2008

Transboundary
Waters Management

Inventory of Internationally shared Aquifers












Instructions

- Press on the aquifer name to see all the information about the aquifer.
- Press on the  icon next to each aquifer to open this aquifer in "Google Earth"
- You can sort the database by clicking on the headers (ID, Aquifer name, etc...)
- You can search the database by clicking 'search...' to show the search options

Search ... (Click here to show/hide search options)

1077x723

Found aquifers: 65

| ID | Aquifer Name | Type | Countries | Boundary length (km) | Area (km ²) |
|----|--|----------|--------------------|----------------------|-------------------------|
| 1 |  Secovlje-Dragonja/Dragonja | Karst | Slovenia / Croatia | 21 | 99 |
| 2 |  Mirna-Istra | Karst | Croatia / Slovenia | 26 | 214 |
| 3 |  Opatija | Karst | Croatia / Slovenia | 21 | 302 |
| 4 |  Rijeka | Karst | Croatia / Slovenia | 36 | 460 |
| 5 |  Cerknica/Kupa | Karst | Croatia / Slovenia | 32 | 238 |
| 6 |  Radovic-Metlika/Zumberak | Karst | Slovenia / Croatia | 12 | 158 |
| 7 |  Bregana-Obrezje/Sava-Samobor | Alluvial | Croatia / Slovenia | 7 | 54 |
| 8 |  Bizeljisko/Sutla | Alluvial | Slovenia / Croatia | 4 | 180 |
| 9 |  Dolinsko-Ravensko/Mura | Alluvial | Croatia / Slovenia | 26 | 768 |
| 10 |  Mura | Alluvial | Croatia / Hungary | 52 | 300 |
| 11 |  Drava/Drava West | Alluvial | Hungary / Croatia | 31 | 262 |

| | | | | | |
|----|---|------------------------|-----------------------------------|----------------------|-----|
| 17 | Krka | Karst | Croatia / Bosnia & Herzegovina | 42 | 414 |
| 18 | Cetina | Karst | Bosnia & Herzegovina / Croatia | 70 | 587 |
| 19 | Neretva right | Karst | Bosnia & Herzegovina / Croatia | N/A | 862 |
| 20 | Trebinjica/Neretva left | Karst | Croatia / Bosnia & Herzegovina | 124 | 242 |
| 21 | Bileko Lake | Karst | Bosnia & Herzegovina / Montenegro | 90 | 1 |
| 22 | Dinaric litoral west coast | Karst | Montenegro / Croatia | N/A | 200 |
| 23 | Dinaric east coast/Skadar/Shkodra lake | Karst | Albania / Montenegro | 35 | 450 |
| 24 | Beli Drim/Drini Bardhe | Karst | Serbia / Albania | 30 | 170 |
| 25 | Metohija | Alluvial | Serbia / Montenegro | N/A | 4 |
| 26 | Lim | Karst | Serbia / Montenegro | N/A | 700 |
| 27 | Tara Massif | Karst | Serbia / Bosnia & Herzegovina | 117 | 211 |
| 28 | Macva-Semberija | Alluvial | Serbia / Bosnia & Herzegovina | N/A | 967 |
| 29 | Norl | Close Window | | | |
| | Interflu | Field Name | Serbia | Bosnia & Herzegovina | |
| 30 | Ban | id | 57 | 58 | |
| 31 | Mirc | Aquifer ID | 28 | 28 | |
| 32 | Daci | Aquifer name | Macva-Semberija | Macva-Semberija | |
| 33 | Tim | Countries | Serbia, B&H | Serbia,B&H | |
| 34 | Star | Country Name | Serbia | Bosnia & Herzegovina | |
| 35 | Nish | Aquifer Type | Alluvial | Alluvial | |
| 36 | Zem | Boundaries Length (km) | N/A | N/A | |
| 37 | FYR | Area (km^2) | 967 | 0 | |
| | | Area Population (inh) | 817 | N/A | |
| 38 | FYROM-Central Serbia | Karst | FYROM / Serbia | 50 | 100 |
| 39 | Tetovo-Gostivar | Karst | FYROM / Serbia | 15 | 50 |
| 40 | Korab/Bistra - Stogovo | Karst | FYROM / Albania | 25 | 140 |
| 41 | Jablanica/Golobordo | Karst | FYROM / Albania | 50 | 250 |
| 42 | Ohrid Lake | | FYROM / Albania | N/A | 0 |



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IV International Symposium on Transboundary Waters Management


Thessaloniki, Greece

17th - 18th October 2008

 Transboundary Waters Management

Inventory of Internationally shared Aquifers





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Search ... (Click here to show/hide search options)

| | | | |
|-------------------------------|---------------------------|--|---------------------------|
| Type | Show all types ▼ | Country | Show all countries ▼ |
| Area (km ²) | >= ▼ <input type="text"/> | Discharge Flow (m ³ /s) | >= ▼ <input type="text"/> |
| Boundaries Length (km) | >= ▼ <input type="text"/> | Annual groundwater resources (Mm ³ /y) | >= ▼ <input type="text"/> |
| Mean annual Rainfall (mm) | >= ▼ <input type="text"/> | Annual groundwater abstractions (Mm ³ /y) | >= ▼ <input type="text"/> |
| Search with selected criteria | | Clear Search criteria : Show all aquifers | |

Found aquifers: 65

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|----|---|-------|--------------------|----------------------|-------------------------|
| 1 |  <u>Secovlje-Dragonja/Dragonja</u> | Karst | Slovenia / Croatia | 21 | 99 |
| 2 |  <u>Mirna-Istra</u> | Karst | Croatia / Slovenia | 26 | 214 |
| 3 |  <u>Opatija</u> | Karst | Croatia / Slovenia | 21 | 302 |
| 4 |  <u>Rijeka</u> | Karst | Croatia / Slovenia | 36 | 460 |
| 5 |  <u>Cerknica/Kupa</u> | Karst | Croatia / Slovenia | 32 | 238 |



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Thessaloniki, Greece

10th - 18th October 2008

Transboundary Waters Management

Inventory of Internationally shared Aquifers

Instructions

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- You can search the database by clicking 'search...' to show the search options

Search ... [\(Click here to show/hide search options\)](#)

| | | | |
|-------------------------------|-------|--|---------|
| Type | Karst | Country | Albania |
| Area (km ²) | >= | Discharge Flow (m ³ /s) | >= |
| Boundaries Length (km) | >= | Annual groundwater resources (Mm ³ /y) | >= |
| Mean annual Rainfall (mm) | >= | Annual groundwater abstractions (Mm ³ /y) | >= |
| Search with selected criteria | | Clear Search criteria : Show all aquifers | |

Found aquifers: 65

| ID | Aquifer Name | Type | Countries | Boundary length (km) | Area (km ²) |
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| 1 |  Secovlje-Dragonja/Dragonja | Karst | Slovenia / Croatia | 21 | 99 |
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| 3 |  Opatija | Karst | Croatia / Slovenia | 21 | 302 |
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IV International
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Management


Thessaloniki, Greece

15th – 18th October 2008



Inventory of Internationally shared Aquifers









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- You can search the database by clicking 'search...' to show the search options.

[Search ... \(Click here to show/hide search options\)](#)

| | | | |
|-------------------------------|--|--|--|
| Type | <input type="text" value="Karst"/> | Country | <input type="text" value="Albania"/> |
| Area (km ²) | <input type="text" value=">="/> <input type="text" value=""/> | Discharge Flow (m ³ /s) | <input type="text" value=">="/> <input type="text" value=""/> |
| Boundaries Length (km) | <input type="text" value=">="/> <input type="text" value=""/> | Annual groundwater resources (Mm ³ /y) | <input type="text" value=">="/> <input type="text" value=""/> |
| Mean annual Rainfall (mm) | <input type="text" value=">="/> <input type="text" value=""/> | Annual groundwater abstractions (Mm ³ /y) | <input type="text" value=">="/> <input type="text" value=""/> |
| Search with selected criteria | | Clear Search criteria · Show all aquifers | |

Found aquifers: 8

| ID | Aquifer Name | Type | Countries | Boundary length (km) | Area (km ²) |
|----|---|-------|--------------------------|----------------------|-------------------------|
| 23 |  <u>Dinaric east coast/Skadar/Shkodra lake</u> | Karst | Albania / Montenegro | 35 | 450 |
| 24 |  <u>Beli Drim/Drini Bardhe</u> | Karst | Serbia / Albania | 30 | 170 |
| 40 |  <u>Korab/Bistra - Stogovo</u> | Karst | FYROM / Albania | 25 | 140 |
| 41 |  <u>Jablanica/Golobordo</u> | Karst | FYROM / Albania | 50 | 250 |
| 43 |  <u>Viosa-Pogoni/Nemechka</u> | Karst | Albania / Greece | 37 | 550 |
| 44 |  <u>Mourqana Mountain/Mali Gjere</u> | Karst | Greece / Albania | 20 | 440 |
| 45 |  <u>Prespes and Ohrid Lakes</u> | Karst | Greece / Albania / FYROM | 52 | 750 |
| 46 |  <u>Galicja</u> | Karst | Albania / Greece | N/A | 0 |

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IV International Symposium on Transboundary Waters Management

Thessaloniki, Greece

16 - 18th October 2008

Transboundary Waters Management

Home Page > Water Database

Transboundary Aquifers

Internationally Shared Surface Waters

South Meda Countries Aquifers

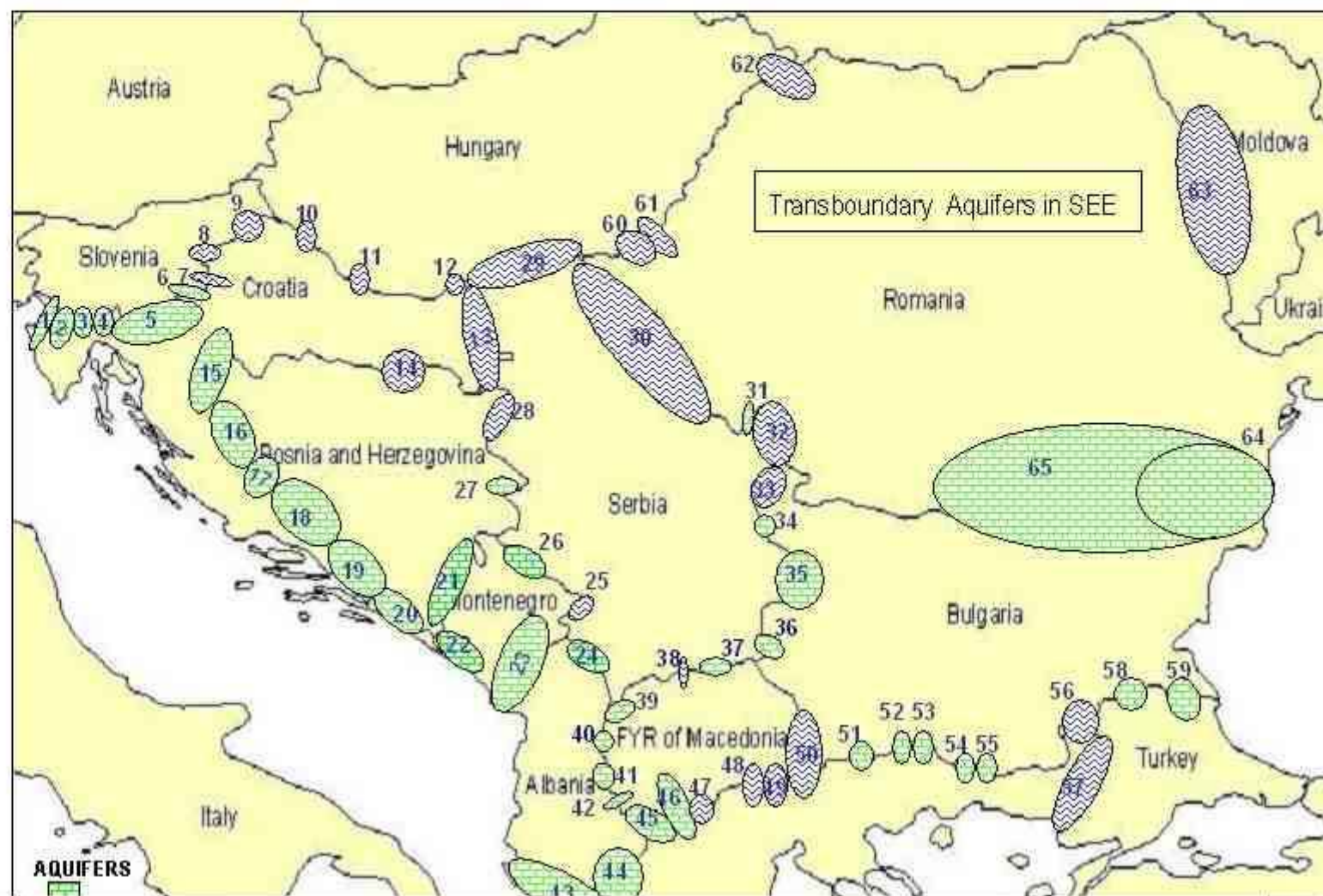
East Meda Countries Aquifers

Interactive Map

Aquifers Database

Descriptive Information

for more information



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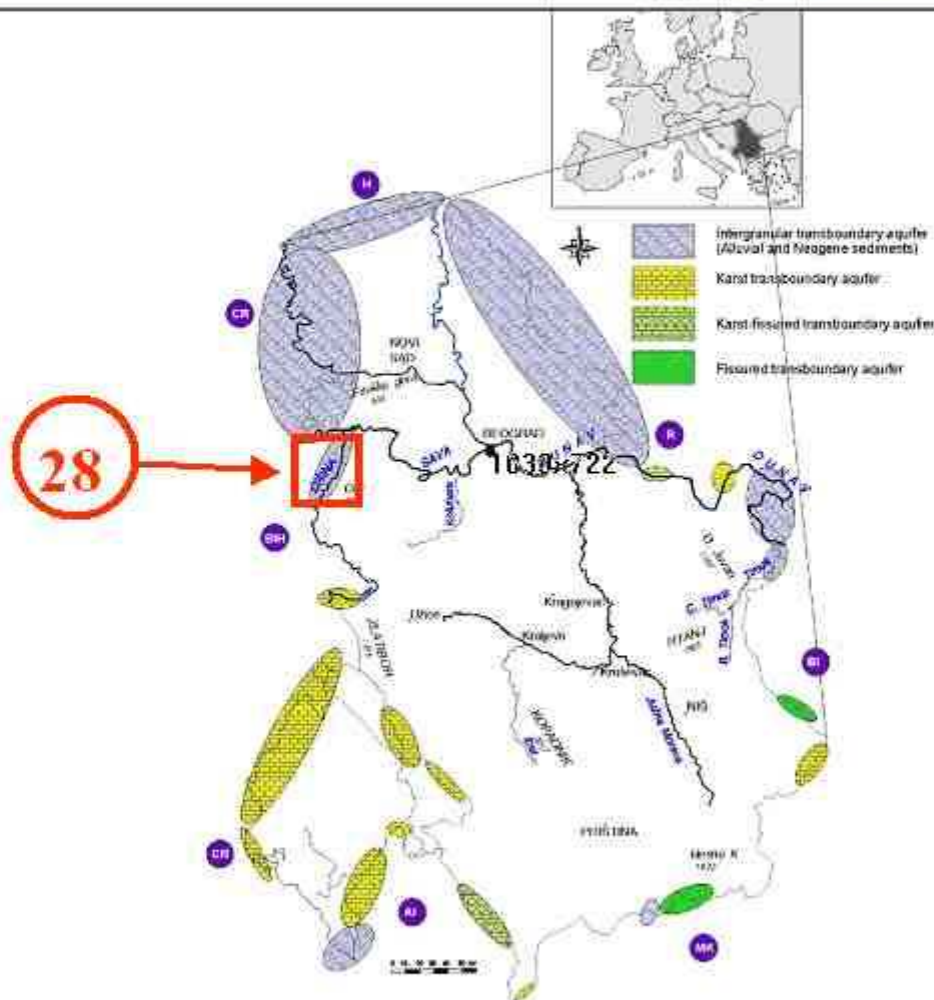
IV International Symposium on Transboundary Waters Management

Thessaloniki, Greece

16-18th October 2008

Transboundary Waters Management

Home Page ▸ Water Database ▸ Transboundary Aquifers ▸ Inventory of Internationally shared Aquifers



NAME OF THE TRANSBOUNDARY AQUIFER

28. Macva-Semberija

Shared by : SERBIA and BOSNIA & HERZEGOVINA

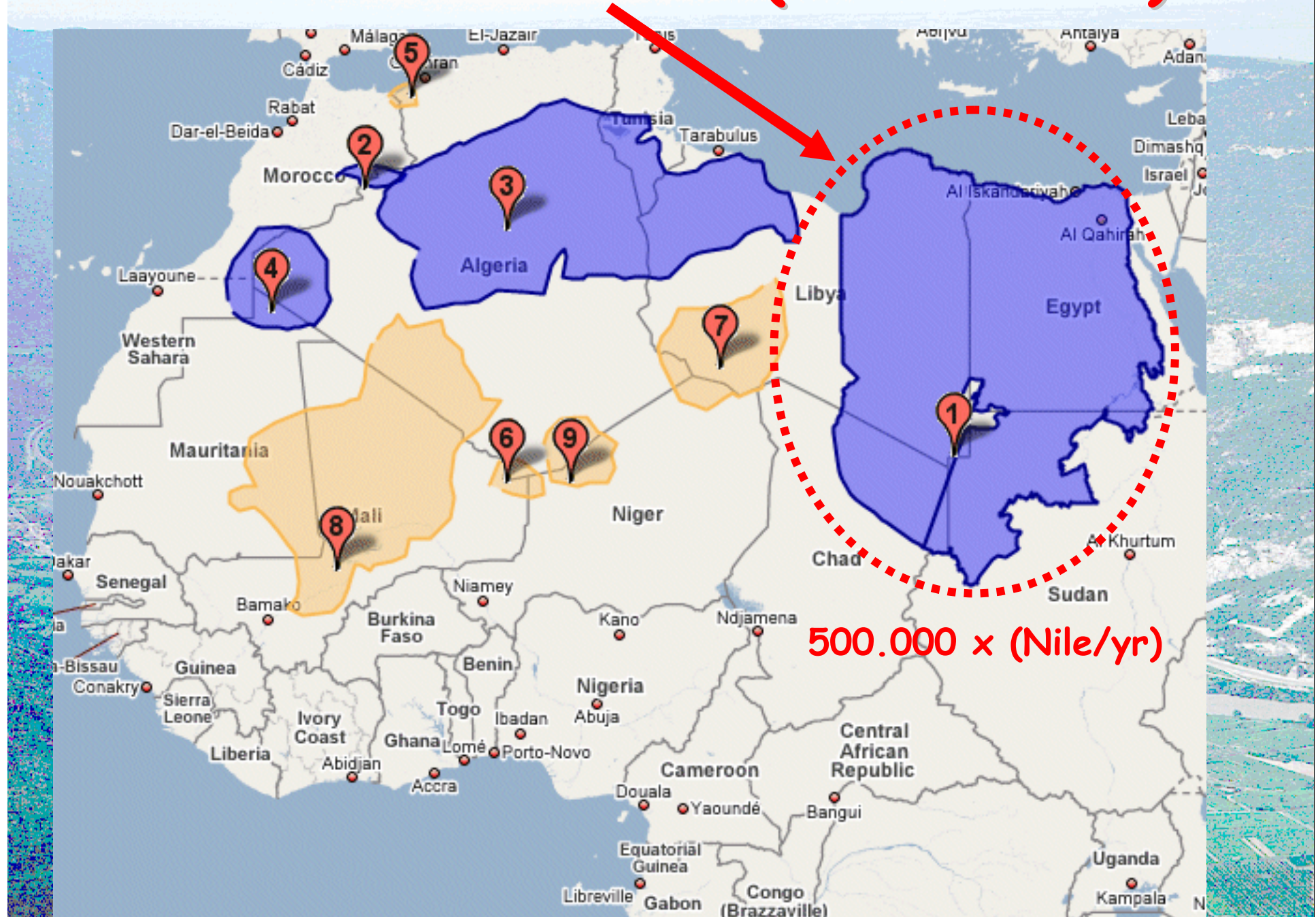
Serbia (1)

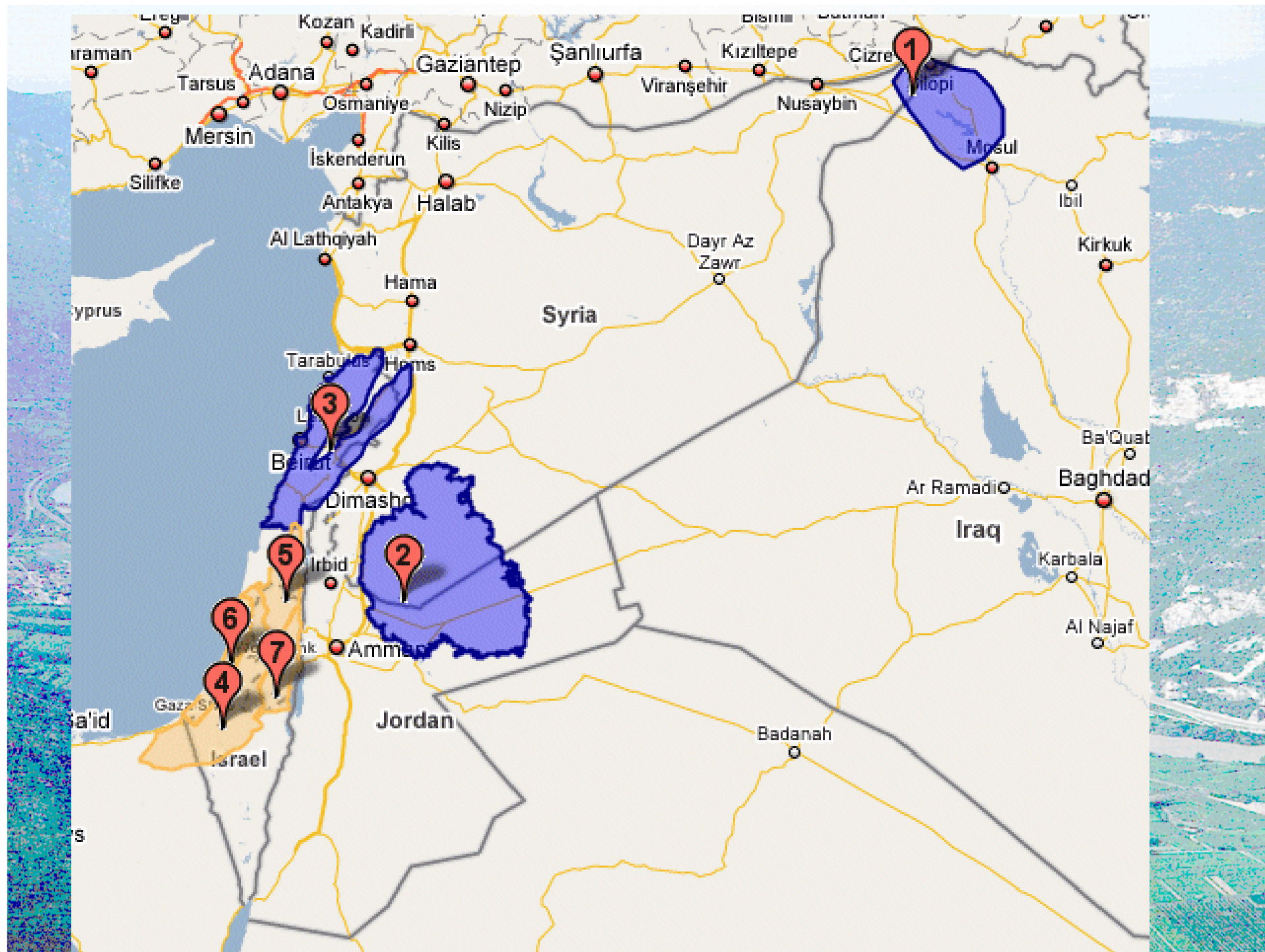
Serbia (2)

Bosnia & Herzegovina

1 AQUIFER PROPERTIES

The Nubian Sandstone (4 Countries)





Water Governance

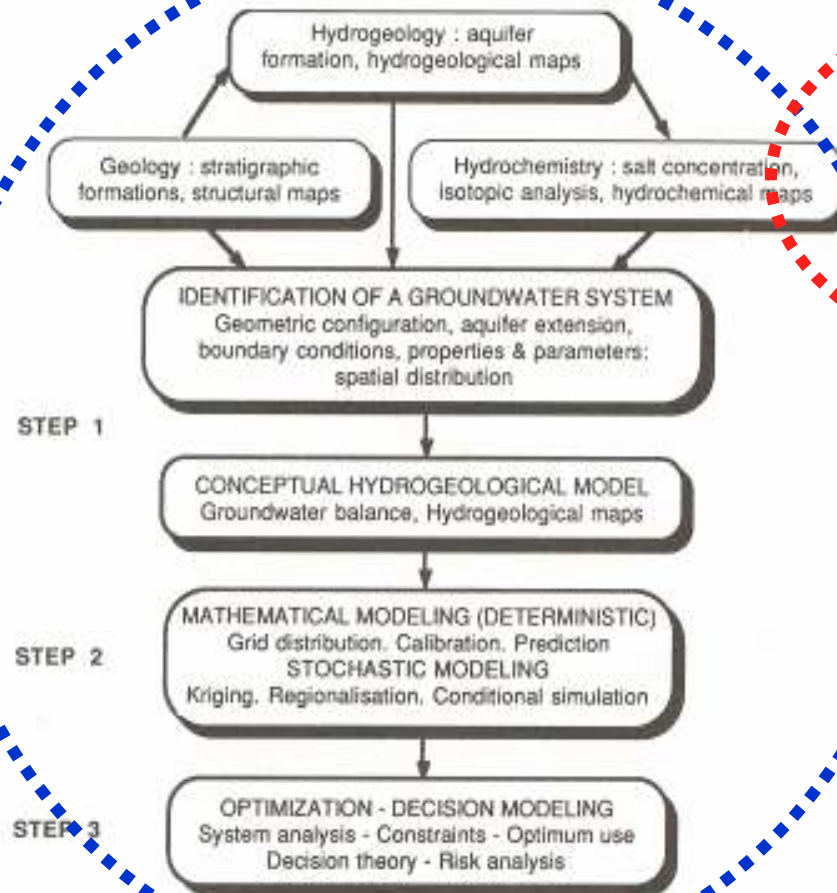
Water Governance means the way how:

- ❖ decision makers,
- ❖ institutions,
- ❖ stakeholders

interact in order to manage water resources.

Governance is mainly appropriate to situations where a nation-state loses its monopoly of political power, such as in transboundary waters.

Knowledge Development Challenge

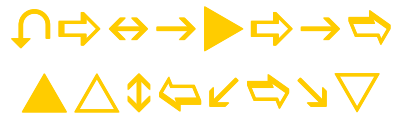


**Groundwater Economics,
Institutions, & Society**

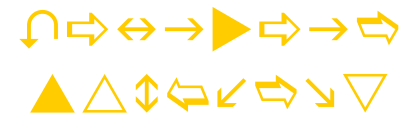
**Groundwater
Policy &
Governance**

Present State of Knowledge

Desired State of Knowledge

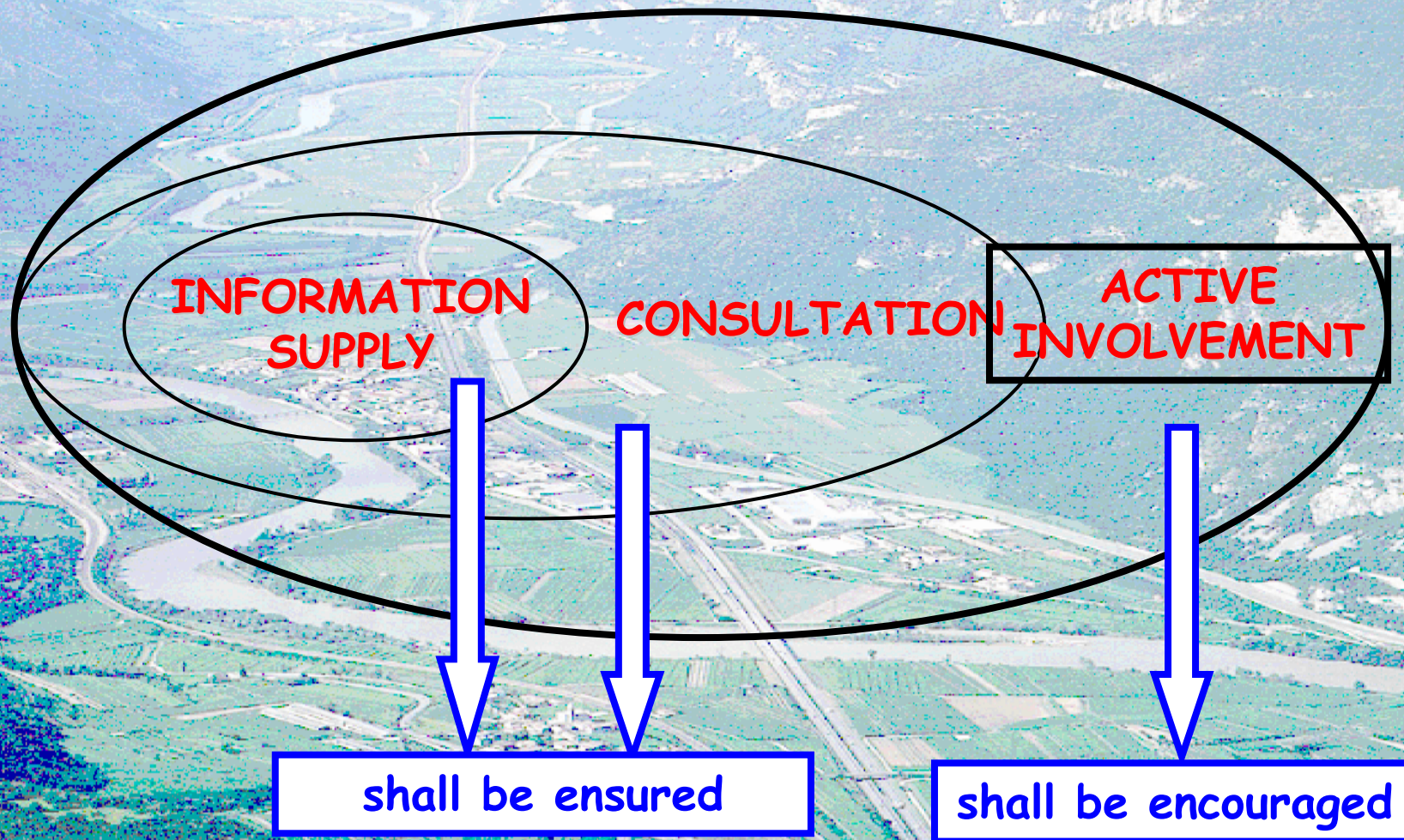


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Language problems

EU WATER FRAMEWORK DIRECTIVE



IMPORTANCE OF RESEARCH AND TECHNOLOGY

DATABASES, MODELING, SCENARIA, ALTERNATIVE REMEDATION PRACTICES, INFORMATION NETWORKS

GIS-DATA

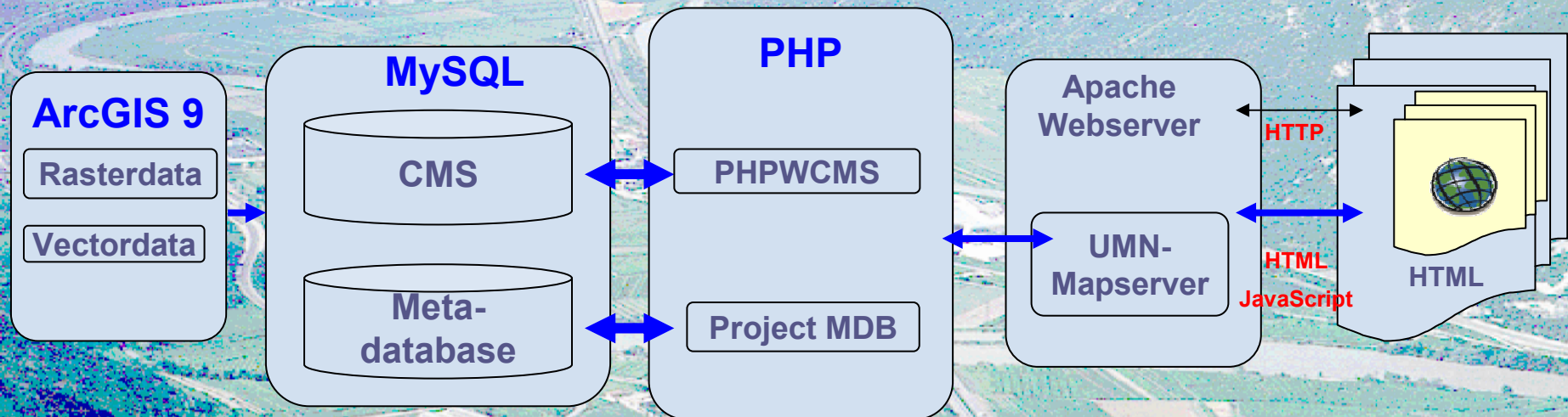
DATABASE

APPLICATIONS

SERVER

CLIENTS

Browser



A serene landscape photograph of a sunset over a body of water. The sun is low on the horizon, casting a warm, golden glow across the sky and reflecting on the water. In the foreground, there are tall reeds and a small, dark boat partially submerged. The background shows distant mountains under a clear sky. The entire image is framed by a decorative border with a blue and green pattern.

Ευχαριστώ !

