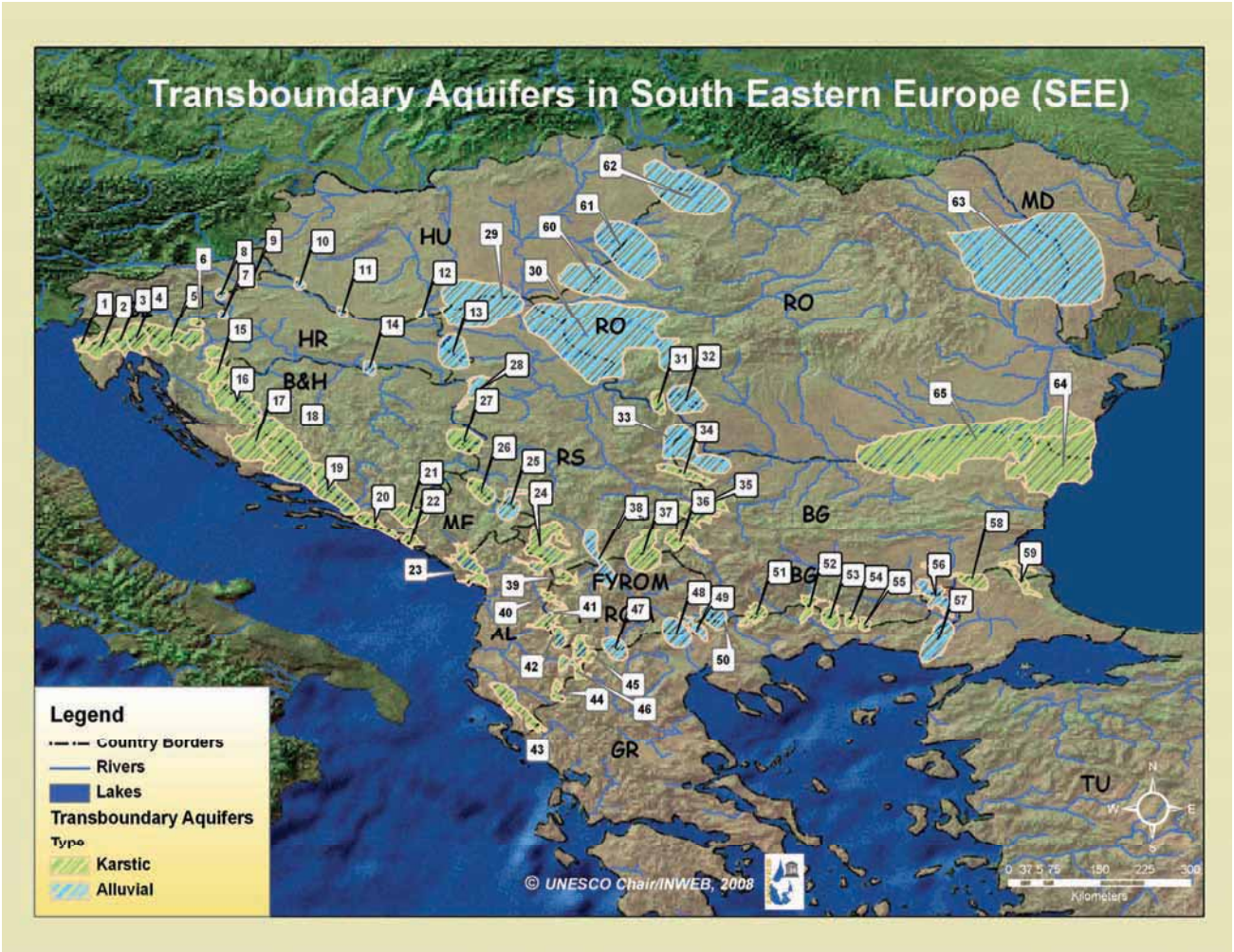
United Nations
Educational, Scientific and
Cultural Organization

International
Hydrological Programme

Internationally Shared Aquifers in South Eastern Europe (Balkan Region): A Preliminary Assessment

Phase I of UNESCO-ISARM / Balkans Programme

The inventory presented here is part of the UNESCO-ISARM (Internationally Shared Aquifer Resources Management) programme. UNESCO, and more specifically UNESCO's International Hydrological Programme (IHP) (Paris), having recognised that transboundary aquifer systems are important sources of fresh water in many regions of the world, decided to launch a new initiative called ISARM to promote studies on transboundary aquifers. The UNESCO-ISARM programme aims at improving understanding of scientific, socio-economic, legal, institutional and environmental issues related to the management of transboundary aquifers. UNESCO-IHP has set up an international group of experts including representatives from the International Association of Hydrogeologists (IAH), the Food and Agriculture Organisation of the United Nations (FAO), the United Nations Economic Commission for Europe (UNECE) and the United Nations Economic and Social Commission for Western Asia (UNESCWA). As a first step the programme has initiated an inventory of the world's transboundary aquifers. Details on the ISARM project are available at the website <www.isarm.net>, hosted by IGRAC.



The Contribution of the UNESCO Chair and Network INWEB

UNECE

"Transboundary water resources are increasing in importance as sources of freshwater worldwide. As much as 80% of water resources in the Mediterranean region are shared between two or more countries, and in SEE transboundary groundwaters are the most important source of freshwater".

The present version of the inventory is the result of the UNESCO-ISARM initiative in South Eastern Europe (SEE) coordinated by UNESCO-IHP Secretariat (Paris) in collaboration with UNESCO-BRESCE (Venice) and the United Nations Economic Commission for Europe (UNECE). It has been carried out by the UNESCO Chair on "sustainable water resources management", which coordinates the Network INWEB "*International Network of Water/ Environment Centres for the Balkans*" at the Aristotle University of Thessaloniki, Thessaloniki, Greece (Prof. J. Ganoulis). The main objective of this activity was to collect and analyse new data and hydro-geological maps on transboundary aquifers in SEE with special reference to transboundary karst aquifers. This particular type of transboundary aquifer dominates South Eastern Europe in terms of number, quantity and quality of water. Karst aquifer water resources are important not only for different human uses but also for sustaining the environment and maintaining biodiversity of ecosystems. This inventory Incorporating new information from the SEE countries and using new Internet-based technologies like Google Earth and map server techniques, is also available on the Internet (see www.inweb.gr).

UNESCO CHAIR & NETWORK INWEB at the Aristotle University of Thessaloniki, Greece

UNESCO BRESCE

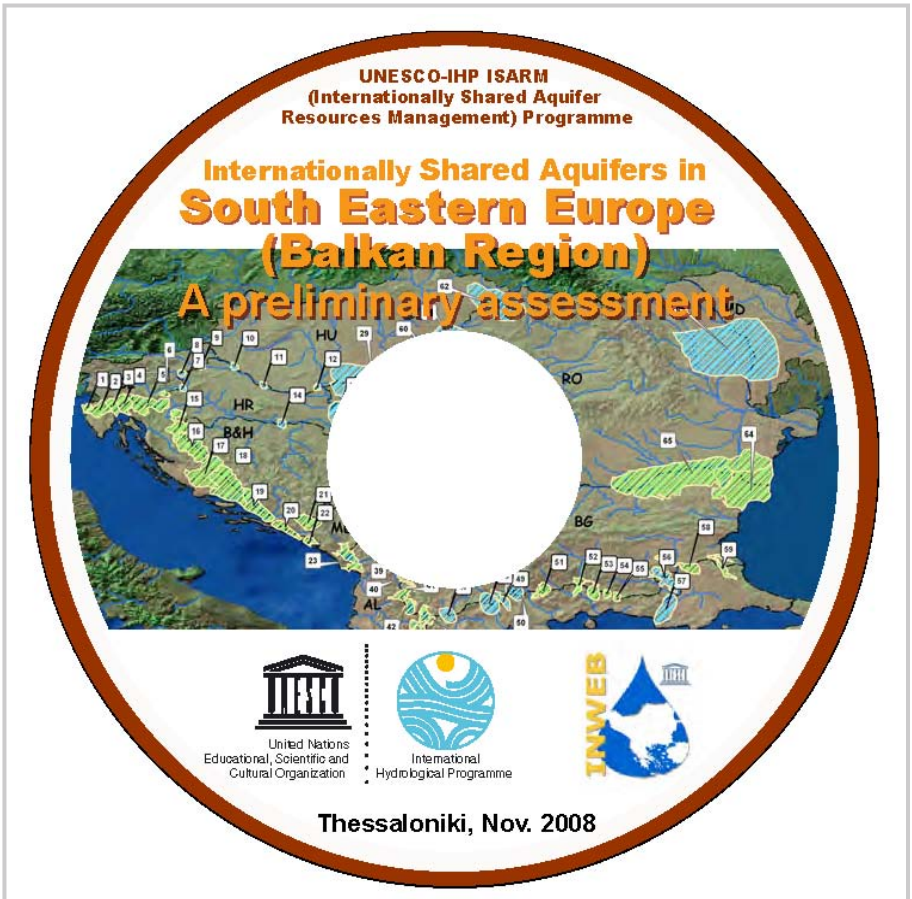
Acknowledgments

Dr. Rossitza Gorova, Executive Environment Agency, Ministry of Environment and Water, Sofia, Bulgaria
Eng. Ventcislav Nikolov, Director of the Basin Directorate in the Black Sea Region, Varna, Bulgaria
Eng. Ivailo Tcankov, expert Basin Directorate in the Danube Region, Pleven, Bulgaria
Dr. Lidija Globevnik, University of Ljubljana, Faculty of Civil and Geodetic Engineering, Ljubljana, Slovenia
Prof. Dr. Sevket Cokgor, Istanbul Technical University, Faculty of Civil Engineering, Istanbul, Turkey
Mr. Nijaz Lukovac, Hydro-Engineering Institute, Sarajevo, Bosnia & Herzegovina
Prof. Dejan Ljubisavljevic, Faculty of Civil Engineering, University of Belgrade, Belgrade, Serbia
Prof. Cvetanka Popovska, University of Ss. Cyril and Methodius, Skopje, Former Yugoslav Republic of Macedonia
Dr. Manjola Banja, Hydrometeorological Institute, Tirana, Albania
Asst. Prof. Davor Malus, University of Zagreb, Zagreb, Croatia
Prof. dr Boris Mijatovic, NKIAH Committee of Serbia and Montenegro, Serbia and Montenegro
MSc Saša Milanović, Faculty of Mining & Geology, University of Belgrade, Belgrade, Serbia
Mr. Goran Jelavić, Vodno područje slivova Jadranskog mora, Mostar, Bosnia and Herzegovina
Dr. Ivana Starčevića, Vodno područje slivova Jadranskog mora, Mostar, Bosnia and Herzegovina

The Importance of Karst Aquifers

Almost half of the Balkan region is karst (map). Major aquifers have formed in these karstic formations, with caves, stalactites and stalagmites of great natural beauty, some of which have been included in the list of UNESCO's natural heritage sites. The most important karst aquifers of the region are located along the Adriatic coast in the mountainous area of the Dinarides. This chain of high mountains is the continuation of the Alpic ring in central Europe (the Alpes or Alpides). Almost half of the water from the mountainous area of Dinarides disappears underground in karst formations and flows in the shortest direction to the Adriatic Sea. The rest of the water drains via the Danube River towards the Black Sea.

"Karst aquifer water resources in SEE are important not only for different human uses but also for sustaining the environment and maintaining biodiversity of ecosystems".



UNESCO Chair-
INWEB

Civil Engineering
Department
Aristotle University of
Thessaloniki
54124 Thessaloniki
Greece

Tel. +30-2310-995682
Fax: +30-2310-995681
e-mail:
iganouli@civil.auth.gr

For more information on this inventory visit INWEB's Internet site at

www.inweb.gr

Collecting data series on an aquifer, such as water levels, rates of abstraction and groundwater quality, over long periods of time, is the foundation on which sustainable groundwater management is based. The main purpose of this inventory is to put together existing reliable data/information on shared aquifers in the SEE region and make them available and accessible for use by Balkan countries and any other interested parties.

The inventory is based mainly on meta-data and is available on the Internet (www.inweb.gr). Google Earth technology is used to provide a background view of the regional location of the shared aquifers (e.g. figure below).

View of the Macva's Aquifer region (Serbia-Bosnia and Herzegovina) in Google Earth.

The UNESCO-ISARM Programme

The UNESCO-ISARM (Internationally Shared Aquifer Resources Management) is a multidisciplinary, international, demonstration project coordinated by UNESCO International Hydrological Programme (IHP), Paris and included in the UNESCO 2008-2011 programme. It was launched in June 2000 at the 14th Session of the Intergovernmental Council of the UNESCO-IHP and is an intergovernmental project in which all national IHP Committees are involved.

The Council also decided to invite the Food and Agriculture Organisation of the United Nations (FAO), the International Association of Hydrogeologists (IAH) and the United Nations Economic Commission for Europe (UNECE) to cooperate in order to create the UNESCO-FAO-IAH-UNECE interagency ISARM initiative to promote studies concerning transboundary aquifer systems.

A first phase of UNESCO-ISARM was initiated in Africa in 2002 and a second phase in the Americas in 2003. The first UNESCO/Organisation of American States (OAS) ISARM-Americas workshop was held in September 2003 in Montevideo, Uruguay. Participation at the workshop was strong: twenty countries were represented, including Haiti and the Dominican Republic. A third phase, of which this inventory forms a part, was launched in the Balkans in 2003 by UNESCO-ISARM and UNESCO Chair and Network INWEB.

UNESCO Chair/INWEB coordinated a workshop in October 2004 in Thessaloniki, Greece to resent and assess the compilation and validation of data for this inventory. Further data were collected and reviewed during a second workshop hold in Thessaloniki in April 2007, in cooperation with UNECE.