



Workshop on the Danube Region Geothermal Concept (DanReGeotherm)

*Budapest, 28 November 2013
Geological and Geophysical Institute of Hungary*

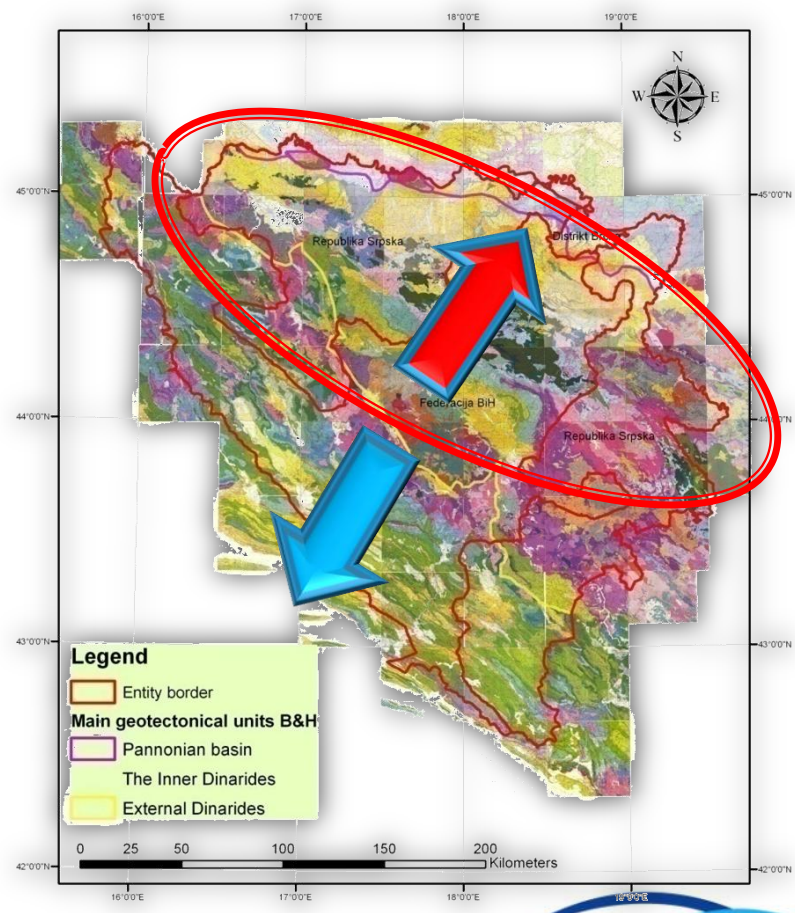
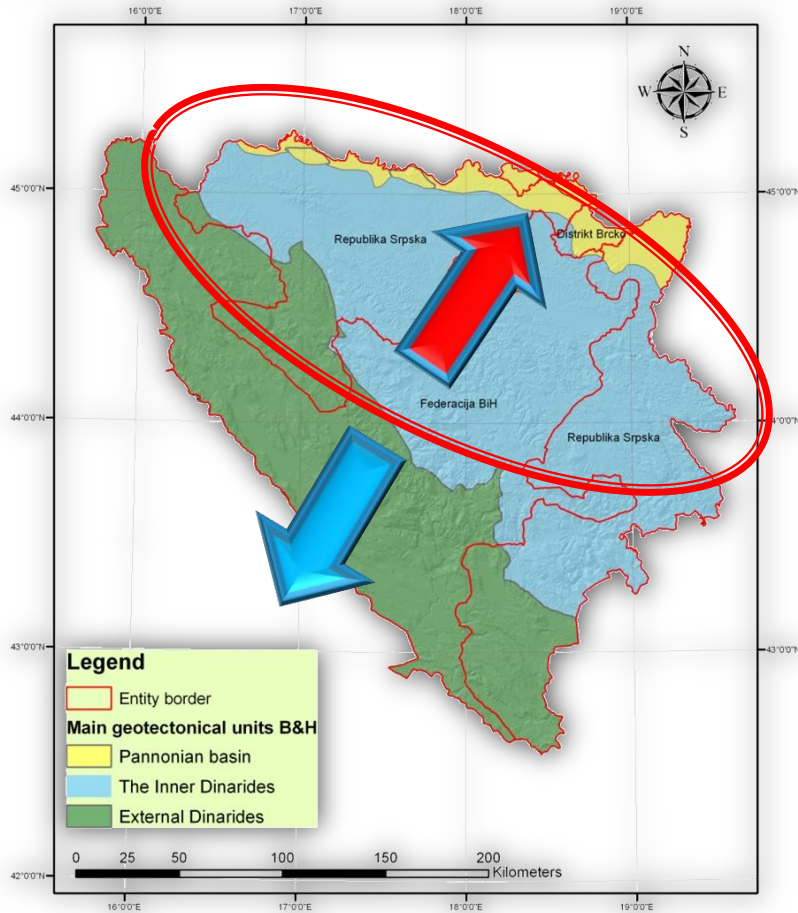
Country update: Bosnia and Herzegovina

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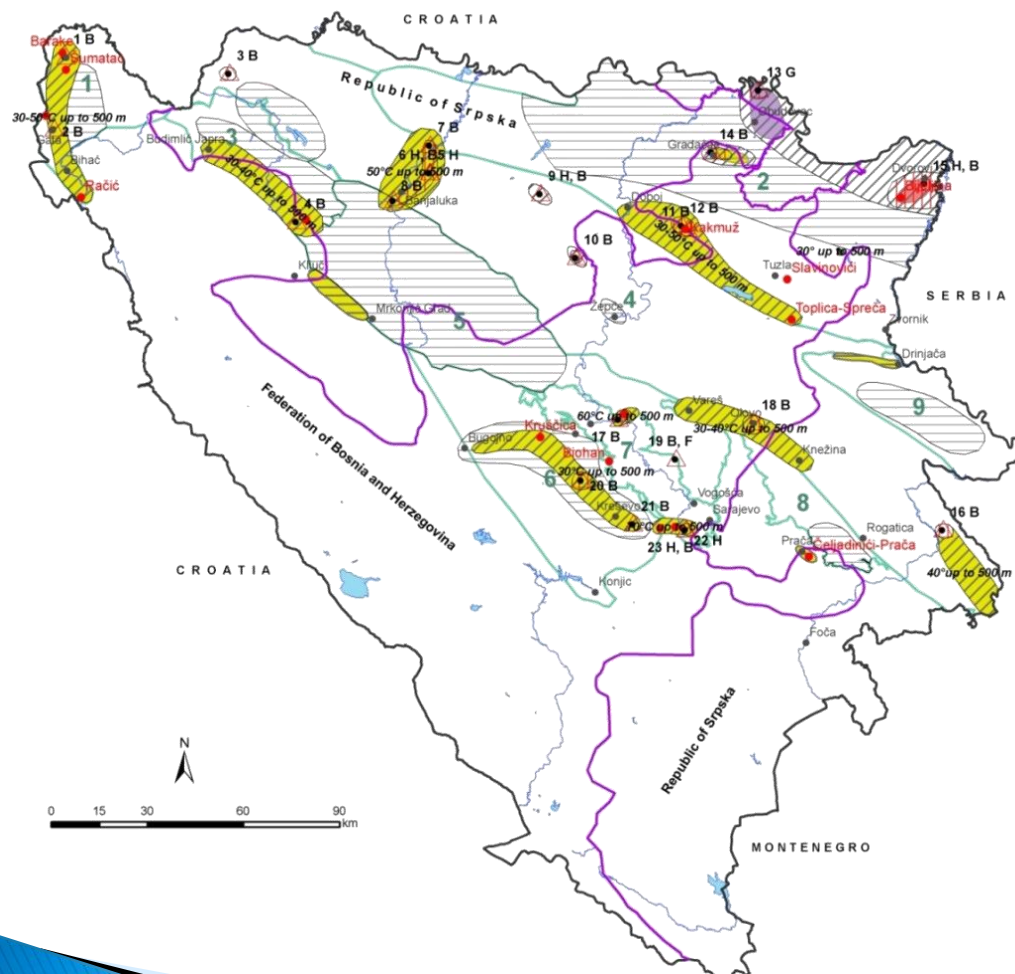
Main deep geothermal reservoirs

Geological, hydrogeological conditions



Main deep geothermal reservoirs

Subsurface temperature conditions



Utilization of geothermal energy for direct heat

F = Fish farming
 H = Individual space heating (other than heat pumps)
 B = Bathing and swimming (including balneology)
 G = Greenhouse and soil heating

Hydrogeothermal regions

- Border of hydrogeothermal regions
- 1 Mesozoic massif of NW Bosnia
- 2 Mesozoic and Tertiary artesian basins of northern Bosnia
- 3 Una-Sana Paleozoic massif
- 4 Ophiolite massif
- 5 Mesozoic Mid-Bosnian massif
- 6 Mid-Bosnian Paleozoic massif
- 7 Mid-Bosnian Mesozoic basin
- 8 Paleozoic massif of SE Bosnia
- 9 Paleozoic and Neogene massif of E Bosnia

Temperature and depth of aquifers

- 120-140°C at 2500 m
- 90-100°C at 2500 m
- 30-70°C up to 500 m

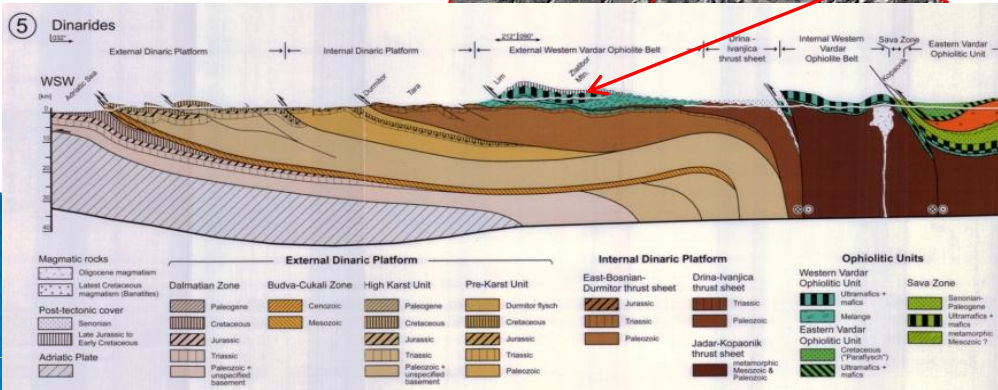
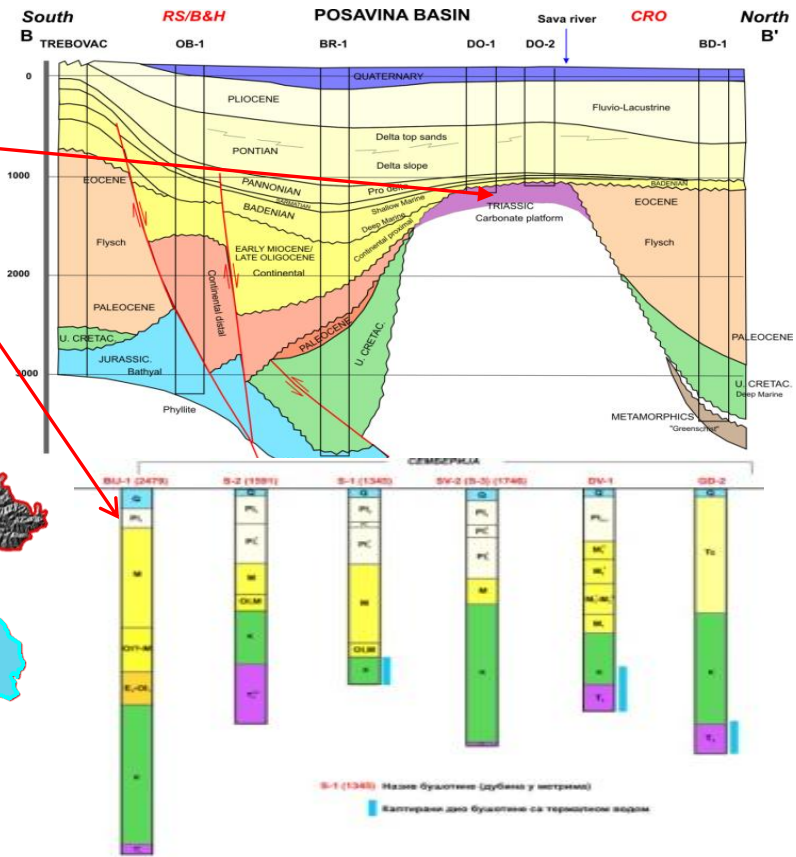
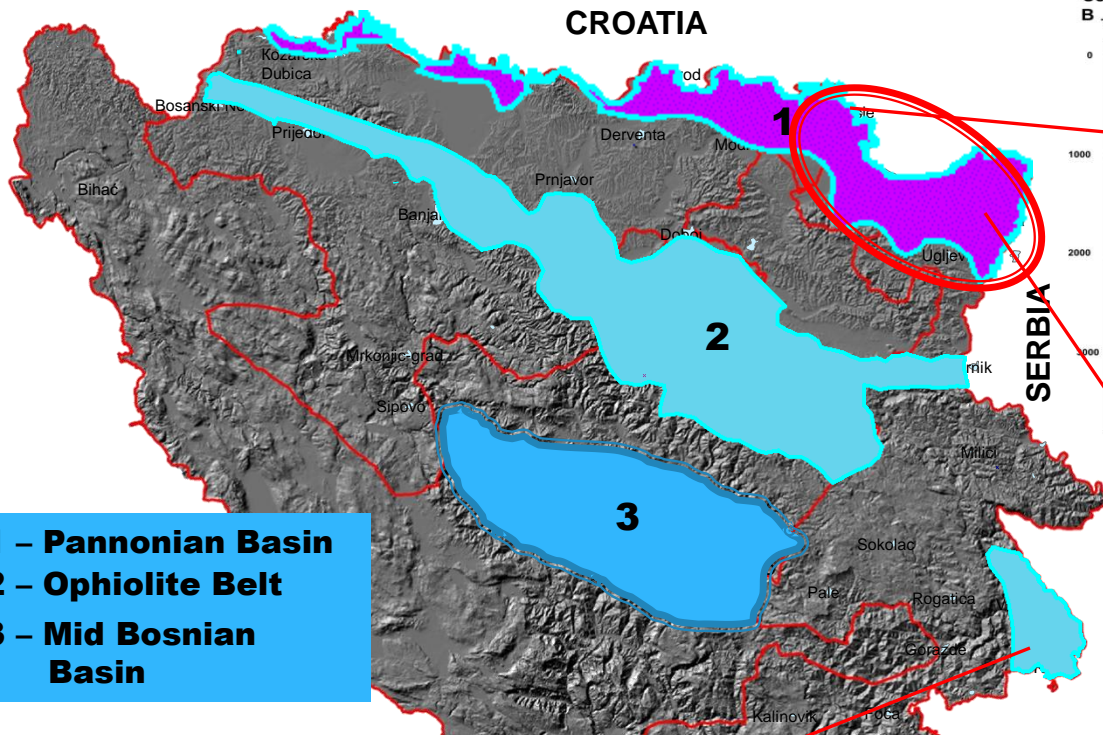
Proved and perspective geothermal zones

- ▨ Important proved resources in use
- ▨ Less promising geothermal zones
- ▨ Promising geothermal zones

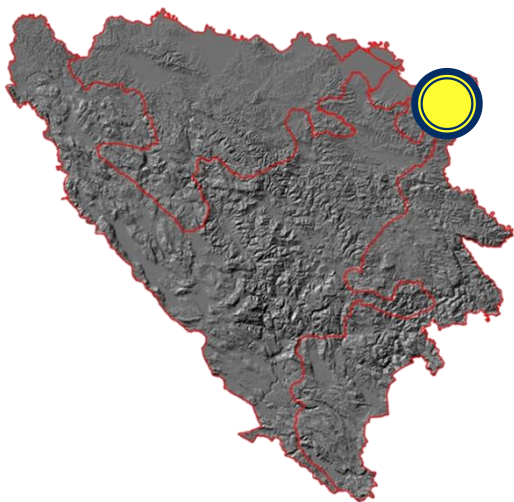
Other symbology

- ▲ 1 Locality for direct heat utilization
- Other significant geothermal waters
- Important towns
- Boundary between Federation of B&H and Republic of Srpska

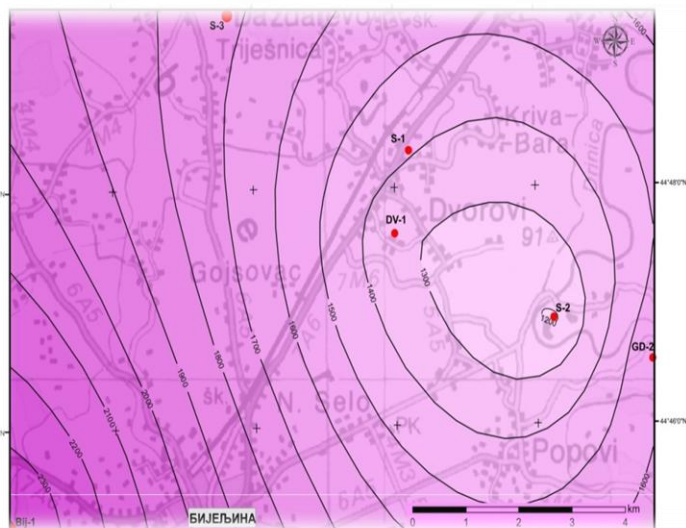
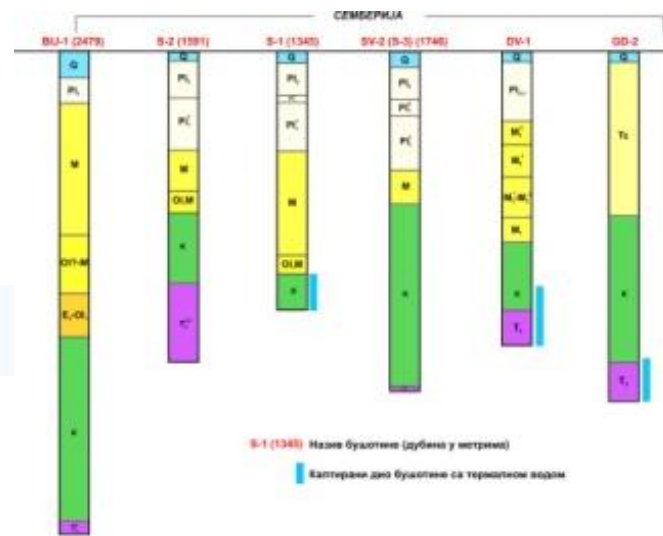
Main deep geothermal reservoirs



Location of the main reservoirs Semberija



200 km² / 6 boreholes
Each > 1350 m



ЛЕГЕНДА

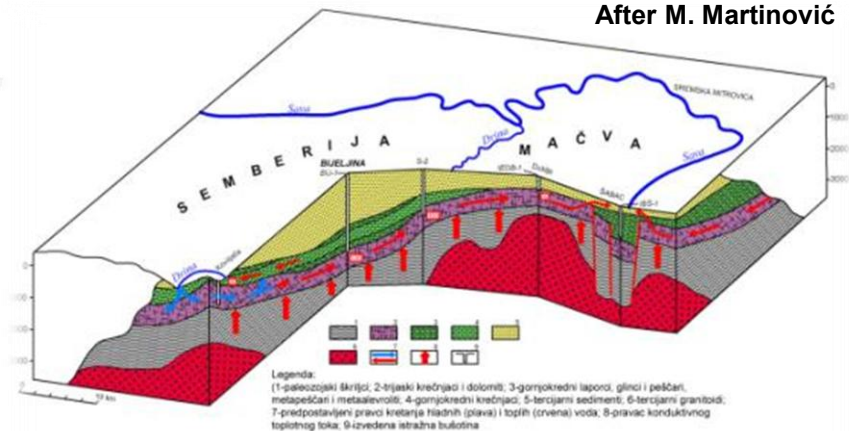
S-1 ● Дубока бушотина

300 — ИЗОЛИНИЈА ДУБИНЕ ПОВЛАЧЕ ТРИЈАСКИХ СЕДИМЕНАТА

Дубина до повлаче тријаских седимената

1.192 - 1.200
1.200 - 1.300
1.300 - 1.400
1.400 - 1.500
1.500 - 1.600
1.600 - 1.700
1.700 - 1.800
1.800 - 1.900
1.900 - 2.000
2.000 - 2.100
2.100 - 2.200
2.200 - 2.300
2.300 - 2.400
2.400 - 2.500

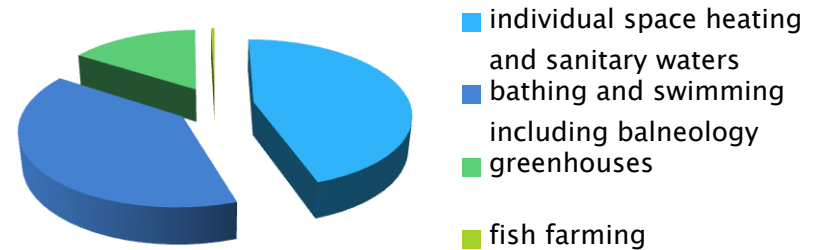
After M. Martinović



Main types of current utilization of geothermal energy

Direct heat

The second most important kind of direct use of thermal waters in B&H.



| | | | |
|--------------------------|--------------|-------------------------------|----------------------------------|
| Individual space heating | | 31.70 GWh _{th} /year | in 5 spas, by heat exchangers |
| Agriculture | Greenhouses | 10.94 GWh _{th} /year | 10 months/year |
| | Fish farming | 0.31 GWh _{th} /year | one locality, during cold period |
| TOTAL | | 42.95 GWh _{th} /year | |

Main types of current utilization of geothermal energy

Electricity

➤ Without production of electricity based on geothermal energy, without planned plants in the appropriate energy strategies.

➤ Balneology

The most important/frequent use of thermal waters in Bosnia and Herzegovina. More than 20 spas with thermal water, $T=17.5-75^{\circ}\text{C}$.

The total geothermal energy used for bathing and swimming is estimated at $27.67 \text{ GWh}_{\text{th}}/\text{yr}$.

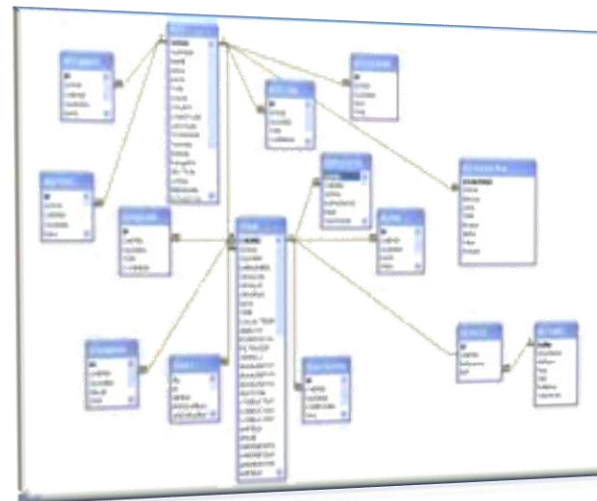


Data collection

There is no one institution officially responsible for data collection.

Available:

- database of thermal springs and boreholes
- data on thermal water reserves and use
- temperature data in the subsurface
- thermal spring analyses
- map of granitic formations
- borehole logs
- geophysical survey etc.



Organisations managing with these data:

- Geological Survey of the Republic of Srpska (responsible for GeolIS in the Republic of Srpska)
- Geological survey of the Federation of B&H (responsible for GeolIS in the Federation of B&H)
- Ministry of industry, energy and mining of the Republic of Srpska
- Ministry of energy, mining and industry of the Federation of B&H
- Jadran Naftagas Banja Luka, INA Zagreb...

Formats:

- Mostly in GIS database

Publicity:

- Mostly not in public domain

Main stakeholders of geothermal projects

- Ministry of industry, energy and mining of the Republic of Srpska
- Ministry of energy, mining and industry of the Federation of B&H
- Geological Survey of the Republic of Srpska
- Geological survey of the Federation of B&H
- Commissions for concession, in both entities
- Spas and their associations
- Private companies:
 - Slobomir Bijeljina,
 - Mannvit Banja Luka,
 - Geoterm Bijeljina
 - Termal riviera Ilidža
 - Inner Gradačac
 - Vega fruit etc.



THANK YOU FOR ATTENTION !!!