

Geothermal Exploration in Greece

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Geothermal exploration in Greece

Started in the 70's by IGME, PPC for high enthalpy fields for power generation

Extended to low enthalpy fields in the 80's for agricultural applications

Geological mapping
 Geochemical investigation
 Schlumberger resistivities
 Shallow boreholes

⇒ many areas of geothermal interest all over the country



Milos island

Active hydrothermal system
maintained by Pleistocene
volcanic activity

Reservoir fluid

310-323°C boiled
seawater at 1-5 km

Geology

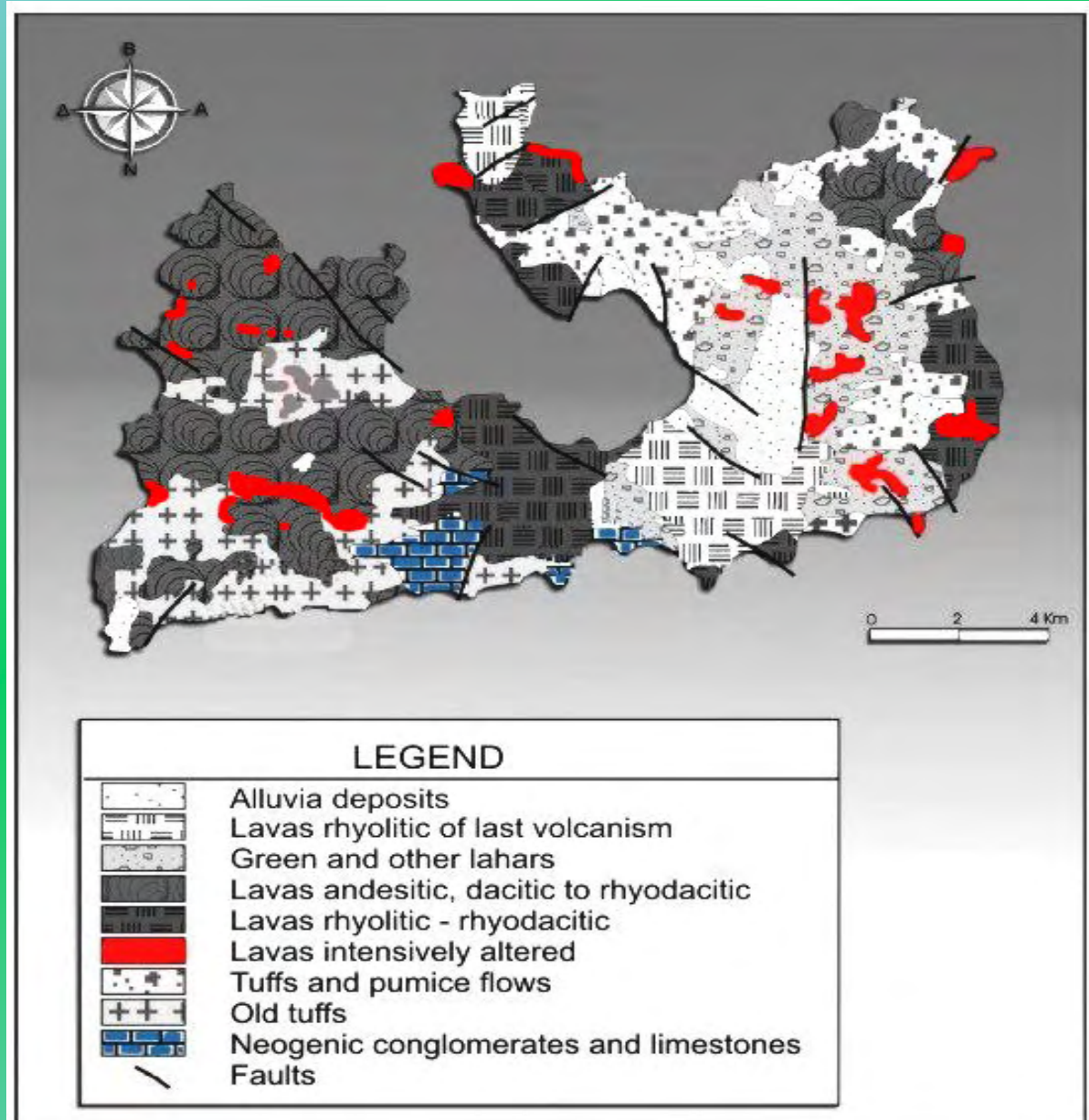
Alluvia / volcanic products
Altered tuffs
Neogene sediments
Metamorphic basement

Methodology

Geological mapping
Thermal manifestations
Geochemical investigation
Schlumberger resistivities
Shallow boreholes
Five deep wells

Applications

A few houses / hotels



Santorini island

Active hydrothermal system maintained by Holocene and recent volcanic activity

Reservoir fluid

High enthalpy boiled seawater at 1+ km

Geology

Volcanic products
Metamorphic basement (limestones)

Methodology

Geological mapping
Thermal manifestations
Geochemical investigation
Schlumberger resistivities
Gravity / magnetic survey
A few shallow boreholes

Applications

none



Nisyros island

Active hydrothermal system maintained by Pleistocene volcanic activity

Geology

Volcanic products
Metamorphic basement (limestones)

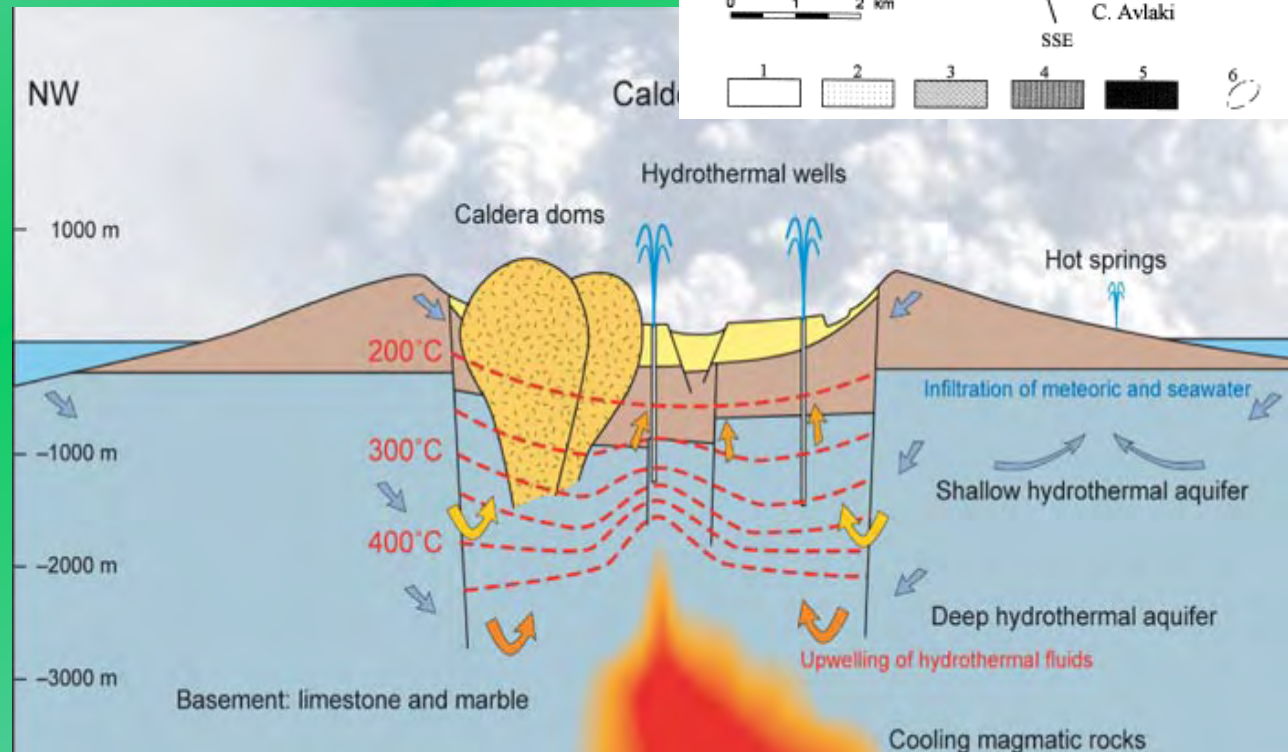
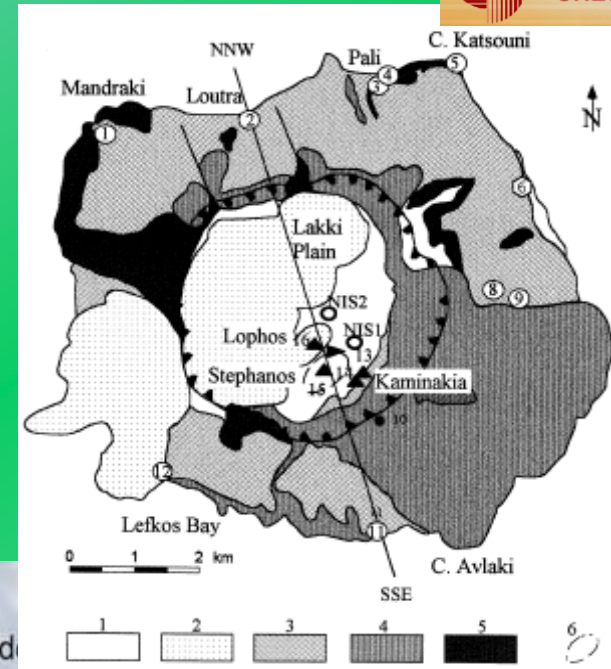
Methodology

Geological mapping
Thermal manifestations
Geochemical investigation
Schlumberger resistivities
Two deep wells

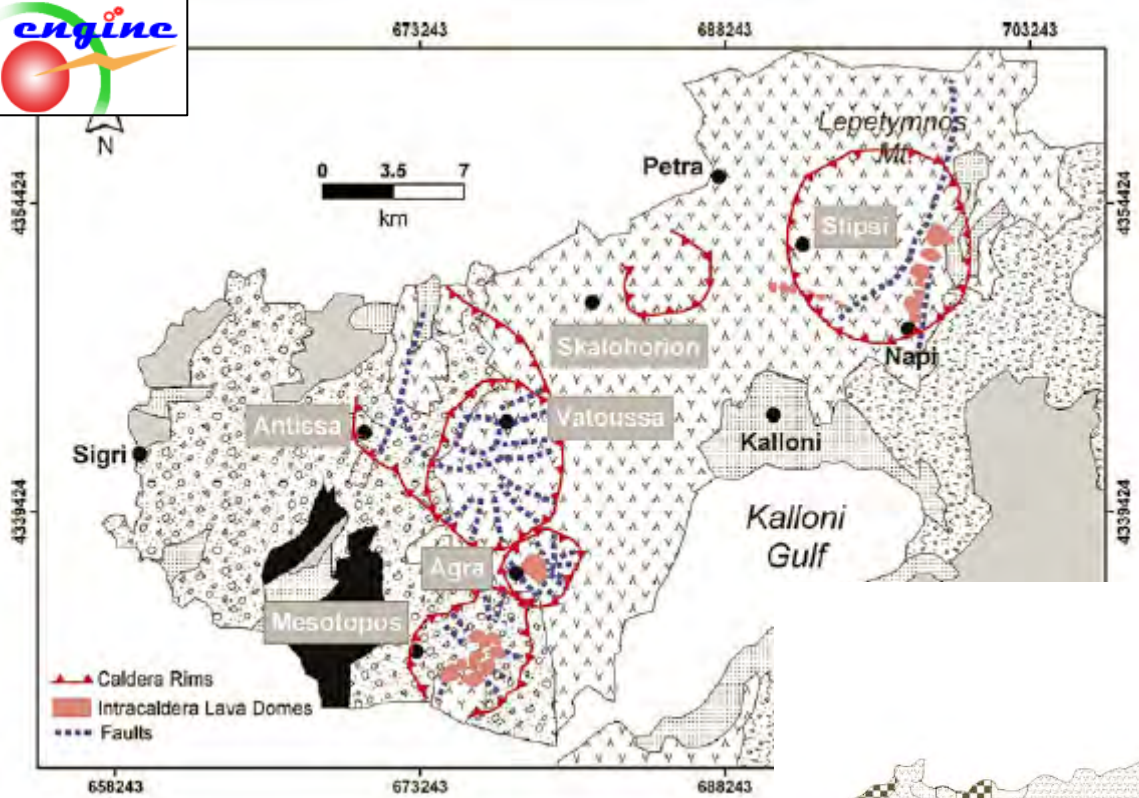
Applications

none

Reservoir fluid
250-350°C boiled seawater at 1-2 km
100-150°C at shallow depth



Nisyros conceptual model by Swiss Federal Institute of Technology (ETHZ)

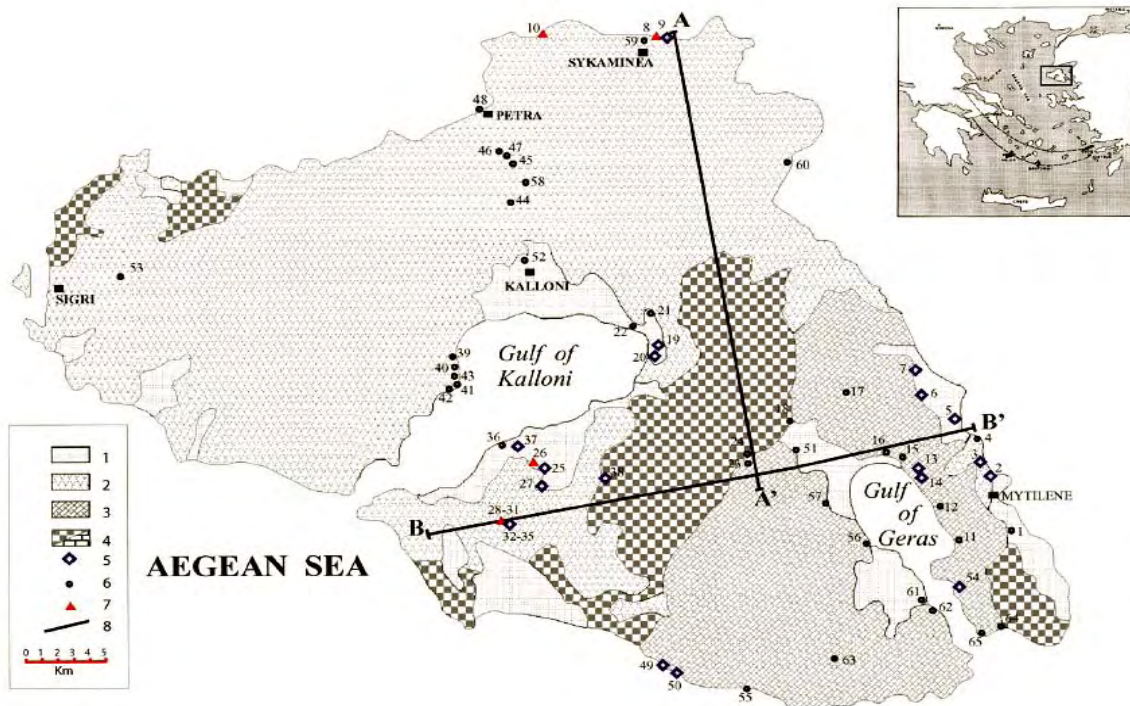


Lesvos island

Medium enthalpy hydrothermal systems heated by Miocene volcanism

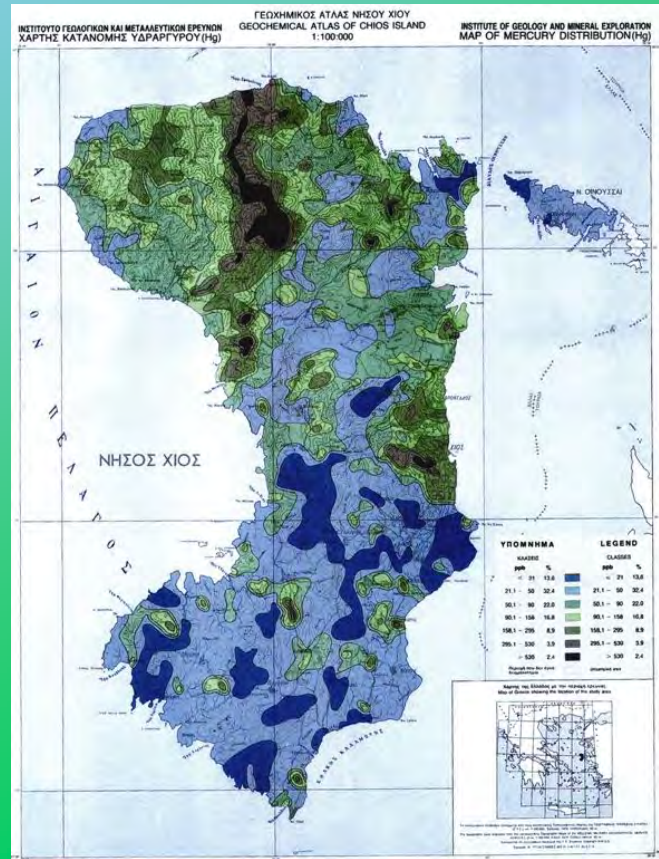
Reservoir fluid
100-120°C saline water at 1+ km

- Methodology
- Geological mapping
- Thermal manifestations
- Geochemical investigation
- Shallow boreholes
- Deeper drilling
- Applications
- Greenhouses & spas



- (1) Pliocene-Quaternary marine and continental sediments, (2) Miocene volcanic rocks, (3) ophiolitic basement, (4) carbonate-phyllite basement, (5) cold water, (6) thermal water, (7) thermal water with associated gas phase

Chios island

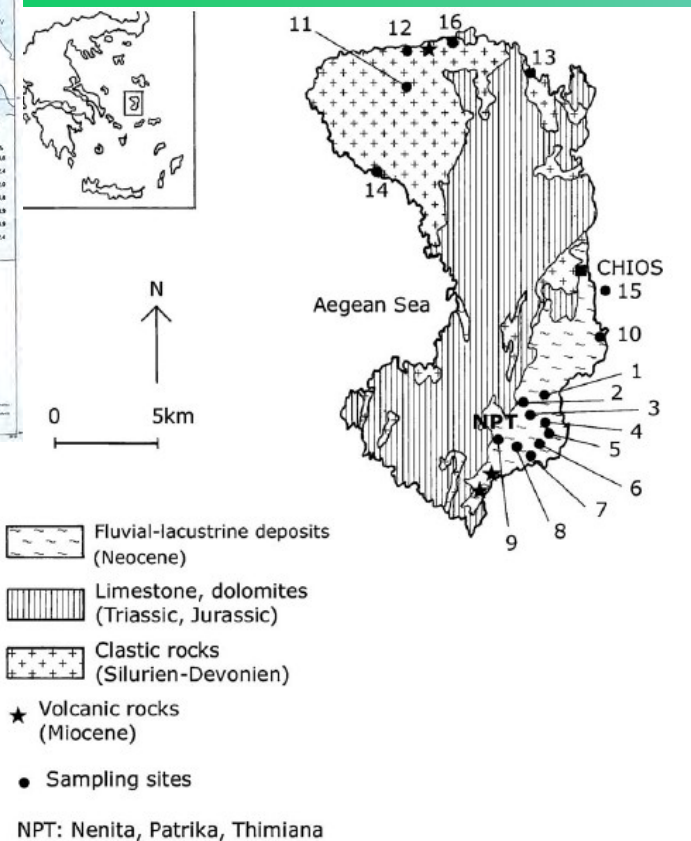


Medium enthalpy hydrothermal systems heated by Miocene volcanism

Reservoir fluid
140-150°C boiled seawater

Methodology
Geological mapping
Thermal manifestations
Geochemical investigation

Applications
none



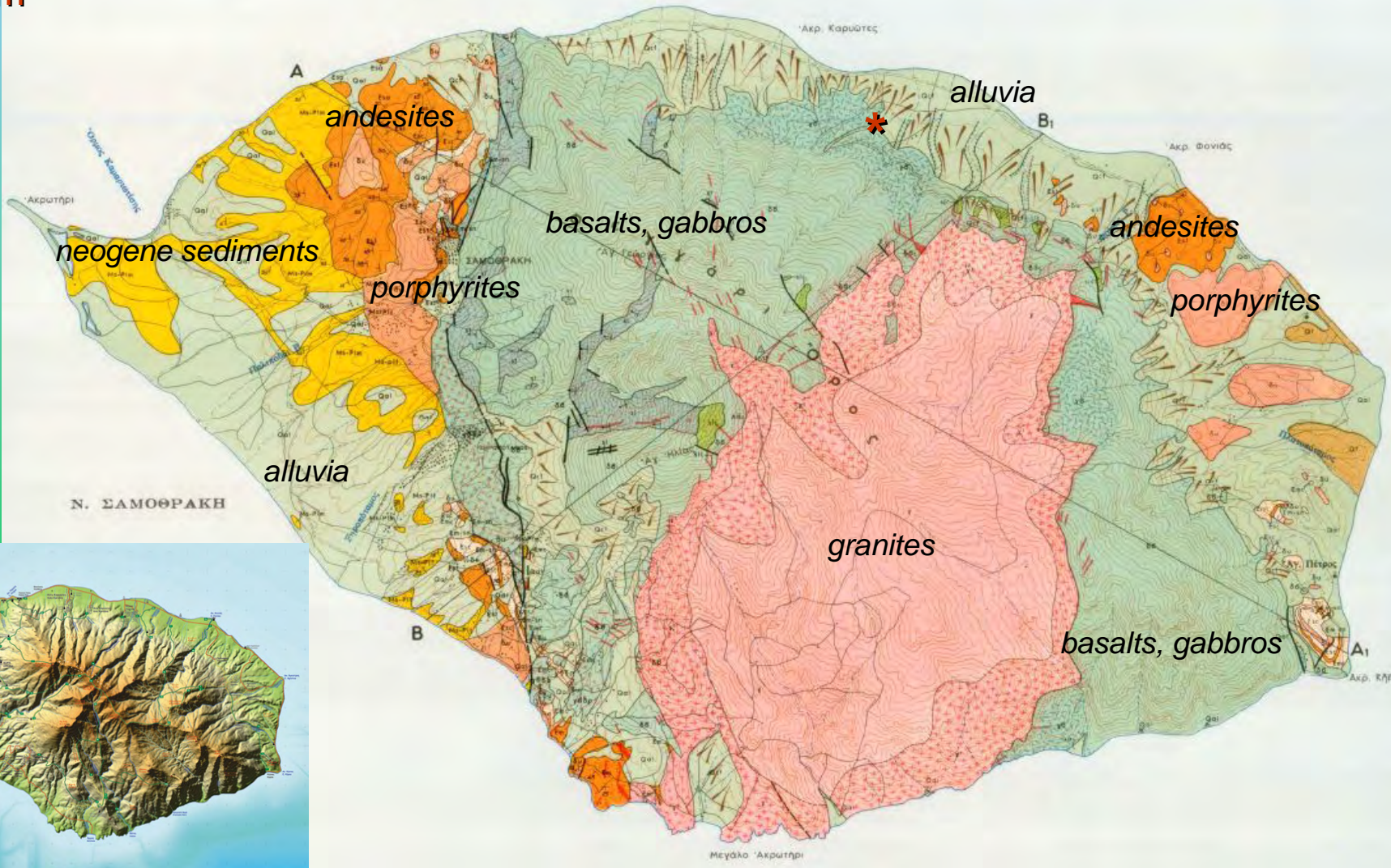
Samothraki island

Medium enthalpy hydrothermal systems heated by Miocene volcanism

Reservoir fluid
>100°C saline water

Methodology
Geological mapping

Applications
spas



Alexandroupolis Basin

High heat flow basin (Oligocene / lower Miocene volcanism)

Reservoir fluid

120-140°C meteoric water at 1,5-2 km

<u>area/well</u>	<u>depth</u>	<u>°C</u>
Aristino	: 200-465	30-92
Tychero	: 400	38

Methodology

- Geological mapping
- Thermal manifestations
- Geochemical investigation
- Shallow boreholes

Applications

- Spas & space heating



Nestos Basin and Xanthi/Komotini Basin

High heat flow basins

Reservoir fluid

120-150°C meteoric water at 2-3 km

<u>area/well</u>	<u>depth</u>	<u>°C</u>
N.Kessani	: 300-400	75-80
Sappes	: 250-400	38-40
L.Mitrikou	: 450	40
Magana	: 200-400	40-65
Eratino	: 550-650	65-75
	1700	115
	3000-4000	127-178

Applications

Greenhouses, soil heating, fish farming, space heating & spas

Methodology

Geological mapping

Thermal manifestations

Geochemical investigation

Local Schlumberger Resistivities

Shallow boreholes



Strymon Basin

High heat flow basin

Reservoir fluid

100-140°C meteoric water at 3-4 km

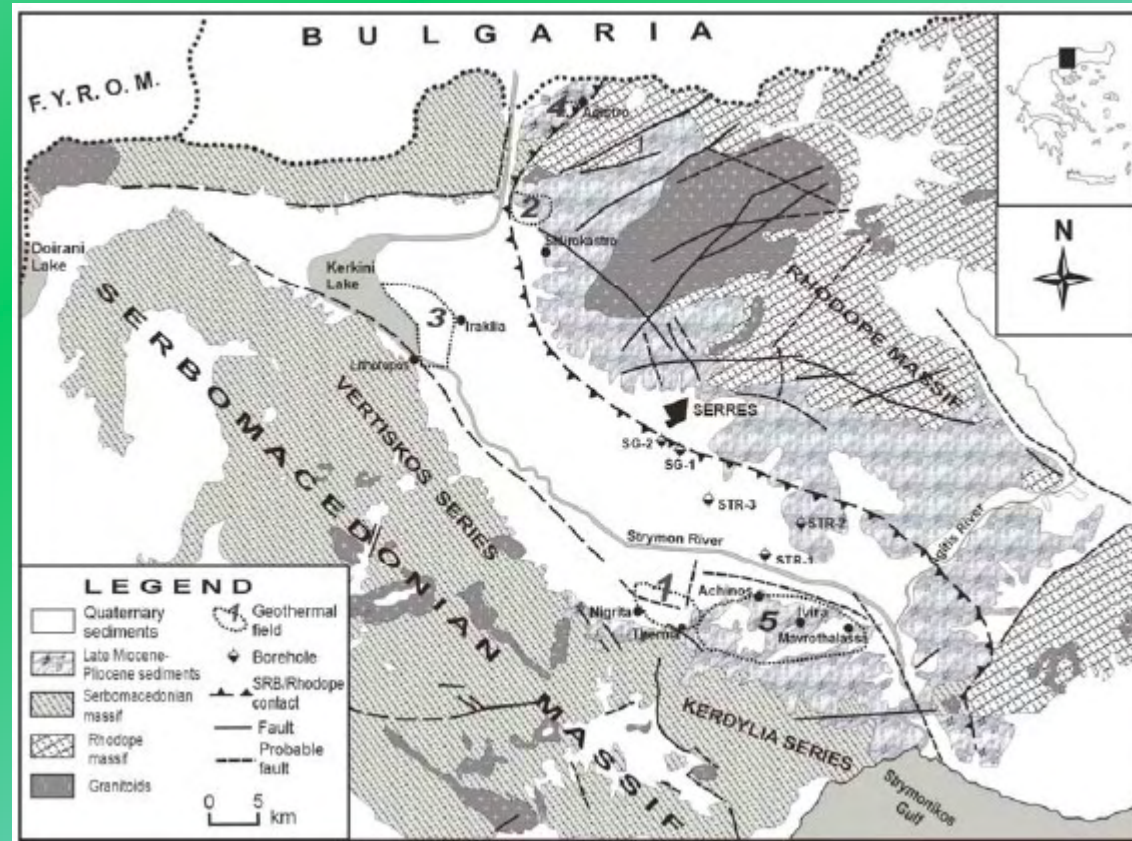
Methodology

- Geological mapping
- Thermal manifestations
- Geochemical investigation
- Shallow boreholes

<u>area/well</u>	<u>depth</u>	<u>°C</u>
Agistro	: 70-130	40-47
Sidirokastro	: 10-450	40-65
Iraklia	: 300-450	40-62
Nigrita	: 100-400	40-65
Ivira	: 450-550	40-50
SG-1&2	: 500	20
STR-2&3	: 2678-3144	89-96
STR-1	: 2884-3651	106-135

Applications

Greenhouses, agricultural & spas



Other Basins

High heat flow basins

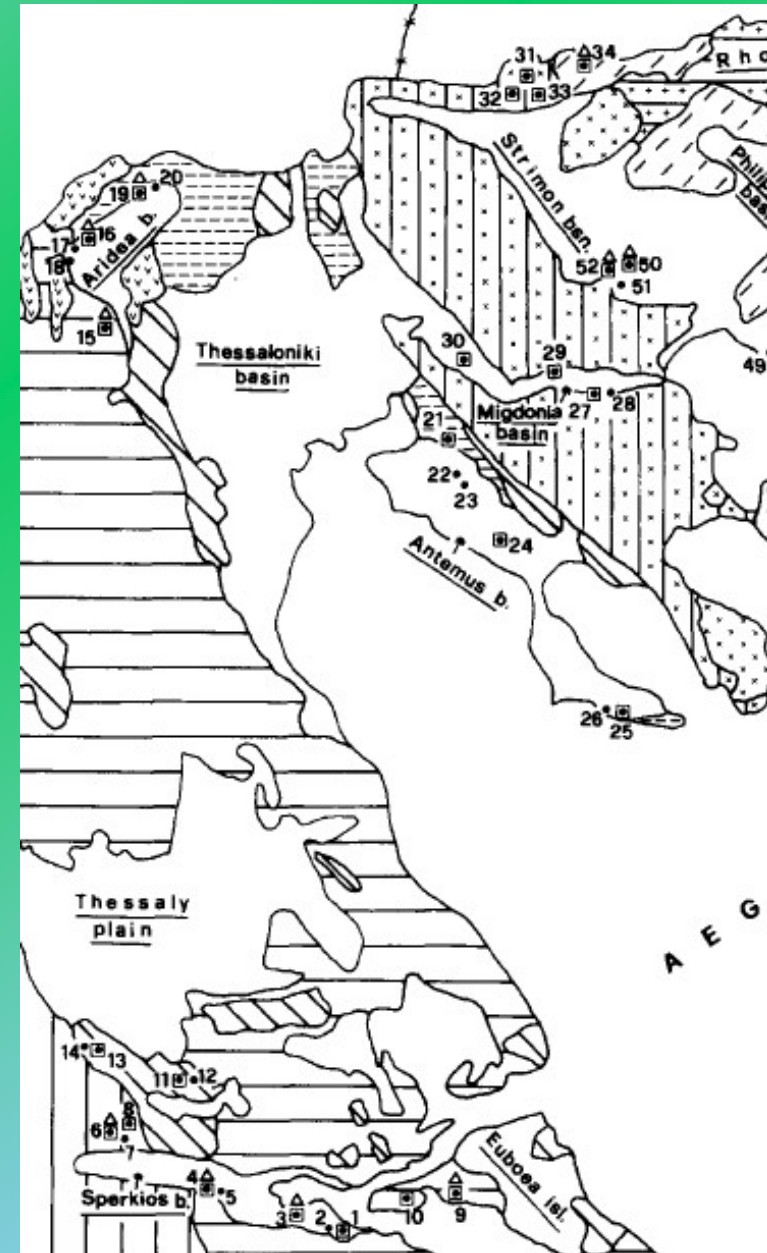
<u>Basin</u>	<u>SiO₂ or K/Mg temperature</u>
Mygdonia	80-100 °C
Anthemous	100-130 °C
Aridea	60-85 °C
Sperchios	80-120 °C

Methodology

- Geological mapping
- Thermal manifestations
- Geochemical investigation
- Shallow boreholes

Applications

- Spas & greenhouses



Thank you for your attention