WASTE RECYCLING AND ENERGY PRODUCTION

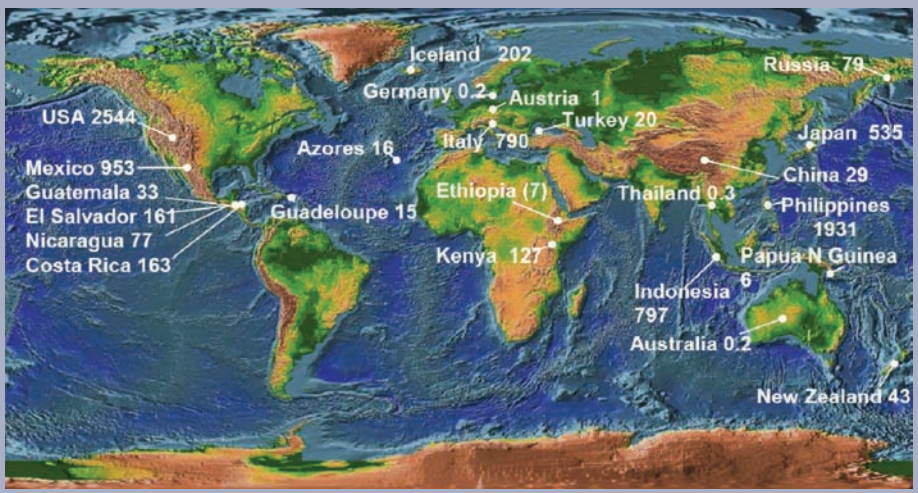
Geothermal Energy

amra

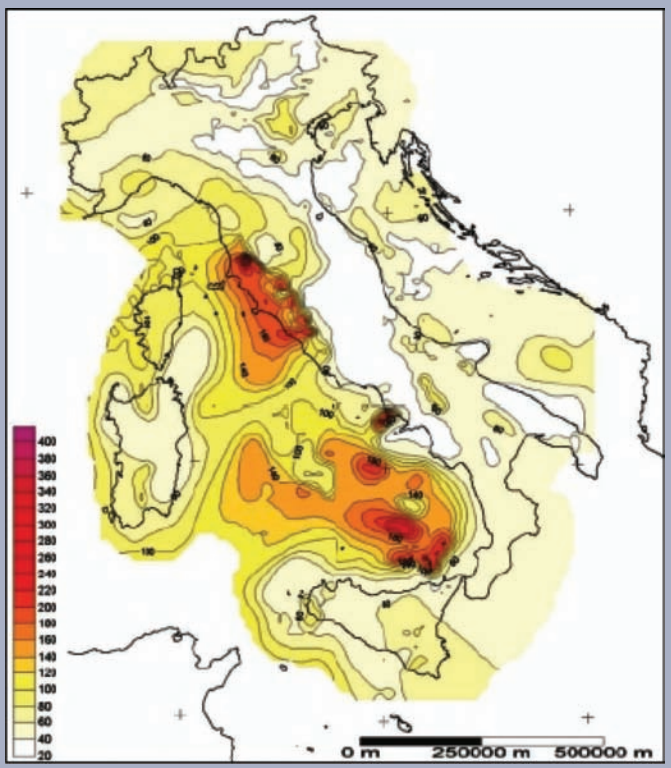
analysis and monitoring of environmental risk

AMRA ACTIVITIES

Geothermal energy is a renewable energy sources exploiting the matter and energy flows that already exist in nature under undisturbed conditions. An important objective for AMRA is the improvement of the exploitation of this energy resource, availing of the experience existing in Italy where geothermal fields are exploited since many decades and numerous areas with non negligible potentiality are present (in figure the world geothermal energy production in MWe).
AMRA's experts have a large experience also in central America having contributed to geothermal exploitation for electrical energy production in Guatemala, El Salvador, Nicaragua and Costa Rica.



In Italy, the geothermal source is concentrated mainly on Tyrrhenian Coast (as shown in figure below).
The elevated geothermal potential of the Campanian territory, concentrated in the island of Ischia and in the volcanic area of the Phlegrean Fields, provides the opportunity for AMRA to contribute to the development of new technologies for the exploitation of the geothermal energy, transforming a natural threat into chances of development and promoting actions of technological transfer to the industrial sector.
The geothermal production needs to be always submitted to true evaluations of environmental impact. AMRA plans actions to reduce the connected risks and the environmental and sanitary impacts, to extremely low values.



MAIN OBJECTIVES

AMRA studies of geothermal resource include:
- structure reconstruction by seismic investigation;
- development of new technologies for the exploitation of the geothermal energy;
- promoting actions of technological transfer to the industrial sector;
- minimizing the environmental impact of geothermal production;
- development of new technologies for the exploitation of low enthalpy systems in agricultural, zootechnical, industrial and thermal framework.

MAIN PROJECTS

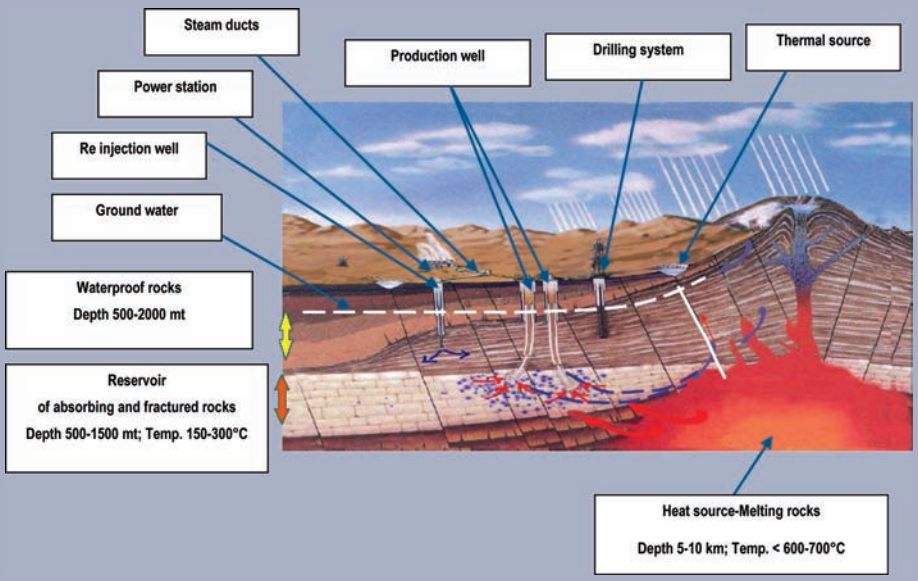
EC FP7-ENERGY-2009

GEISER, Geothermal Engineering Integrating Mitigation of Induced Seismicity in Reservoirs.

The project is aimed at the establishment of a procedure to realise the goals of enhancing geothermal systems with a reliable concept for the mitigation of induced seismicity.

This concept will ensure that geothermal energy can reach its full efficiency and profitability thresholds at the European scale.

The project aims to bridge the gap between the scientific development of advanced exploration technologies and the application of operational services.

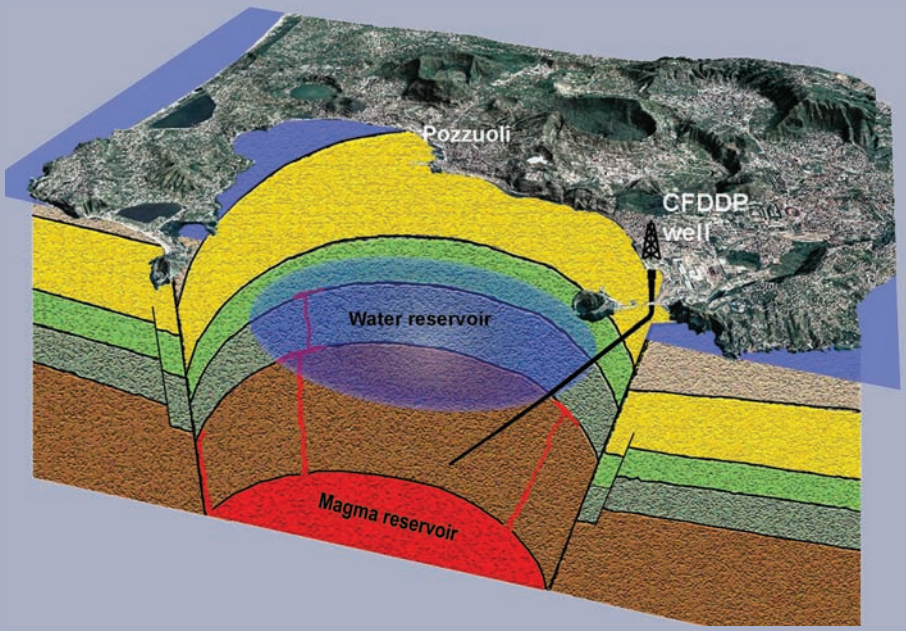


INTERNATIONAL CONTINENTAL SCIENTIFIC DRILLING PROGRAM

Campi Flegrei Deep Drilling Project.

The main aim of the project is to drill a 4000 m deep borehole crossing the main geothermal reservoirs in order to:

– evaluate the geothermal potential and the possible implementation of a geothermal power plant as a pilot project in the city of Napoli;
– define the volcanic structures associated eruptive potential of the Campi Flegrei Volcano (depth of magma, mechanism of bradyseism phenomena, etc.).



MAIN SCIENTIFIC PAPERS

C. Troise, F. Pingue, G. De Natale
Coulomb stress changes at calderas: modeling the seismicity of Campi Flegrei (Southern Italy)
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G. De Natale, C. Troise, F. Pingue
A mechanical fluid-dynamical model for ground movements at Campi Flegrei caldera
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F.S. Gaeta, G. De Natale, F. Peluso, G. Mastrolorenzo, D. Castagnolo, C. Troise, F. Pingue, D.G. Mita, S. Rossano
Genesis and evolution of unrest episodes at Campi Flegrei caldera: the role of the thermal fluid-dynamical processes in the geothermal system
Journ. Geophys. Res., 103, B9, 20921- 20933, 1998

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A model for earthquake generation during unrest crises at Campi Flegrei and Rabaul calderas
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G. De Natale, A. Zollo, A. Ferraro, J. Virieux
Accurate faulting mechanisms of a 1984 earthquake swarm at Campi Flegrei caldera (Italy), during an unrest episode: implications for for volcanological research
Journ. Geophys. Res., 100, B12, 24167-24185, 1995

G. De Natale, F. Pingue
Ground deformations in collapsed caldera structures
Journ. Volcan. Geotherm. Res, 57, 19-38, 1993

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