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Deep geothermal resources and energy: Current research and developments

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Energy from deep geothermal resources plays an increasing role in many European countries in their efforts to increase the proportion of renewables in their energy portfolio. Deep geothermal heat and electric power have a high load factor, are sustainable and environmentally friendly. However, the safe, sustainable, and economic development of deep geothermal resources, also in less favourable regions, faces a number of issues requiring substantial research efforts: (1) The probability of finding an unknown geothermal reservoir has to be improved. (2) Drilling methods have to be better adapted and developed to the specific needs of geothermal development. (3) The assessment of the geothermal potential should provide more reliable and clear guidelines for the development. (4) Stimulation methods for enhanced geothermal systems (EGS) have to be refined to increase the success rate and reduce the risk associated with induced seismicity. (5) Operation and maintenance in aggressive geothermal environments require specific solutions for corrosion and scaling problems. (6) Last but not least, emerging activities to harness energy from supercritical reservoirs would make significant progress with qualified input from research.

In particular, sedimentary basins like e.g. the North German and Polish Basin, the Pannonian Basin, the Po Valley, the Bavarian Molasse Basin or the Upper Rhine Graben have a high geothermal potential, even if geothermal gradients are moderate. We will highlight projects that aim at optimizing exploration, characterization, and modeling prior to drilling and at a better understanding of physical, hydraulic and chemical processes during operation of a geothermal power plant. This includes geophysical, geological and geochemical investigations regarding potential geothermal reservoirs in sedimentary basins, as well as modelling of geothermally relevant reservoir parameters that influence the potential performance and long-term behavior of a future geothermal power plant.

In our overview we will also highlight contributions of EGU2012-sessions ERE1.6 (Geothermal energy from deep sedimentary basins – exploration, exploitation, characterization and modeling) and ERE1.7 (Development of deep geothermal resources).