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Updated Assessment of Geothermal Resources in Brazil

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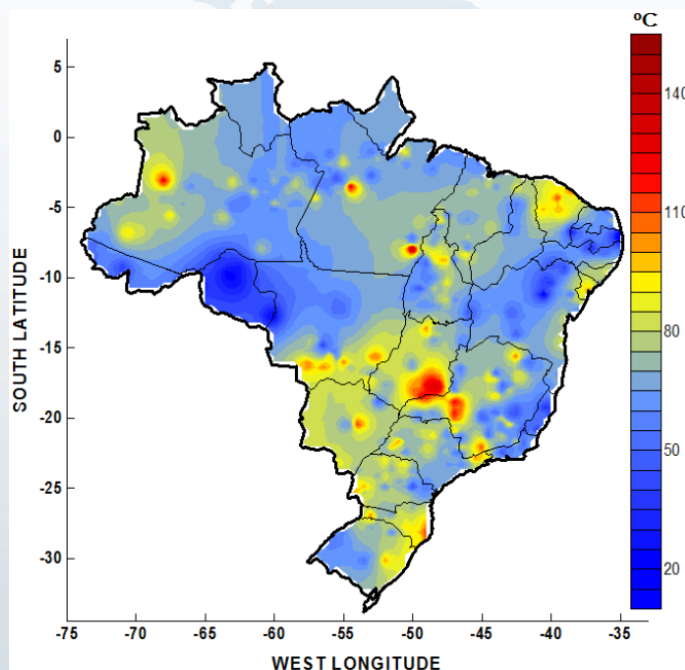
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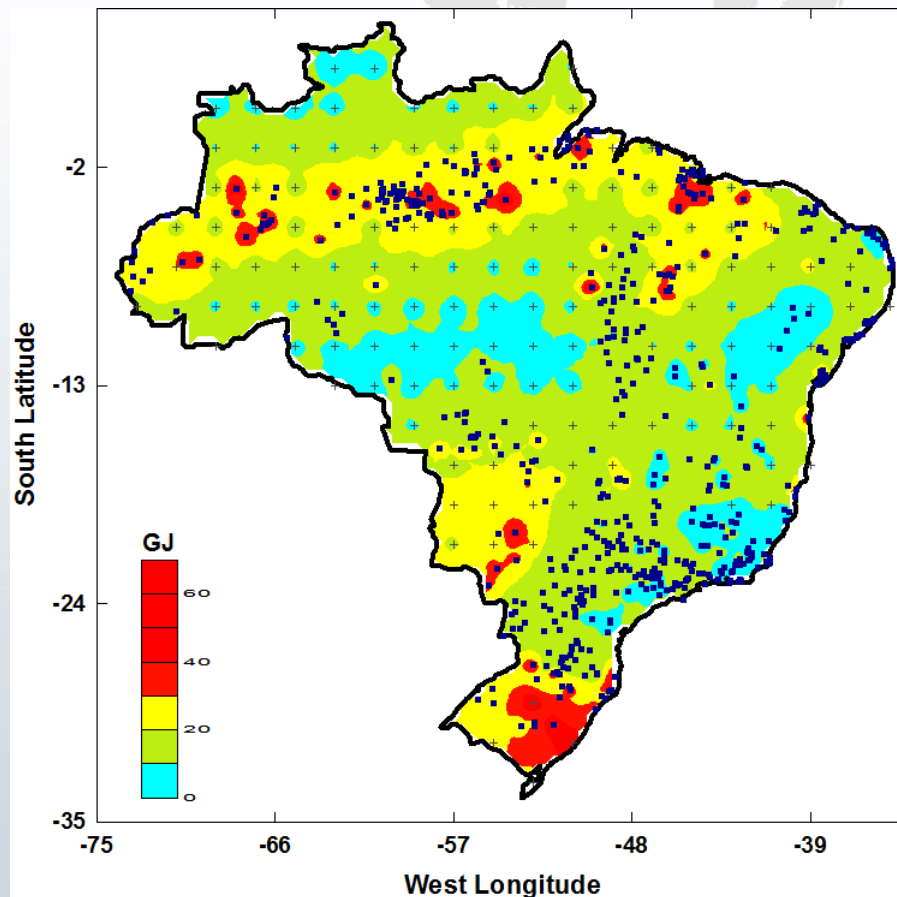




- Electricity matrix in Brazil is over 79% from renewables of which 86% from hydroelectricity;
- Assessment of Geothermal resources for Brazil based on data acquired at over 1,100 sites;
- A significant low temperature geothermal anomaly has been discovered in the Eastern part of Tocantins;
- Nevertheless, potential for high temperature geothermal systems appears to be restricted only to the Atlantic island of Fernando de Noronha and Trindade;
- The total capacity of low temperature geothermal systems under economic exploitation is estimated at 365 MWt, while the annual energy use is estimated to be of the order of 6,540 TJ;
- About a dozen of the spring systems account for the bulk of this capacity. Most of them are located in west central Brazil (in the states of Goiás and Mato Grosso) and in the south (in the state of Santa Catarina);
- The potential for large scale exploitation of low temperature geothermal water for industrial use and space heating is considered to be significant in the central parts of the Paraná basin, where cold winter seasons prevail under subtropical climate conditions.



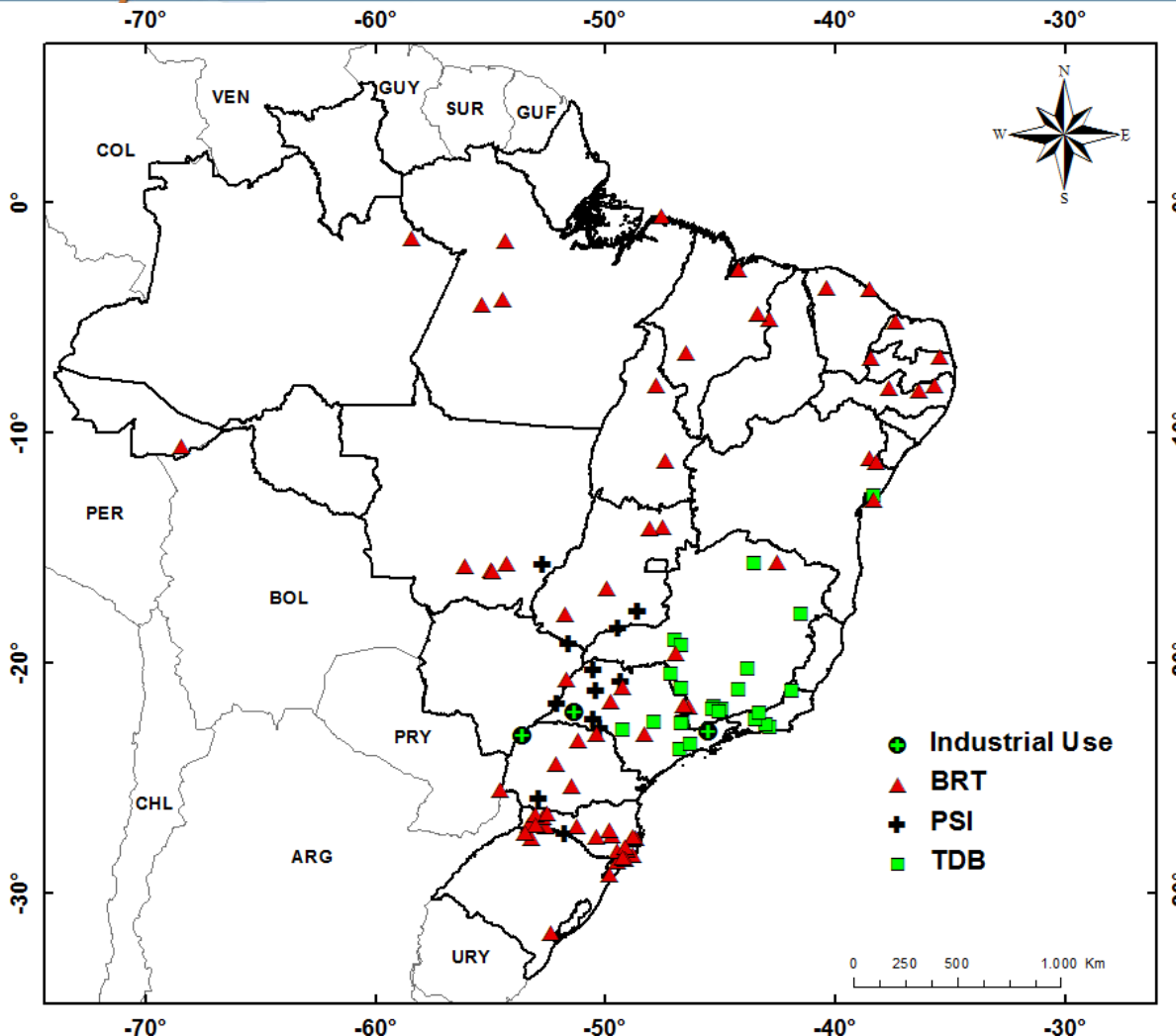
Map of excess temperatures referred to depth of 3 km



Map of recoverable resource (in GJ) referred to depth of 3 km. Dots are the the locations of geothermal studies.

recoverable resource is that part of the resource base associated with pore fluids that can be extracted using current technology.

Locations of major thermal spring systems in Brazil

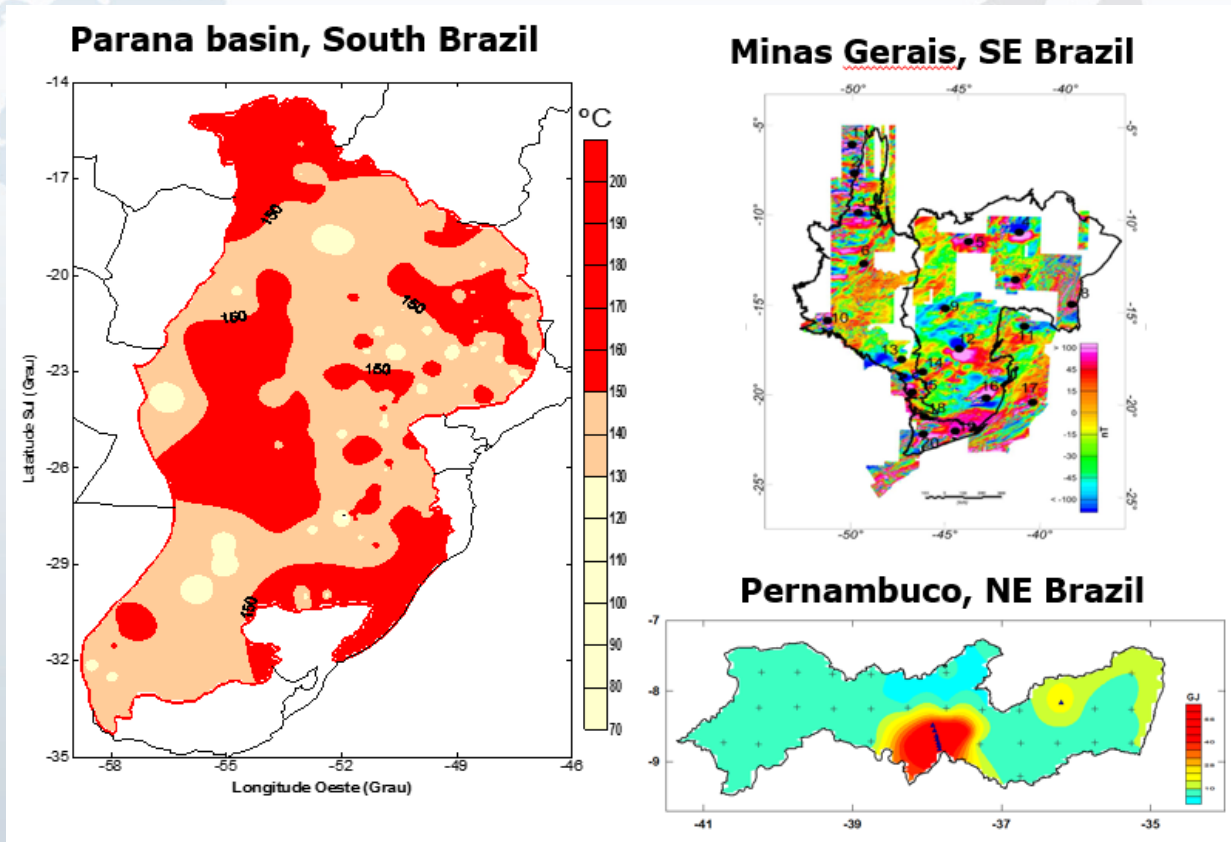


BRT (Bathing, Recreation and Tourism)

PI S (Potential for Industrial use and Space Heating)

TDB (Therapeutic, Drinking and Bathing)

Future perspectives (medium enthalpy)



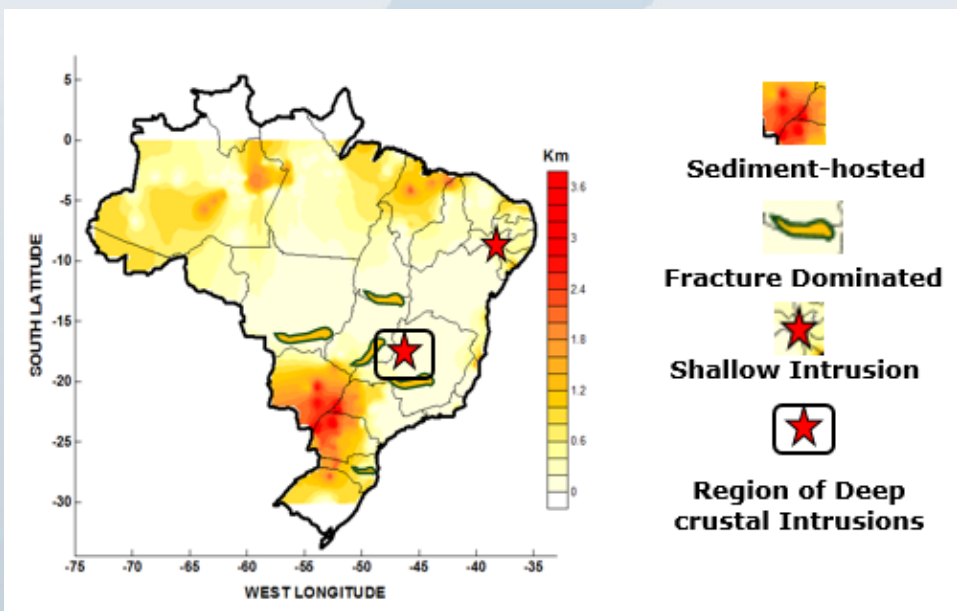
Possible localities of medium enthalpy geothermal resource at depths greater than 5km.



Conclusions

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- 1. The resource base of Brazil, referred to the selected depth of 3km, is estimated to be of the order of 10^{24} J.
- 2. The recoverable part of resource base is estimated to be of the order of 10^{22} J. The deeper parts of the Paleozoic sedimentary basins account for 90% of it.
- 3. Most of identified resources are of low enthalpy type, with temperatures less than 100°C.
- 4. There are, however, indications of medium to high enthalpy resources at depths greater than 5km in southern and northeastern parts of Brazil.



Thicknesses of reservoirs in locations suitable for exploitation of geothermal resources within the Brazilian territory. It includes central parts of Paleozoic sedimentary basins (yellow and red shaded areas) and layers of relatively high fracture density in the upper crust (orange shaded areas with blue borders). Also indicated are locations of shallow and deep crustal magmatic intrusions.

**For more information
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