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Assessment of Medium- to Low-Temperature Mexican Geothermal Resources

Eduardo R. Iglesias, Rodolfo J. Torres, J. Ignacio Martínez-Estrella and Neftalí Reyes-Picasso
Instituto de Investigaciones Eléctricas, Geothermal Department

Abstract

In 2003 we published our first assessment of the medium- to low-temperature (T $\leq$ 200°C) Mexican geothermal resources. It was based on a database of 1,358 geothermal manifestations (surface manifestations, e.g. springs, fumaroles, water wells, etc.) identified at that time. Due to lack of information on one or more relevant parameters, such as geographical coordinates, reservoir or surface temperature, type of fluid, etc., that assessment included only about 30% of the geothermal manifestations in the database. Since then our group significantly increased the amount of information in the database by field work and data compilation from different sources, developed a relational database and linked it with a Geographical Information System. This work presents an updated assessment of the medium- to low-temperature Mexican geothermal resources based on our current database which includes 2,361 geothermal manifestations. As before, we relied on the volume method and Montecarlo simulations to estimate geothermal resources and their uncertainties for each identified geothermal system. These geothermal systems very often include more than one geothermal manifestation, generally increasing the reliability of the individual estimations. In all, we estimated the geothermal resources of 918 individual geothermal systems which included 1,797 geothermal manifestations (as before, a significant fraction of the identified manifestations lacked relevant information) located in 26 of the 32 Mexican States. In most cases these resources would be classified as "inferred resources", according to the Australian Geothermal Code. We then added the inferred thermal energy statistical distributions of the 922 geothermal systems by Montecarlo simulation, to obtain the total estimable geothermal resources of the 26 Mexican States and its uncertainty. With the resulting statistical distribution we estimated that the total thermal energy stored in the 922 geothermal systems lies between 1,168 EJ and 1,274 EJ with 90% confidence. The statistical distribution of the (conservatively) inferred reservoir temperatures indicates that 5% of these systems have temperatures between 151 and 208 °C, 40% of these systems have temperatures between 102 and 151 °C, 50% of these systems have temperatures between 60 and 102 °C and 5% of these systems have temperatures between 36 and 60 °C. These resources contain massive amounts of thermal energy that could be used in a wide variety of direct applications and power generation. They are potentially important for the economy of 26 of the 32 Mexican States.