



HAL
open science

Contribution of multi-methods geophysics to improve the regional knowledge of Bouillante geothermal Province (Guadeloupe)

Lydie-Sarah Gailler, Vincent Bouchot, Jean-Michel Baltassat, Nicolas Coppo,
Bernard Bourgeois, Guillaume Martelet, Isabelle Thinon

► **To cite this version:**

Lydie-Sarah Gailler, Vincent Bouchot, Jean-Michel Baltassat, Nicolas Coppo, Bernard Bourgeois, et al.. Contribution of multi-methods geophysics to improve the regional knowledge of Bouillante geothermal Province (Guadeloupe). 19ème Conférence géologique de la Caraïbe, Mar 2011, Le Gosier, Guadeloupe, France. pp.104. hal-00607181

HAL Id: hal-00607181

<https://brgm.hal.science/hal-00607181>

Submitted on 8 Jul 2011

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Session: Geothermal Research – Volcanology

Oral presentation

**Contribution of multi-methods geophysics to improve the regional knowledge of
Bouillante geothermal Province (Guadeloupe)**

Lydie Gailler¹, Vincent Bouchot¹, Jean-Michel Baltassat¹, Nicolas Coppo¹, Bernard Bourgeois¹, Guillaume Martelet¹, Isabelle Thinon¹

¹ BRGM, 3 avenue Claude Guillemin, 45060 ORLEANS LA SOURCE

Corresponding author: l.gailler@brgm.fr

The need to understand the geological context of the Bouillante geothermal Province (Basse-Terre, Guadeloupe, French West Indies) has led to numerous onshore and offshore geophysical investigations. This work presents a compilation of all available, subaerial and marine, gravity and magnetic, electric and magnetotelluric data acquired during the last 30 years.

Oldest electric and magnetotelluric data were digitalized from manuscripts (area of interest from Mahaut to Basse-Terre). Although we faced different problems related to missing acquisition parameters, we partially reconstruct MT tensors to provide a qualitative interpretation of resistivity distribution at depth. The previous interpretations have been improved and evidenced well developed conductive anomalies overlying more resistive ones at the location of, but also beyond, the geothermal field area.

The large-scale gravity signal (from Montserrat to La Dominique) is used to explore existence and geometry of deep dense intrusive complexes beneath La Soufrière and the Bouillante Chain (if existing) volcanoes which could be interpreted as heat sources for the geothermal systems. Modelling has been initiated to constrain the geometry of such structures together with the distribution of more or less dense products both onshore and offshore.

Because Guadeloupe volcanism spars the Brunhes-Matuyama geomagnetic reversal (0.78 Ma), analysis of magnetic anomalies highlight areas predominantly composed of formations either younger or older than the reversal. Modeling is used to reconstruct a generalized topography of the island at 0.78 Ma. The detailed analysis of the offshore magnetic lineaments will be tentatively used to understand the inheritance of the lithosphere structure in the island evolution.

An updated large-scale model of the geothermal system will be proposed based on geological constraints and previous geophysical interpretations. This synthesis could act as a guide in the implantation of upcoming surveys in order to better constrain the Bouillante geothermal Province, and to improve the knowledge the island evolution as a whole.

This post-doctoral study is carried out in the framework of a "Carnot institute" labeled project.