# Study and Modeling of Pressure and Temperature during a Geyser Eruption

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The purpose of this project is to understand geysers better and to predict aspects of their behavior. The existing literature on the subject provides explanations for how they work, but does not offer mathematical models for all their eruptive phases. In particular, no detailed analysis could be found of the overpressure measured at the beginning of each eruption, the following depressurization and refilling of the geyser reservoir. This research investigates them and submits mathematical models for the pressure and temperature inside the geyser cavity during their eruptions. In order to study the behavior of geyser eruptions, a reduced-scale geyser model was realized with a pressure cooker and plumbing material. Sensors inside the pressure cooker were used to plot graphs of temperature and pressure versus time. Eight phases were identified as part of an eruption cycle and special attention was paid to the factors which determine the overpressure, depressurization and refilling phases. Several components of the experiment were modified, including the height of the vent (2 and 6 meters) and the depth of the cavity (from 2 to 15 centimeters). This project offers a modeling that predicts and explains the pressure and the temperature variations during eruptions. The mathematical models created were validated by the experimental data that were recorded. This work aims at understanding the eruption of geysers, in terms of pressure and temperature versus time. The mathematical models produced can contribute to predicting real geyser eruptions. Understanding how they work may help to protect them sustainably.

**Awards Won:**

Geological Society of America &amp

American Geosciences Institute: First Award of $1,250

Third Award of $1,000