

A GRAVITY INVESTIGATION OF THE PITCH LAKE OF TRINIDAD AND TOBAGO

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ABSTRACT

The Pitch Lake or Asphalt Lake of Trinidad and Tobago is situated in the southwest peninsula of the island of Trinidad. It has fascinated explorers, scientists and the common folk since its discovery by Sir Walter Raleigh in the year 1595. Raleigh himself found immediate use for the asphalt to caulk his ship. Since then, there have been numerous research investigations into the use and chemical composition of this material. Above all, there have been countless theories, postulations and conclusions as to the size, source and origin of the asphalt. The Asphalt Lake is, at present, an oval, lake-like outcrop composed of an oil, clay and water (mud) mixture.

In November 1989 a small scale gravity survey was performed on the Asphalt Lake. The objectives were: (i) to determine the geometry and depth of the asphalt lake, (ii) to determine from density contrasts, the type of rock beneath the Asphalt Lake, and (iii) to determine the possible source or sources of asphalt in the lake.

Forty three gravity stations were recorded along roads in the vicinity of the lake, and fifty four gravity stations were recorded along two profiles across the lake. The data was processed and modeled at the Simon Bolivar University in Caracas, Venezuela.

The results showed that a gravity low exists at the present Asphalt Lake and trends NNW - SSE. Modeling along the two lake profiles indicated that the lake is not bowl-shaped as previously thought, but irregular, with a possible plug at the centre. Asphalt thickness varies from 20m gg/cc, which is typical of the Upper Morne L'Enfer Formation. The modelling also indicated that two, possibly large faults exist, which are connected to the Los Bajos fault system to the south. These two faults intersect at the asphalt outcrop and the asphalt is sourcing from them.

The asphalt from the Lake is of economic value to Trinidad and Tobago. Some ten million tons have been mined since mining started in 1867. The refined product is used in the manufacturing and road surfacing industries.