Geothermal Heat Flow in Northern Indonesia

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Heat flow is defined as the movement of heat from Earth's interior to its surface. Heat flow fluctuates among geographic locations as well as with time. This variability is the result of tectonic, volcanic, and other natural processes, making it a valuable tool in understanding a range of geologic topics.

This research aims to construct a geothermal map of the northernmost part of Indonesia with an emphasis on the Penyu/West Natuna Basin. Data contributing to these maps is from fifteen different basins, showing a wide range of geological and geothermal conditions. The Penyu/West Natuna Basin formed as one of three broken crests of the Malay Dome, at the triple junction of the Eurasian, Indo-Australian, and Pacific Plates. This region is still one of the highest heat flow areas in this region, making the Penyu/West Natuna Basin of high interest in oil and mineral exploration.

Geothermal mapping depicts the heat loss from the cooling of Earth's core and radioactive elements and its diffusion to the surfaceGeotfBlackwell's previously published work in North America (SMU Geothermal Laborat

method follows Fourier's Law of heat conduction which is calculated by multiplying a thermal conductivity by a local temperature gradient. Thermal conductivity is specific for each type of rock and is calculated based on the percentages of dominant lithologies in each well. The product of this equation is a heat flux vector. All data required for this calculation is found on the geophysical database of the South East Asia-Pacific region, donated by L. Bogue Hunt. Logs

using ArcMap program. Contours are inferred in areas of tectonic interference. Due to this alteration, a geothermal map of this region is essential for not only petroleum exploration but also for mineral extraction and geothermal energy advancement.

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Abstract

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