

## **Cenozoic and Mesozoic Magmatism and Thermal History of Southeast Asia: New Data and Tectonic Constraints**

Speaker

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### **ABSTRACT**

During the last 250 million years, the Indochina Peninsula and surrounding regions have experienced a rich assortment of magmatism and a complex thermal/denudation history due to a variety of plate tectonic processes. These magmatic and tectonic events are intimately linked with Southeast Asian basin and petroleum system evolution. Magmatism was caused by a number of tectonic processes, including normal subduction, continent-continent collision, continental rifting, diffuse extension, and transtensional strike-slip tectonics.

This report summarizes new field, geochemistry, radiogenic isotope, and geochronology data on mainly Mesozoic and Cenozoic igneous rocks from Viet Nam, Burma, Malaysia, China, and Indonesia.

Igneous rocks of Southeast Asia record and yield profound constraints on the denudation and structural history of basement terranes and potential petroleum reservoirs, the timing of magmatic events, regional tectonics, and the nature of their underlying lithospheric parental rocks.

These constraints are provided by new field studies and the application of an integrated

regimen of laboratory analyses, including apatite and zircon fission track analyses, K-Ar and <sup>40</sup>Ar/<sup>39</sup>Ar geochronology, Rb/Sr, Nd/Sm, and U/Pb isotope analyses, and major and trace element geochemistry.

The main belts of Mesozoic and Cenozoic igneous rocks of SE Asia discussed in this report are: Triassic collisional granitic rocks of Viet Nam and the Thai-Malay Peninsula, Jurassic subduction-related rocks of the Indochina Peninsula, Cretaceous collisional granitic rocks of China, Viet Nam, Burma, and the Thai-Malay Peninsula, Paleogene continental rift-related basaltic rocks of offshore Viet Nam basins, and Neogene diffuse extensional and transtensional basaltic rocks of China, Indonesia, Indochina and Burma.

Apatite fission track data for onshore rocks from Malaysia, Viet Nam, Burma, and Indonesia document the low temperature (<120°C) thermal history and therefore the denudation history of continental blocks. Mesozoic and older rocks of the Indochina Peninsula experienced rapid cooling due to uplift and erosion during the Late Paleogene (50-25 Ma) at the time many prolific sedimentary basins were undergoing rapid subsidence due to rifting and transtension.

### **About the Author**

#### **Steve Bergman**

Steve Bergman is a volcanology-geochronology-hard rock petrology-tectonics specialist who has worked at the ARCO Exploration Research Laboratory in Plano for the last 18 years, initially in the Minerals Research group, and for the last 13 years in Basin Analysis Research groups. He received a B.S. in Geology from the University of Dayton in 1977, and M.A. & Ph.D. degrees in Geology from Princeton University in 1979 and 1982, respectively, and spent a sabbatical year as a visiting scholar at the University of Cambridge Bullard Laboratory in 1996-1997. He is mainly interested in increasing hydrocarbon exploration efficiency by integrating field geology, petrology, volcanology, and high-tech laboratory data to characterize basin evolution, thermal evolution, and other elements of the petroleum system. His main field laboratories include Alaska, the western USA, Indonesia, Vietnam, Burma, New Zealand, NW Europe, and Turkey.