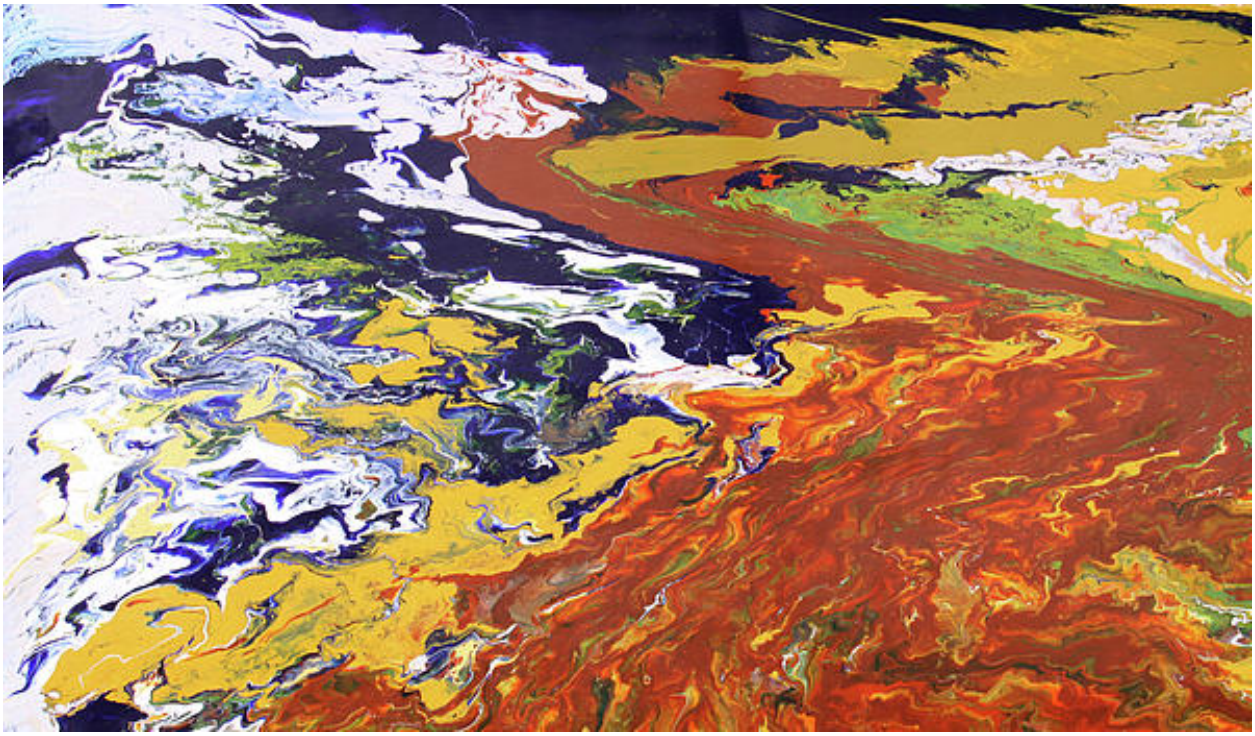
Geology and Structures of Samui and Chantaburi Granites: Analogous to Granites in the Gulf of Thailand or not.



“Ductile silicate melt: :Look like an abstract painting”

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Abstract

Granites from three locations in Thailand have been investigated for petrochemical and structural information. They are from the Chantaburi area in eastern Thailand, the Samui Island in southern peninsula, and granite drilled cores from the Gulf of Thailand. Semi-polished slabs and thin sections have been done for meso-and micro-scopic analyses. Point-counting analysis has been done for most of the selected samples. Major-oxide, trace- and rare-earth element analyses have been carried out for identifying granite types and their tectonic settings. Structural data are derived from remote-sensing and filed surveys, and the structures have been plotted in steronets and rose diagrams to statistically determined the maximum stress analyses.

The results show that the studied granites are of I-type (or magnetite-series) affinity for granites from the Samui Island. However,the I-type Chantaburi and the S-type ±A-type Samui granites are interpreted have been formed after the prolong compression tectonics during early Mesozoic. The peraluminous to peralkaline Samui granites may have formed by anatexis (partial melting) of the (meta-) clastic sediments of Paleozoic ages. The calc-alkaline to peralkaline Chantaburi granites may have formed in relation to the onset rifting after major collisional period of subduction. In the Gulf, the calc-alkaline granites may have been generated in association with subduction of (Nakhon-Thai?) oceanic lithosphere.

Both joints, faults, shear zones, and foliations constitute major structural features for the Chantaburi and Samui granites. No structural geometry and styles have been reported for the granites from the Gulf dur to the scarity of samples. Several major sets of these lineament structures are recognized. Structures plots reveal that they are in N-S, NW-SE, NE-SW, E-W and NNW-SSE direction. The NE-SW trending joints and faults show both dextral and sinistral slip movement and additionally the NW-SE trending lineaments display both dextral and sinistral senses. Field evidence supports that the sinistral slip movement along the NW-trending faults occurred prior to that of the dextral motion. The N-S trending lineaments also show both old and young structures. The old ones are considered if the structures are filled with vein quartz or pegmatite/aplite bodies. The N-S striking lineaments are considered to the youngest for both Chantaburi and Samui areas. In Samui area, these lineaments are found to control the development of Quaternary colluvium.

Such N-S-trending lineaments are well-recognized in the Gulf as well as in the central and northern parts of Thailand. These structures control not only the large but also the small Cenozoic basons. The major N-S-trending lineaments mainly bound these Cenozoic basins as half-graben or (full-) graben structures. Such N-S-trending lineaments conform well with that of the present-day bore-hole breakout giving rise to the horizontal shear-max stress orientation in the N-S strike. We also consider that the dextral movement along the NW-SE-trending joints and faults (such as in Samui Island) may have controlled the opening joints of the N-S direction.

Therefore we infer that the structures found in Samui and Chantaburi area are analogous to those of the Thai Gulf. Such scenario can enhance possibility for the target granites in the Gulf to act as the potential reservoir rocks.