

Four Generations in a Decade: Progress in Regional Tectonic Mapping and Petroleum Systems Analysis with Satellite Altimetry Data

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The authors began joint work on a comprehensive GIS-based tectonic map (the 'SEAMAGIC' project) in mid-2000 using among other data, regional gravity compiled in the mid-1990's. Since then, advances in processing of satellite altimetry data combined with the collection of more and higher-resolution topographic/ bathymetric information have provided three more data blankets to improve the detail and resolution of the basic mapping. Each interpretation cycle benefitted from improved presentation methods (such as a broader range of data attributes) and built on insights from earlier work. Rapid revisions improved our corporate memory via repetition, leading to ever more thorough and internally consistent interpretations, resulting in a deeper understanding of the petroleum systems.

Transform locations and major tectonic lineations correlating to newly imaged seamounts and volcanos have been moved up to 50 km and extended. The dominant Song Hong-Mae Ping trend of strike-slip faulting is well-known onshore. With the reduction of satellite track (nne-ssw and nnw-sse) artifacts, we trace this faulting across shelf areas where it controls sediment distribution into deepwater fan-prone areas. Gravity map noise levels have been reduced such that both basin-bounding and intra-basin faults from published maps correlate reliably to gravity features at a scale of 5-10 km versus 20-40 km just a decade ago.

We illustrate a progression of tectonic interpretations, predictions of sediment channel & catchment (fan-prone) systems, and basin & sub-basin outlines for three areas: the Sabah shelf, a convergent margin; the South China Sea passive margin; and the East China Sea trans-tensional basin.