

## **Geological heritage features of Tawau volcanic sequence, Sabah**

### **Abstract**

Semporna Peninsula area was built up by thick Tertiary sequence of volcanic flows and volcanoclastic rocks. Early Cretaceous tholeiitic basalt is the oldest sequence of volcanic rocks interpreted to have formed as part of a wide spread submarine volcano or volcanic complex within an MORB characterized by rapid volcanism. Miocene to Quaternary volcanisms from volcanic arcs contributed sequences of lava flows and pyroclastic rocks of dacitic, andesitic and basaltic rock types forming the major mountain chains of southeast Sabah. This Neogene volcanic sequence is dominated by low to high K-calc alkaline andesitic to dacitic volcanic rocks similar to modern island arc type. The subaerial of the latest lava flows of the region indicates volcanism consistent with tholeiitic basalt type. It has been accepted that during the Cenozoic, Sabah has been subjected to series of major tectonic regimes. A number of deformation phases have been determined include: Middle Eocene, Middle Miocene and Plio-Pleistocene phases of crustal movements of this region. The area appeared, therefore, to have been subjected to compressional tectonic regime throughout much of the late Cenozoic. However, the structural and sedimentological expression of these tectonic regimes varies considerably. It is suggested here that compressional episodes were interspersed with periods of active transtensional basin formation and that Late Miocene extension of the eastern part of Sabah which was related to compressional forces. On the basis of geological data and kinematic reconstructions, two types of island arcs can be differentiated: those related to the progressive closing of the Celebes and Sulu marginal basins during Middle Miocene and those belonging to the south Philippine Sea Plate during Plio-Pleistocene. The combined age and chemistry for these two magmatic belts allow us to decipher the Tertiary evolution of the complex zone of interaction of the Semporna Peninsula and the surrounding areas. This Tertiary sequence is underlain by the Early Cretaceous pillow lava basalt, and culminated by the late Pleistocene volcanisms those contributing to the major topography of the area include Andrassy,

Lucia, Maria, Wullersdorf and Magdalena mountains formed the prominent topographic features of the area. This youngest volcanic apron covers an extensive area of the Semporna Peninsula. Semporna volcanic associations form important link with the long chain of Tertiary volcanic activities in this region that extend from the Sulu Archipelago, Philippines to the southeastern part of Sabah.