



V34B-06 - The Rise of the Tibetan Plateau as a Consequence of Progressive Underthrusting of the Indian Lithosphere Driven by Subduction of the Giant India-Australia Plate at the Sumatra-Java Trench

 Wednesday, 11 December 2019

 16:00 - 18:00

 Moscone South - 154, Upper Mezz.

Abstract

The Tibetan Plateau is the highest (> 4500 m in elevation) and largest (> 2,500,000 km²) plateau on Earth, which is unique today and likely also rare in Earth's history. The scientific speculation on the origin of the Himalaya-Tibetan plateau can be traced back to mid-19th century when British mathematician John Pratt (1855) recognized a mass deficit beneath the Himalaya, which was interpreted, by another British mathematician George Airy (1855), as being buoyed by thick crust beneath the plateau. This was the very origin of the modern theory of isostasy. In his continental drift hypothesis, Wegener (1912) suggested that mountains were the results of continents colliding and crumpling, insightfully citing the example of India colliding into Asia to uplift the Himalayas. Based on the isostasy theory and Wegener's mountain-building hypothesis, a Swiss geologist Emil Argand (1924) proposed that the origin of the Himalaya-Tibetan Plateau could be understood as resulting from the underplating of the Indian continent towards beneath the Eurasian continent. However, this 95-year old interpretation has been rejected or "ruled out" because (1) this is too simple using little data; (2) plate tectonics theory, in terms of the Wilson Cycle concept, cannot explain the continued India-Asia convergence since the collision; (3) decades of comprehensive (geological, geophysical, petrological, geochemical and geochronological) studies by the international communities with several 1000's of publications have shown extraordinary complexities beyond any single model. In this presentation, I summarize my current research on the subject and found that I cannot avoid the conclusion that the rise of the Tibetan Plateau is a straightforward consequence of progressive underthrusting of the Indian lithosphere driven by subduction of the giant India-Australia Plate at the Sumatra-Java Trench. References: [1] Niu, Y., 2014. Geological understanding of plate tectonics: Basic concepts, illustrations, examples and new perspectives. *Global Tectonics and Metallogeny* **10**, 23-46. [2] Niu, Y., 2017. Slab breakout: A causal mechanism or pure convenience? *Science Bulletin* **62**, 456-461.

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