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Preface for the Special Issue "Geology, Geodynamics and Mineral Resources of SE Asia". Insights from GeoSEA XV Congress, Hanoi, 2018

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SE Asia is an assembly of Gondwana-derived crustal blocks, and an important piece for the geodynamic understanding of the Asian continent. Since the Phanerozoic, this area experienced several significant geodynamic events. The separation of many continents and microcontinents from Gondwana through rifting lead to the opening of oceanic domains. The closure of these oceanic basins and the subsequent continental collision is attested by subduction related magmatism, accretionary complexes, high-pressure and high-temperature metamorphisms, crustal melting and magmatism including volcanism and plutonism. The Mesozoic tectono-magmatism, the Cenozoic intracontinental tectonics related to the India collision, and the recent magmatism and tectonics are also significant events recognized in SE Asia. These geodynamic events represent the general framework for the numerous ore deposits recognized in the area.

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Since several years, the geological knowledge of SE Asia underwent great advances in many fields of Earth Sciences, including detailed mapping, magmatic and metamorphic petrology, geochronology, structural analysis. This Special Issue of the Journal of Asian Earth Sciences aims at providing some of the new results in stratigraphy, paleogeographic reconstructions, magmatic and metamorphic petrology, geochronology, geochemistry, mineral resources, tectonics, geophysics, and geodynamic reconstructions. Most of these contributions were firstly presented during the GeoSEA XV International congress held in Hanoi in October 2018. Both detailed contributions and large syntheses dealing with the Indochina block, and its relationships with neighboring blocks such as South China, Sibumasu and Philippines Mobile Belt are provided in this volume (Fig. 1).

Tran et al. present a wide synthesis of the Neoproterozoic to Early Triassic evolution of the Indochina block. Among many new results, the authors clearly emphasize the distinction between the two main orogenic events of SE Asia. The Early to Middle Triassic *Indosinian orogeny* resulted from the south-directed oceanic subduction of a branch of the Paleotethys, followed by continental collision of the South China block below Indochina. The *Trans-Mekong orogeny*, a possible equivalent of the Cimmerian orogeny described more to the west in Central Asia, was related to the collision of the Sibumasu block with Indochina after the closure of another branch of the Paleotethys. In spite of numerous previous works, the Kon Tum massif, in the central part of Indochina block, received attention by **Owada et al**., and **Bui et al.** that document the timing of magmatic and metamorphic events using zircon and monazite geochronology. The detailed stratigraphic, sedimentological, and structural analyses of the Triassic formations in the Truong Son belt and Sam Nua basins provided by **Villeneuve et al.** bring new and important insights on the Triassic collision between Indochina and South China blocks.

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The geology and metallogeny of the Sibumasu block are addressed in the Singapore area by **Dodd et al., Gillespie et al., and Leslie et al.** Up to date sedimentary, lithostratigraphic, petrologic and structural information is now widely accessible for this area. **Kanajapayont et al.** emphasize the importance of inherited zircons, and clarified the Triassic age of the granites and gneiss related to the collision of the Sibumasu block with Indochina in Thailand. During the pre-collision stage, the oceanic subduction gave rise to a magmatic arc coeval with volcanic-hosted massive sulfide deposits. **Basori et al.** documented the mineralogic and geochemical variations of the paragenetic succession, and microthermometric evidence for the formation of Permian VHMS Tasik Chini ore deposits of central Peninsular Malaysia.

It is also well acknowledged that after its Mesozoic integration to Asia, Indochina, and more widely Sundaland, experienced an important reworking as a consequence of the India collision. **Nguyen and Luong** present a detailed microtectonic analysis of the brittle deformation observed in south central Vietnam that allowed them to reconstruct the paleostress regime that affected eastern Indochina from Oligocene to present, and to decipher the role played by the far-field effect of the Indian collision and Sunda subduction. Recent tectonics have also important bearings for applied geology. A multidisciplinary approach using field structural geology, seismic profiles, GPS velocity record was carried out by **Nguyen V. H. et al.** to derive the present strain rate in the Ninh Thuan nuclear plant and surrounding regions. The Pleistocene activity of SE Asia is also represented by an intraplate volcanism such as the alkaline and tholeiitic basalts of the Krông Nô area of South Vietnam that are petrologically and geochemically analyzed by **Hoang et al.**

From Kamchatka to East Indonesia, the Eurasian margin is bounded by several island arcs. The Philippines archipelago exposes many ophiolitic belts. The Pujada ophiolite, in SE

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Mindanao, provides a unique opportunity to elucidate the tectono-magmatic evolution of the Molucca sea Collision Complex. **Olfindo et al.** document the late Cretaceous age, and the back-arc setting of this ophiolite that belonged to the proto-Molucca lithosphere between the Halmahera and Sangihe arcs. More to the North, in NW Luzon, **Pasco et al.** show that the Dos Hermanos ophiolitic mélange is comparable to the Zambales ophiolite of Western Luzon. Both ophiolitic suites record the complex convergence and emplacement history of a paleo-oceanic lithosphere upon the Philippines Mobile Belt. The intense tectonic and magmatic activities along the Philippines Mobile Belt represent highly favorable conditions for the genesis of epithermal gold and porphyry copper deposits. The petrological and geochemical similarities between the Baguio and Pacific Cordillera ore districts in Luzon and East Mindanao, respectively are reviewed by **Yumul et al.** They emphasize the high potential of metallic resources waiting to be discovered in the Philippines. The petrographic, geochemical, and geochronological data from the Poboya and Sassak gold-copper districts in Western Sulawesi of Indonesia provided by **Maulana et al.**, allow the authors to discuss the mineralizing processes of this Mio-Pliocene ore district in relation with the central and northern parts of Western Sulawesi. ***Kyi Khin et al.*** provided the geology setting, structural and lithostratigraphic framework of the Rakhine Coastal Ranges in western Myanmar and its implications for the collision of the India Plate and the West Myanmar Block.

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Figure Captions

Fig. 1. Tectonic map of Asia showing the main continental blocks involved in the continental assembly. Emphasis is placed on the Indochina-Simao-North Qiantang block, Sibumasu-South Qiangtang, and South China Block (SCB) with their tectonic boundaries. Namely, the

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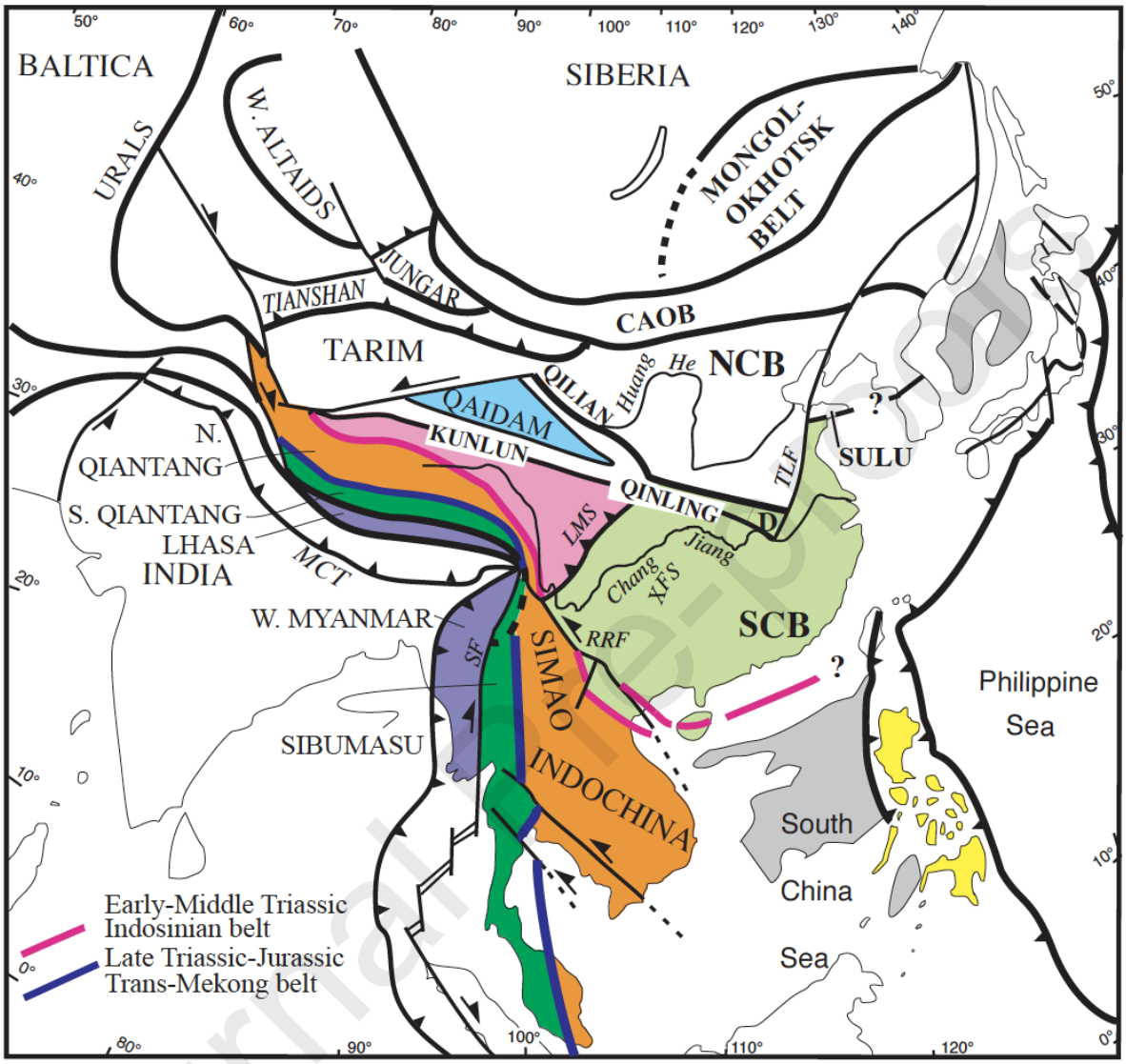
Early-Middle Triassic Indosinian belt, and Late Triassic-Early Jurassic Trans-Mekong (Cimmerian) belt. RRF=Red River Fault. SF=Sagaing Fault.



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Suggested order of papers in the volume

1. Tran et al.
Neoproterozoic-Early Triassic tectono-stratigraphic evolution of Indochina and adjacent areas: a review and new data

2. Owada et al.
Timing of magmatism and ultrahigh- to high-grade metamorphism in the Kannak Complex, Kon Tum Massif, Vietnam: Magmatic activity and its tectonic implications

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9. Basori et al.
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