Gondwana dispersion and Asian accretion

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Laporan (Report)

Dr. Ian Metcalfe who is presently with the Department of Geology & Geophysics, University of New England, Armidale NSW 2351, Australia gave the above talk to an audience of 20 at the Geology Department, University of Malay on 9th February 1996.

Dr. Metcalfe who is on his way back from a meeting in France was here to share with members his latest research data on Gondwana dispersion and Asia accretion.

Abstrak (Abstract)

During the last decade, a wide range of geological and geophysical data has led to the recognition of various continental terranes in East and Southeast Asia (Fig. 1) which, on tectonostratigraphic, palaeobiogeographic and palaeomagnetic grounds are "suspect" or allochthonous in nature. Some of the recognised terranes may be composite and there is some disagreement with regard to the number of terranes and their boundaries. The continental terranes are bounded by sutures (representing former oceans), by narrow mobile belts or major fault zones. Comparative studies of the stratigraphy, palaeontology, and palaeomagnetism of the various continental terranes of East and Southeast Asia suggests that they were all derived directly or indirectly from Gondwanaland. Asian continental terranes that are placed on the India-Australian margin of Gondwanaland in the Early Palaeozoic include Tarim (here regarded to include the Kunlun and Ala Shan terranes), Qaidam, Indochina (which includes the Qamdo-Simao block of western China), North and South China, Sibumasu, Qiangtang, Lhasa, Kurosegawa, NW and SE Hainan, West Burma and the Woyla terranes. The evolution of Gondwanaland and Tethys during the Palaeozoic and Mesozoic involved the rifting of continental slivers/fragments from northern Gondwanaland, and the northwards drift and amalgamation/accretion of these to form proto East and Southeast Asia. Three continental slivers were rifted from the northern margin of Gondwanaland in the Early to Late Devonian (North China, South China, Indochina/East Malaya/Qamdo-Simao, Qaidam and Tarim terranes); Early-Middle Permian (The Cimmerian continent including the Sibumasu and Qiangtang terranes and possibly NW and SE Hainan); and Late Triassic to Late Jurassic (Lhasa, West Burma and Woyla terranes). The northwards drift of these terranes was accompanied by the opening and closing of three successive oceans, the Palaeo-Tethys, Meso-Tethys and Ceno-Tethys.

Assembly of Gondwanaland-derived Asian terranes began with the amalgamation of South China and Indochina/East Malaya along the Song Ma/Song Da zone during the Late Devonian/Early Carboniferous to form "Cathaysialand". Palaeomagnetic, climatic and biogeographic data indicates that Cathaysialand and North China were located within the Palaeo-Tethys at low northern/equatorial latitudes during the Late Carboniferous and Permian. Palaeomagnetically determined palaeolatitudes are consistent with the development of tropical Cathaysian floras on these terranes. The Tarim, Kunlun, Qaidam and Ala Shan terranes accreted to Kazakhstan/Siberia in the Permian.

A major episode of rifting occurred on the northern margin of Gondwanaland in the Late Carboniferous-Early Permian and the Cimmerian continent separated in the late Early Permian resulting in the opening of the Meso-Tethys. Suturing of Sibumasu and Qiangtang to Cathaysialand occurred in the Late Permian-Triassic, closing a major branch of the Palaeo-Tethys. South and North China amalgamated and then accreted to Laurasia by Late Triassic-Early Jurassic times. The highly disrupted Kurosegawa terrane of japan, possibly derived from Australian Gondwanaland, accreted to Japanese Eurasia, also in the Late Jurassic.

The Lhasa, West Burma and Woyla terranes rifted from NW Australian Gondwanaland in the Late Triassic to Late Jurassic and drifted northwards during the Jurassic and Early Cretaceous as the Ceno-Tethys opened and the Meso-Tethys was destroyed by subduction beneath Eurasia. Accretion of these terranes to proto-Southeast Asia occurred in the

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Cretaceous. The South West Borneo and Semitau terranes were derived from the South China/Indochina margin by the opening of a marginal basin in the Cretaceous which was subsequently destroyed by southwards subduction during the rifting of the Reed Bank-Dangerous Grounds terrane from South China when the South China Sea opened. The NW and SE Hainan terranes, which formed part of Early Palaeozoic Gondwanaland, reached their current positions, relative to South China, sometime in the Jurassic-Cretaceous.

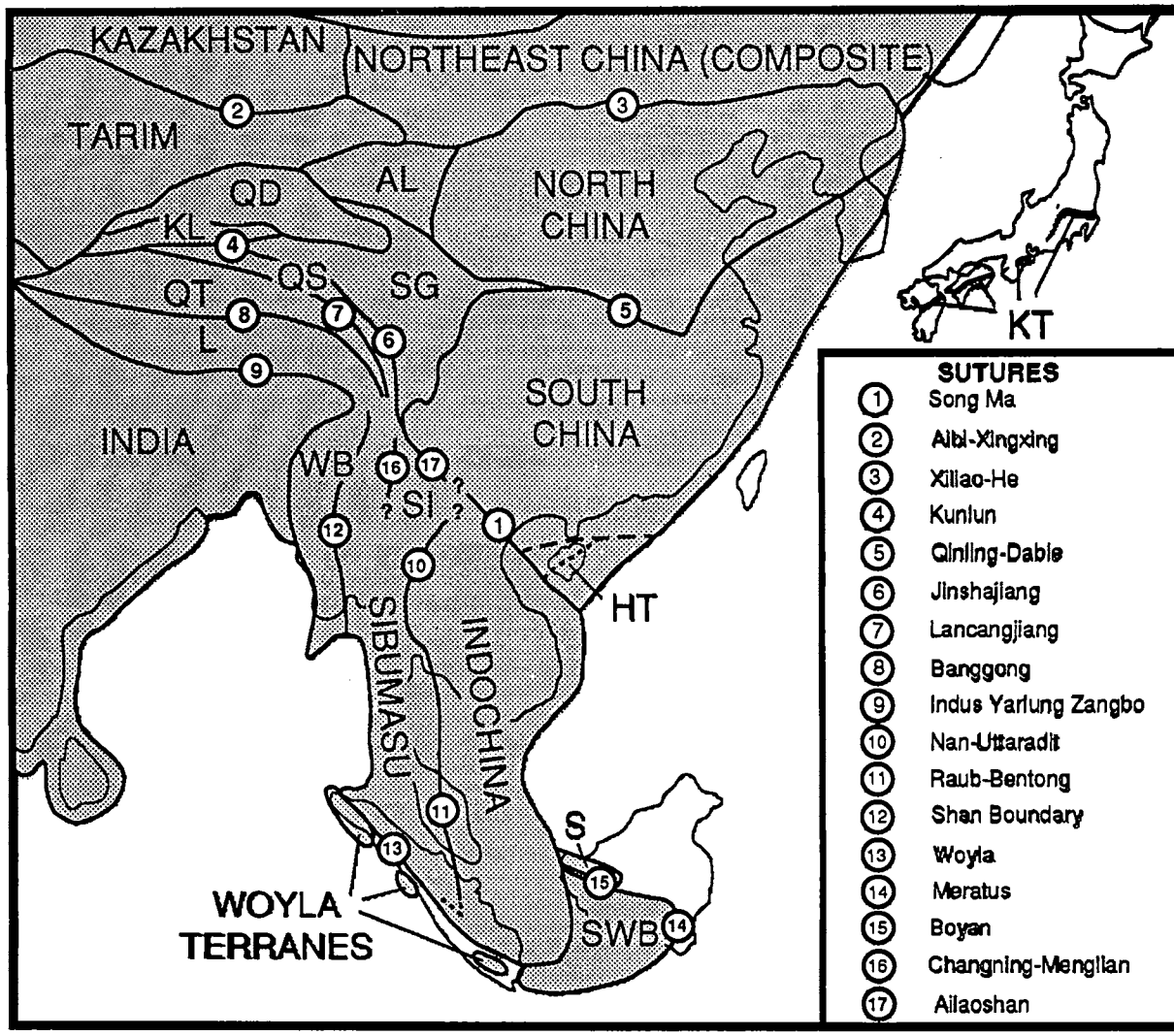

Figure 1. Distribution of principal continental terranes and sutures of East and Southeast Asia. WB = West Burma, SWB = South West Borneo, S = Semitau Terrane, HT = Hainan Island terranes, L = Lhasa Terrane, QT = Qiangtang Terrane, QS = Qamdo-Simao Terrane, SI = Simao Terrane, SG = Songpan Ganzi accretionary complex, KL = Kunlun Terrane, QD = Qaidam Terrane, AL = Ala Shan Terrane, KT = Kurosegawa Terrane.

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Further reading

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