

Palaeomagnetic measurements on Upper Jurassic to Lower Cretaceous sedimentary rocks from Peninsular Malaysia

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Abstract: Palaeomagnetic data from three localities of Upper Jurassic to Lower Cretaceous rebeds in Pahang and Johore, Peninsular Malaysia, indicate that those areas lay about 8°N of their present position and were rotating clockwise and moving north. Since Late Cretaceous, the Peninsula has rotated anticlockwise and moved south to its present position.

Vectors for the three localities are Maran $D = 341, I = 21$; Sungai Tekka $D = 356, I = 27$; Kluang $D = 333, I = 21$. A palaeomagnetic (north) pole for Central Peninsular Malaysia at Lat. 71° N, Long. 41° E is indicated.

INTRODUCTION

Samples of reddish siltstone were collected by NSH from a site east of Maran, Pahang, and east of Kluang, Johore, and by KHP from the Tekka Valley of Pahang (Fig. 1). These rocks come from the belt of Upper Jurassic to Lower Cretaceous rocks shown by Smiley (1970). At each locality, flora identified as of Upper Jurassic to Lower Cretaceous age occurs nearby, although not in the sampled locality (Smiley, 1970; Suntharalingam, no date).

Locality A is a road cut on the main Kuala Lumpur to Kuantan road at Mile 54.25 from Kuantan, about 2 miles W of Maran; locality B is at several scattered sites in the Tekka Valley north of Maran; and locality C is about 150 m along a new road running south from the Kluang to Mersing road, 16 miles E of Kluang.

METHOD

Handsamples and cores were collected in the field and three cores (25 mm diameter) drilled from each handsample. Cylinders 25 mm long were cut from each core, and measured on a DIGICO spinner magnetometer in the palaeomagnetic laboratory at the Department of Geology, University of Malaya. Pilot samples were demagnetized thermally step by step to 600°C, and the most stable temperature chosen by means of the highest stability index of Briden (1972); the remaining samples were then demagnetized at that temperature, which was found to be 200° or 300°C.

RESULTS

Results are shown in Table 1. Most samples showed high stability, remaining stable even up to 600°C. Initial intensities were mostly in the range 3 to 10 nT, falling at 600°C to about 25% of the initial value.

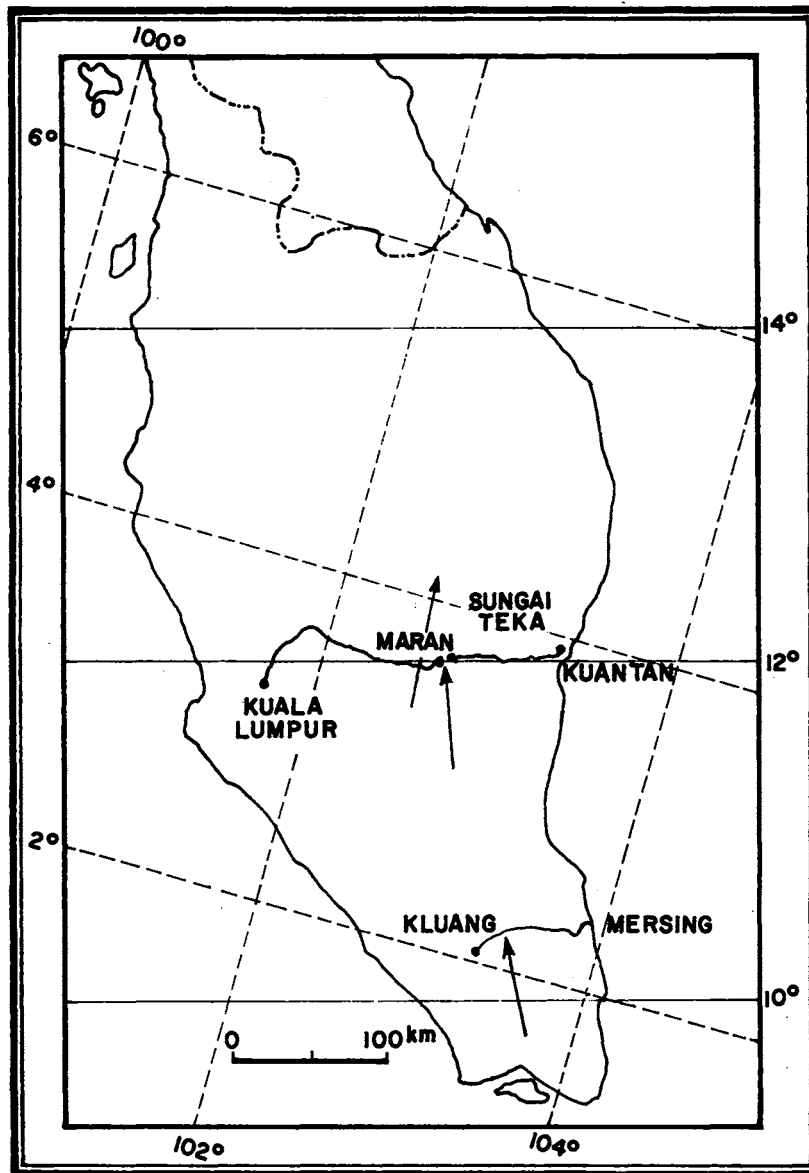


Fig. 1. Palaeomagnetic vectors from Upper Jurassic to Lower Cretaceous redbed sites in Peninsular Malaysia. Arrows mark site mean vectors; heads of arrows are at sites. Solid lines show palaeolatitudes; dashed lines represent latitudes and longitudes.

TABLE I
Palaeomagnetic results from the Upper Jurassic to Lower Cretaceous of Peninsular Malaysia

Location	D,	I	N	k	α_{95}	R	Palaeomagnetic Poles	
							Lat.	Long.
A Mile 54.25 from Kuantan, 2 miles W of Maran 3.55° N 102.78° E	341,	21	5	9.8	25.5	4.59592	71° N	40° E
B Sungai Teka, north of Maran 4.04–4.15° N 102.43–102.70° E	356,	27	5	27.9	14.7	4.85710	61° N	32° E
C 16 miles E of Kluang, Kluang Mersing Road 2.17° N 130.45° E	333,	21	7*	42.8	9.3	6.85998	79° N	85° E
Mean of All Virtual Geomagnetic Poles			N	K	A_{95}	R	71° N	41° E
			17	19.8	8.2	16.19565		

D, I = declination east of true north, inclination (positive down) of cleaned remanence;
R = length of resultant of N unit vectors, k, K = precision parameter; α_{95} , A_{95} radius of circle of 95 percent confidence about mean.
7* = sites represented by 25 samples; one aberrant sample (H687 D = 235, I = 8) omitted from the mean.

The vectors for the localities (D, I = 341, 21; 356, 27; 333, 21) may be compared to the Cretaceous direction of 316, 31 obtained from Segamat basalts and Kuantan and Masai dykes, possibly mid to late Cretaceous; the palaeomagnetic pole from the Upper Jurassic to Lower Cretaceous redbeds lies at 71°N, 41°E compared to 44°N, 35°E for that for Segamat basalts and Kuantan and Masai Dykes (McElhinny, Haile, and Crawford, 1974).

The equivalent palaeolatitude derived from the pole is 12° at Maran. If, as seems most probable, the rocks are normally magnetized, this represents N latitude i.e. about 8° further north than at present. It appears that in the early Cretaceous the Malay Peninsula was rotating clockwise, and moving slowly north, and that since late Cretaceous, it rotated anticlockwise some 40°, and moved south to its present position.

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