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Seismo-tectonics of the Andaman–Nicobar Islands

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Abstract

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The epicentres of 345 earthquakes that occurred between January 1967 and December 1982 in a region bounded by 4° N to 16° N latitudes and 90° E to 98° E longitudes were plotted in order to study the seismicity of this region. Most of the earthquakes in this region are shallow focus, the greatest focal depth being about 250 km. In the northern part of this region, north of 10.5° N, tne earthquake foci are aligned along two branches, which strike northeastwards. No intermediate depth earthquakes are associated with the eastern branch. South of 10.5° N, the foci are located along a zone striking north-northwest. Focal mechanism solutions are reported for 24 earthquakes that occurred in this region during this period. The first motions of *P* and *PKP* phases were used to determine the mechanism solutions. Five of these events occurred in northern Sumatra and the rest occurred in the Andaman–Nicobar Islands. The mechanism solutions of the shallow focus earthquakes in northern Sumatra are characterized by a predominant component of thrust and strike-slip faulting. The inferred orientation of slip vectors deduced from mechanisms of shallow focus events is nearly northeast. Mechanism solutions of 13 shallow focus events that occurred in the Andaman–Nicobar Islands are characterized by thrust, normal and strike-slip faulting. The orientation of slip vectors deduced from thrusting mechanisms is consistent with the underthrusting of the Indian Ocean under the Andaman–Nicobar Islands in a northeasterly direction. Normal faulting mechanism solutions of these islands suggest that they are tectonically similar to island arcs. The results reported in this study show for the first time, using mechanism solutions, the existence of underthrusting along the Andaman–Nicobar Islands, for which there is ample geological evidence.

Introduction

The Andaman and Nicobar islands, numbering 274 and 19 respectively, are located in the Indian Ocean north and south of 10.5° N latitude. These islands form a part of the Burmese and Indonesian arcs (Karunakaran et al., 1964). Hence they constitute a geophysical feature of great tectonic interest. The existence of intermediate depth earthquakes in these islands (Gutenburg and Richter, 1954; Sinvhal et al., 1978) and some active volcanism on the Barren Islands (Holmes, 1965), indicate underthrusting in this region. However, definitive evidence from mechanism solutions is not yet available. Only a few mechanism solutions have been reported from the Andaman–Nicobar Islands region (Fitch, 1970b; Ichikawa et al., 1972). Since more data are available now, it seems pertinent to investigate the mechanism solutions of earthquakes in this region. This paper reports the seismicity and mechanism solutions of earthquakes that occurred during the period 1967 to 1982 in the region bounded by 4° N to 16° N latitudes and 90° E to 98° E longitudes. The seismicity of this region shows that the majority of the events were shallow focus. Focal depth decreases as a function of latitude from south to north. North of about 11° N, the earthquake foci are located along two narrow branches, which are nearly parallel. Intermediate depth earthquakes are associated only with the western branch.

Of the 24 earthquakes for which mechanism solutions are presented here, five events are located in northern Sumatra, and the rest are located in the Andaman–Nicobar Islands. Mechanism solutions of northern Sumatra earthquakes are characterized by a predominant component of thrust and strike-slip faulting. The inferred orientation of slip vectors for shallow focus mechanisms is nearly northeast. Mechanism solutions for shallow focus earthquakes in the Andaman–Nicobar Islands indicate normal, as well as thrust and strike-slip faulting. The deduced orientation of slip vectors varies from northeast to east. Of the five mechanism solutions of intermediate depth earthquakes of the Andaman–Nicobar Islands, two are characterized by a large component of strike-slip faulting whilst the remainig three indicate a steeply plunging axis of tension. Strike-slip mechanism solutions for intermediate earthquakes, which indicate tearing of the lithosphere, are difficult to explain in terms of the sea-floor spreading hypothesis. The tearing in the lithosphere is probably the result of a change in the strike of the arc structure.

Regional settings: Figure 1 shows the area under investigation. The Andaman–Nicobar Islands, which are the subaerial expressions of the Andaman–Nicobar ridge, separate the Andaman Basin from the Bay of Bengal. These islands are part of the Burmese and the Indonesian arcs. The Andaman Basin extends from the Irrawaddy delta coast to northern Sumatra and the Malacca strait. This basin lies in a region of topographic and structural belts that trend southward from as far north as the eastern Himalayas and that curve eastward from Sumatra towards Java (Fig. 1). The structural trends in the Andaman Basin region are shown in Fig. 2.

The western coast-lines of the Andaman–Nicobar Islands are fairly straight and gentle whereas the eastern coastlines are strongly indented and steep (Rodolfo, 1969). Narrow channels separate the north, middle and south Andaman Islands, which are collectively referred to as the Great Andamans. Sewell (1925, 1935), while studying the Andaman region, concluded that recent tectonism had tilted this region westwards. Major channels transect the Andaman–Nicobar ridge. The most prominent and deepest of them is known as the Great Passage. The Andaman and Nicobar islands are separated by the Ten Degrees channel, which is second only to the Great Passage. The structural trend of the Nicobar Islands is north-northwest, whereas that of the Andaman Islands is north-northeast (Rodolfo, 1969).

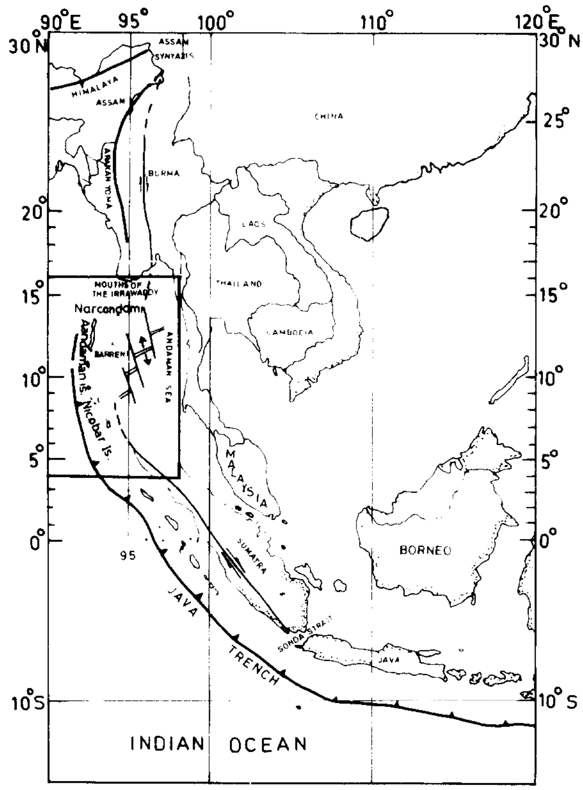

Fig. 1. The major tectonic structures of the Burma–Indonesia region (after Chandra, 1984). Region under study is marked by a rectangle.

Seismicity: To study the seismicity of the region shown in Fig. 1, we used the data reported in the Earthquake Data Report (EDR) by the United States Geological Survey (USGS). The data used in this study covers the period from 1967 to 1982. The method used for preparing the EDR was described by Gunst and Engdahl (1962). In general, the computation precision of this method is quite high, but the final accuracy depends on many factors, such as the spatial distribution of the stations. In most cases the EDR claims a precision of $\pm 0.1°$ in the epicentre locations and ± 25 km in depth.

Figures 3 and 4 show a map of the epicentres of

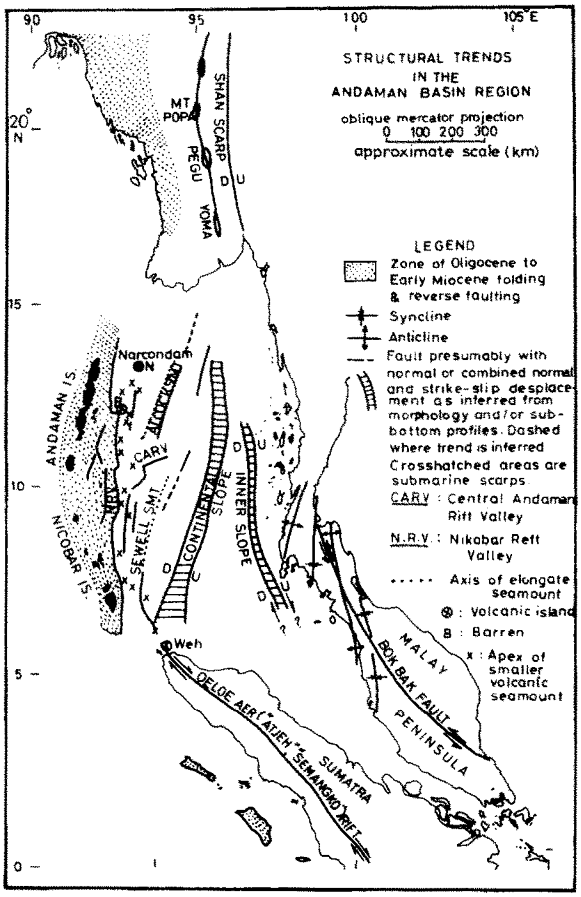

Fig. 2. This diagram shows major structural trends in the Andaman Basin region (after Rodolfo, 1969).

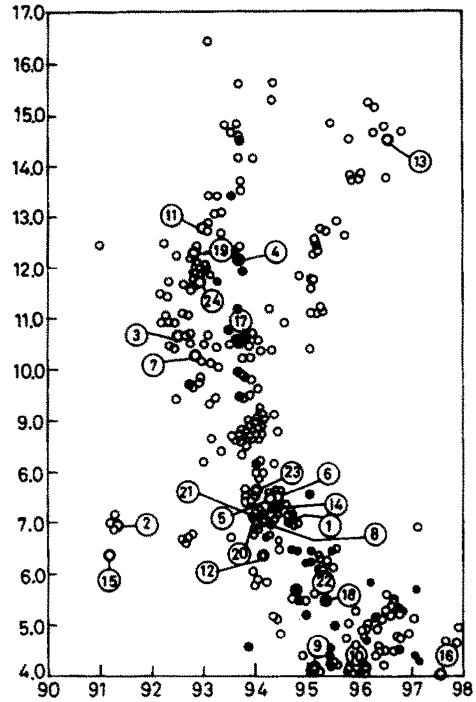

Fig. 3. Plot of epicentres of the earthquakes that occurred in the region under investigation between 1967 and 1982. Open and filled circles represent shallow focus and intermediate depth earthquakes respectively. Larger circles represent those events for which mechanism solutions were investigated. Numbers beside the epicentres correspond to event numbers in Tables 1 and 2.

earthquakes in this region. Open and filled circles represent shallow focus and intermediate depth earthquakes respectively. Larger circles represent those events for which mechanism solutions were investigated. The data used show that seismic activity does not extend below a depth of 252 km. The largest event studied here had a magnitude of 6.3 and occurred at 9.023° N latitude and 93.874° E longitude on October 25, 1970. However, the largest event recorded in this area was an earthquake with a magnitude of 8.7 which had its epicentre at 12.5° N and 92.5° E and occurred on June 26, 1941 (Gutenburg and Richter, 1954). The focal depth of the events decreases from south to north. Sinvhal et al. (1978) studied the seismicity of the region bounded by 4° N to 20° N latitudes and 92° E to 98° E longitudes. These authors also reported that the focal depth of events decreased from south to north. The greatest depth reported by these authors was 228 km whereas the greatest depth we obtained was 252 km.

Figure 3 shows that seismic activity is distributed over a wide zone between 4° N to 6° N latitudes and 94° E to 98° E longitudes. From 6° N to about 10° N, the seismic activity is confined to a narrow zone. It may be noted that a few isolated events are located at about 6.5° N, 93° E and 7° N, 91° E latitudes and longitudes. The northwest trend of the seismic activity continues up to about 10.5° N latitude and 93.5° E longitude. At this point, seismic activity bifurcates into two nearly parallel branches and its trend changes from northwest to northeast. These two branches of seismic activity continue further north (Chandra, 1984) into Burma. It was reported by Chandra (1984) that intermediate depth earthquakes do not occur between 12° N to 20° N latitudes. However, the results obtained in this study indicate the presence of intermediate depth earthquakes north

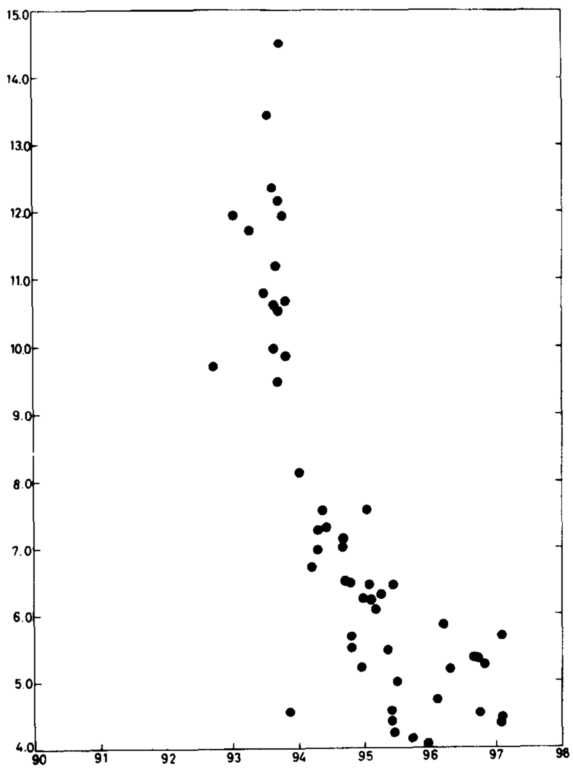

Fig. 4. Plot of epicentres of the intermediate depth earthquakes in the region being studied.

of 12°N latitude. It may be remarked here that north of 10.5°N latitude, intermediate depth earthquakes (see Fig. 4) occur only along the western branch of seismic activity.

Earthquake mechanisms: Earthquakes with body wave magnitudes of 5 or more that have occurred since 1967 were chosen for investigating the mechanism solutions. However, mechanism solutions were obtained for only 24 events. Data used for obtaining solutions were taken from the EDR. A source of double couple acting at the focus was assumed in this study and the data reported here fit adequately with such a model.

An equal area projection of the lower half of the focal sphere was used throughout this study for presenting the radiation patterns. A computer programme for plotting the positions of stations on a diagram of the lower hemisphere using the extended distance tables of Hodgson and Storey (1953) and Hodgson and Allen (1954) was written for an N-D computer at the Bhabha Atomic Research Centre, Bombay. Extended distance tables (Pho and Behe, 1972) and angles of incidence (Banghar, 1970) are available for new tables of P phases (Herrin et al., 1968). However, angles of incidence and extended distance tables based on new P tables were not used in this investigation because these new P tables end abruptly at an epicentral distance of 100°. Moreover, the angles of incidence of Banghar (1970) and the extended distance tables of Pho and Behe (1972) may not be applicable in the region under study for epicentral distances up to 20° because the travel times of P waves in the new tables are consistent only with observed times in the Central United States in this distance range.

In the derivation of the extended distance tables of Hodgson and Storey (1953) and Hodgson and Allen (1954) it was assumed that compressional wave velocity at the focus for events shallower than 33 km was 7.7 km/sec. For a lower velocity at the focus, the positions of the nearby stations plotted on the lower hemisphere would be very different from those obtained for a velocity of 7.7 km/sec, whereas those of distant stations would not be very different. Hence strike-slip mechanism solutions, which are characterized by steeply dipping planes, are not affected as much as solutions characterized by a large component of either normal or thrust faulting. Moreover, the inferred orientation of the axis of compression P for a thrusting mechanism, and the axis of tension T for normal faulting (i.e. the more nearly horizontal axis in either case) could be out by as much as 20 or 30 degrees because of poor distribution of nearby seismograph stations and because of the uncertainties concerning the velocity at the focus. Thus, the axes of compression for thrusting mechanisms and axes of tension for normal faulting mechanisms are usually not as well determined as the other directions of principal stress.

Data

The locations of the 24 earthquakes for which the mechanism solutions are reported in this investigation were obtained from the USGS. The epicentres of these earthquakes are shown in Fig. 3. The numbers shown in Fig. 3 beside the epicentres correspond to event numbers in Tables 1 and 2. The azimuths and plunges of poles of nodal planes together with the orientation of stress axes for each of these events are given in Table 2. For the purpose of discussion, mechanism solutions are grouped into two parts: (1) earthquakes of northern Sumatra, and (2) earthquakes of the Andaman–Nicobar Islands.

Northern Sumatra

Five earthquakes (events 9, 10, 16, 18 and 22) for which mechanism solutions are reported in this study occurred in northern Sumatra. Three of them (events 9, 10 and 16) are shallow focus and the other two (events 18 and 22) are intermediate depth earthquakes. The mechanism solutions of shallow focus events (Fig. 5) are characterized by a large component of thrust faulting. The deduced orientation of the axis of compression is nearly northeast. The choice of nodal plane I (Table 1) as the fault plane for these shallow focus events indicates that the Indian Ocean is underthrusting northern Sumatra. The inferred orientations of slip vectors are nearly northeast. This direction of underthrusting is in very close agreement with the

TABLE 1

Earthquake locations and other pertinent data

Event No.	Fig. No.	Region	Lat. (°N)	Long. (°E)	Date	Origin time (h : min : sec)	Depth (km)	Magnitude (M_B)	Plane I		Plane II		Fault classification
									strike (Az) (°)	Dip (°)	strike (Az) (°)	Dip (°)	
1	11	Andaman	7.008	94.686	17.7.71	05 : 32 : 42.92	132	5.8	34	34E	214	56W	TF
2	7	Andaman	6.966	91.384	7.4.73	03 : 00 : 58.81	N	5.9	0	64E	180	26W	NF
3	7	Andaman	10.686	92.583	9.7.73	16 : 19 : 46.84	46	5.7	10	68W	–	–	Poor solution
4	11	Andaman	12.145	93.721	15.5.75	21 : 07 : 34.40	101	5.0	79	78S	354	68W	SF
5	8	Andaman	7.447	94.293	25.3.76	08 : 16 : 30.30	33	5.3	344	52E	164	38W	TF
6	8	Nicobar	7.494	94.398	16.4.76	16 : 51 : 31.20	22	5.2	134	20E	314	70W	TF
7	8	Andaman	10.281	92.875	21.4.76	19 : 09 : 59.6	33	5.7	13	70W	300	50E	TF
8	11	Nicobar	6.982	94.312	5.8.76	13 : 37 : 16.70	106	5.6	54	60N	234	30S	TF
9	5	Northern Sumatra	4.141	95.140	3.11.76	09 : 54 : 38.20	19.9	5.5	122	22N	302	68S	TF
10	5	Northern Sumatra	4.237	95.774	25.5.77	14 : 55 : 45.00	56.00	5.9	346	18E	166	72W	TF
11	8	Andaman	12.796	93.016	7.2.78	12 : 30 : 40.40	N	5.5	31	46W	350	52E	TF
12	10	Nicobar	6.341	94.154	7.6.78	10 : 26 : 19.90	N	5.0	64	56S	316	66N	SF&TF
13	10	Andaman	14.564	96.514	24.10.78	13 : 38 : 48.30	N	5.0	60	76N	336	60E	SF
14	11	Nicobar	7.308	94.412	8.6.79	20 : 36 : 40.60	132.6	5.2	44	78W	338	30E	TF
15	10	Nicobar	6.393	91.204	16.10.79	22 : 51 : 23.00	34.0	5.2	28	70W	315	50N	SF&TF
16	5	Northern Sumatra	4.029	97.555	1.4.80	16 : 21 : 48.10	41.0	5.6	359	50E	122	56S	TF
17	11	Andaman	10.659	93.825	1.6.80	23 : 11 : 24.00	161.1	5.1	10	60W	306	54N	TF
18	6	Northern Sumatra	5.455	95.347	10.9.81	14 : 17 : 43.44	102.6	5.0	29	70W	314	50E	SF&TF
19	9	Andaman	12.198	92.855	2.11.81	21 : 10 : 26.83	N	5.7	116	40W	324	54N	TF
20	9	Nicobar	6.946	94.002	20.1.82	04 : 25 : 11.63	18.9	5.6	92	70S	336	40N	TF
21	9	Nicobar	7.045	94.026	20.1.82	07 : 09 : 17.43	27.0	5.7	102	70S	356	52E	TF&SF
22	6	Northern Sumatra	5.684	97.791	13.2.82	19 : 56 : 12.89	71.0	5.3	26	70W	288	70S	SF
23	7	Andaman	7.564	94.023	22.5.82	08 : 52 : 58.89	N	5.5	198	46E	0	46W	NF
24	10	Andaman	11.687	92.955	16.12.82	08 : 56 : 35.59	63.0	5.3	36	80E	308	70S	SF

Az = Azimuth; PL = plunge; NF = normal faulting; TF = thrust faulting; SF = strike-slip faulting; N = normal depth.

TABLE 2

Orientation of poles and stress axes

Event No.	Fig. No.	Pole of nodal plane				T axis		P axis		B axis	
		plane I		plane II		Az (°)	Pl (°)	Az (°)	Pl (°)	Az (°)	Pl (°)
		Az (°)	Pl (°)	Az (°)	Pl (°)						
1	11	306	56	126	34	126	79	306	11	34	0
2	7	270	26	90	64	90	21	270	71	0	0
3	7	100	22	–	–	–	–	–	–	–	–
4	11	358	12	84	22	128	6	35	24	232	64
5	8	254	38	74	52	254	83	74	7	344	0
6	8	224	70	44	20	44	65	224	25	314	0
7	8	103	20	212	40	149	46	250	12	354	43
8	11	144	30	324	60	144	65	324	15	54	0
9	5	212	68	32	22	32	67	212	23	122	0
10	5	256	72	76	18	76	63	256	27	346	0
11	8	121	44	261	38	198	68	100	3	8	22
12	10	334	34	226	24	276	43	12	6	109	46
13	10	150	14	246	30	292	10	196	32	37	56
14	11	136	12	250	60	168	50	294	28	40	28
15	10	117	20	224	40	162	44	265	13	7	44
16	5	268	50	32	34	332	58	240	4	148	32
17	11	99	30	216	36	155	51	249	3	342	40
18	6	119	20	223	32	169	40	264	7	2	50
19	9	28	50	234	36	284	74	41	8	134	14
20	9	2	20	247	50	320	50	209	18	106	32
21	9	12	20	265	38	325	43	225	12	124	45
22	6	116	20	18	20	67	34	334	3	248	52
23	7	288	44	90	44	290	1	15	80	188	10
24	10	305	10	40	20	349	20	82	8	190	68

directions computed by LePichon (1968) for this region. Fitch (1970a) reported the mechanism solutions of six shallow focus earthquakes in this region, indicating thrust as well as strike-slip faulting. He inferred a northeasterly direction of underthrusting from his thrust fault mechanisms, which is in complete agreement with the direction of underthrusting obtained here.

The mechanism solutions of two intermediate depth earthquakes (events 18 and 22) are characterized by a large component of strike-slip faulting (Fig. 6). Normally, deep and intermediate events occur inside the descending lithosphere in response to compressional and extensional stresses aligned parallel to the slablike geometry of the lithosphere (Isacks and Molnar, 1971). Extensional stresses parallel to the dip of the seismic zone are predominant in zones characterized by gaps in seismicity as a function of depth or by the absence of deep earthquakes. As deep earthquakes do not occur in northern Sumatra, thrust faulting mechanisms for intermediate events can be expected. However, the mechanism solutions of events 18 and 22 indicate that the B-axis dips steeply. Moverover, the axis of tensions seems to align along the structural trend of the island arc. Fitch and Molnar (1970) also reported a steeply dipping B-axis for one intermediate depth event that occurred in Java; they suggested that an abrupt change in the strike of the arc structure could cause the change in stress orientation. Analogous orientation of the T axes has also been obtained from the mechanisms of events that occurred near strongly curved parts of other island

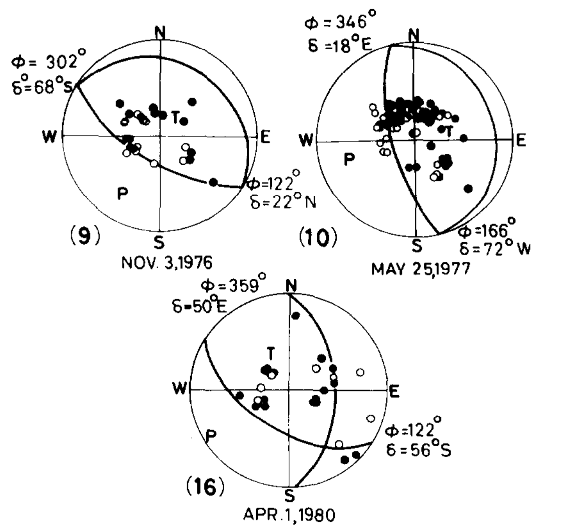

Fig. 5. Mechanism solutions for events 9, 10 and 16 (Table 1 and Fig. 3) that occurred in northern Sumatra. Each of the diagrams in this figure is an equal area projection of the lower hemisphere of the radiation field. Solid circles–compressions; open circles—dilatations. ϕ and δ are the strike and dip of the nodal planes. T and P are the inferred axes of maximum tension and compression respectively. Numbers within brackets correspond to event numbers in Tables 1 and 2.

arcs (Isacks and Molnar, 1971). Steeply dipping B-axes are probably caused by a change in strike of the arc structure in this region.

Andaman–Nicobar islands

Nineteen of the earthquakes for which mechanism solutions are reported occurred in the Andaman–Nicobar Islands. Fourteen of these (events 2–3, 5–7, 11–13, 15, 19–21, 23 and 24) are shallow focus and five (events 1, 4, 8, 14 and 17) are intermediate depth earthquakes.

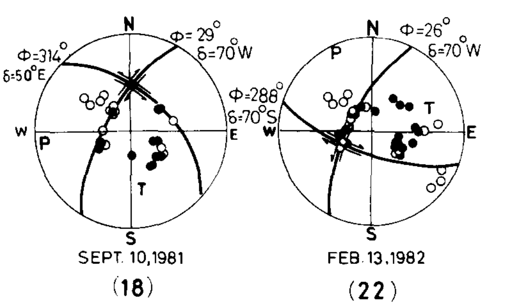

Fig. 6. Mechanism solutions the for September 10, 1981 and February 13, 1982 intermediate depth earthquakes (events 18 and 22 in Table 1 and Fig. 3) that occurred in northern Sumatra. Double arrows indicate sense of shear displacement on the nodal planes. Other symbols as in Fig. 5.

Events 2 and 23 (Fig. 7) are characterized by a large component of normal faulting. Both of the nodal planes strike north–south for each of the events. The deduced orientation of the axis of tension is nearly east–west. Fitch (1970b) reported a normal faulting mechanism for one event that occurred in the Andaman Islands on September 6, 1967. He attributed this mechanism to volcanic activity near the Barren Islands. Normal faulting has been associated with shallow focus events (Stauder, 1968) that occur on the convex side of island arcs; extension in the upper surface of the lithosphere as it bends beneath the island arc is proposed as the cause of normal faulting. Mechanism solutions for events 2 and 23 are consistent with this idea. The radiation pattern of P and PKP waves for event 3 is also shown in Fig. 7. This solution is very poor, so no emphasis will be placed on it in the subsequent discussion.

Mechanism solutions for events 5, 6, 7, 11, 19, 20 and 21 (Figs. 8 and 9) are characterized by a large component of thrust faulting. In each of

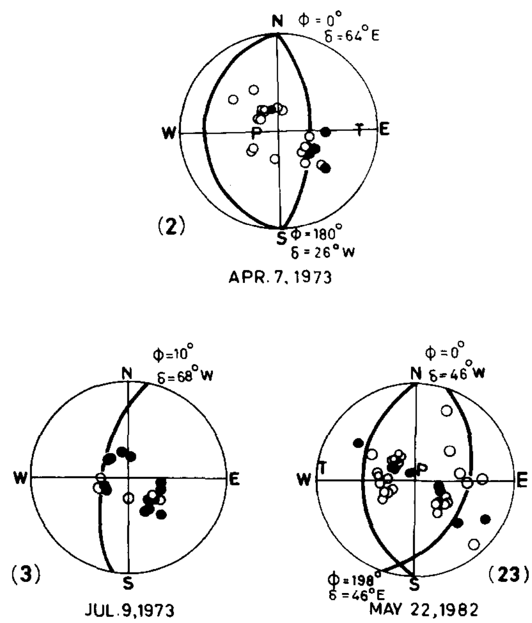

Fig. 7. Mechanism solutions for events 2, 3 and 23 (Table 1 and Fig. 3) that occurred in the Andaman–Nicobar Islands. Symbols as in Fig. 5.

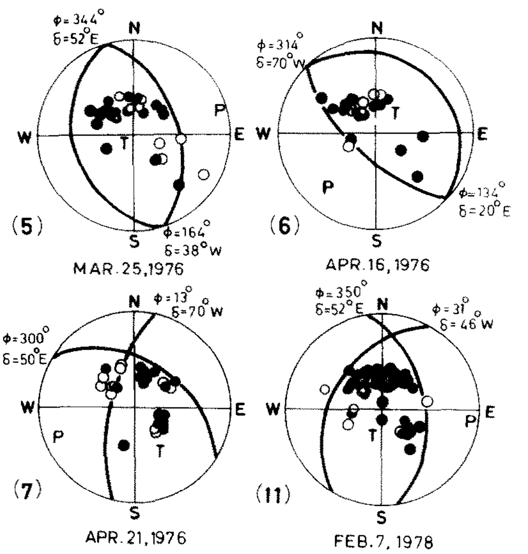

Fig. 8. Mechanism solutions for events 5, 6, 7 and 11 (Table 1 and Fig. 3) that occurred in the Andaman–Nicobar Islands. Symbols as in Fig. 5.

these mechanism solutions, one of the nodal planes dips in a northeasterly direction. For these mechanisms, the choice of the northeasterly dipping plane as the fault plane is consistent with the Indian Ocean being underthrust beneath the Andaman–Nicobar Islands. The inferred direction of underthrusting is nearly northeast. Although, the existence of an underthrusting zone in the Andaman–Nicobar Islands is suggested by the occurrence of intermediate depth earthquakes (Figs. 3 and 4) in this zone, the existence of underthrusting in this region is shown for the first time from focal mechanism solutions.

Mechanism solutions of events 12, 13, 15 and 24 (Fig. 10) are characterized either by a predominant component of strike-slip faulting or a combination of both strike-slip and thrust faulting. Because of the wide spatial separation of these events, their mechanism solutions are discussed separately. The mechanism solution for even 12 (Fig. 10) is characterized by a large component of strike-slip faulting. The strike of one of the nodal planes is parallel and that of the other is perpendicular to the structural trend in the epicentral region of this event. The choice of the nodal plane striking 64° as the fault plane indicates a left lateral movement. The inferred orientation of the slip vector is northeast. Event 13 is located on the eastern branch (Fig. 3). of seismic activity north of 10.5° N latitude. It has been proposed that this branch of seismic activity consists of a spreading ridge intersected by several fracture zones (Chandra, 1984). The choice of a nodal plane (Fig. 10) striking 336° and dipping 60° E as the fault plane is consistent with the orientation of the

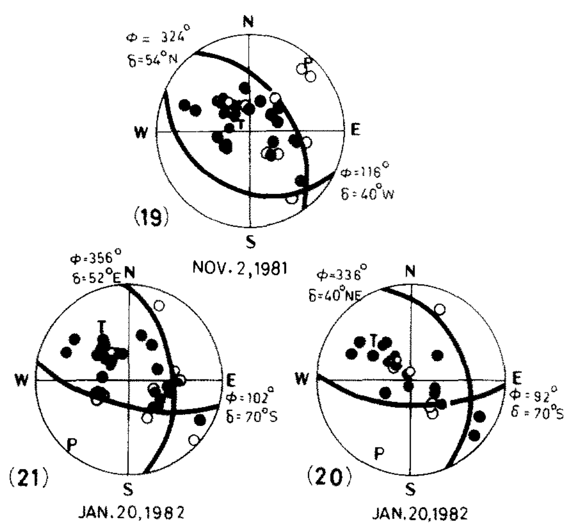

Fig. 9. Mechanism solution for three earthquakes (events 19, 20, and 21 in Table 1 and Fig. 3) that occurred in the Andaman–Nicobar Islands. Symbols as in Fig. 5.

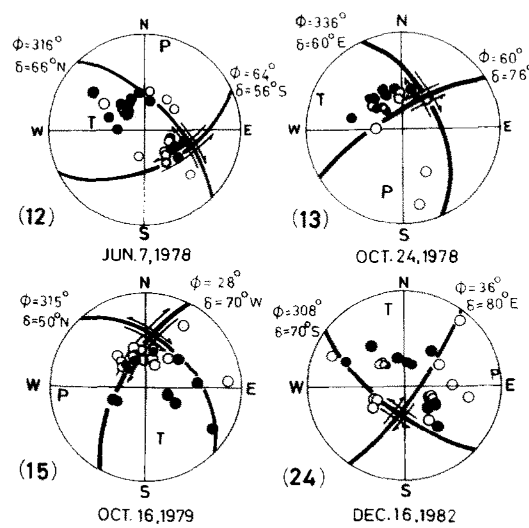

Fig. 10. Mechanism solutions for four earthquakes (events 12, 13, 15 and 24 in Table 1 and Fig. 3) that occurred in the Andaman–Nicobar Islands. Symbols as in Figs. 5 and 6.

fracture zone at the location of this event as suggested by Chandra (1984). The inferred sense of motion is as expected for transform faults, it is opposite to the sense of motion required for a simple transcurrent offset of the ridge. Fitch (1970b) obtained normal faulting mechanisms for two earthquakes that occurred at 14.3°N, 96.2°E, and 13.7°N and 96.5°E respectively. These events are also located on this eastern branch of seismic activity. Normal faulting mechanisms for these events also support Chandra's suggestion (1984).

Event 15 is located about 300 km to the east of the Nicobar Islands. The significance of this activity is not known at present. The radiation pattern for this event (Fig. 10) shows that it is characterized by both strike-slip and thrust faulting. It is very difficult to distinguish between the auxiliary and fault planes in the absence of geological evidence in this region. The inferred orientation of the axis of compression is nearly east–west.

The mechanism solution for event 24 (Fig. 10) is characterized by a large component of strike-slip faulting. The choice of the nodal plane striking 36° as the fault plane indicates a right lateral movement. Here again, the inferred orientation of the slip vector is northeast.

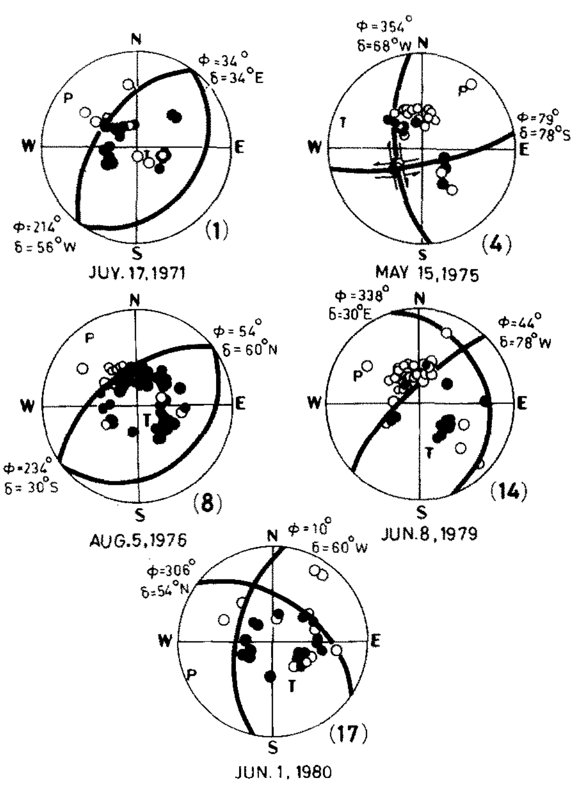

Fig. 11. Mechanism solutions for five intermediate depth earthquakes (events 1, 4, 8, 14 and 17 in Table 1 and Fig. 3) that occurred in the Andaman–Nicobar Islands. Symbols as in Figs. 5 and 6.

The mechanism solutions of five intermediate depth earthquakes (events 1, 4, 8, 14 and 17) are characterized by both thrust and strike-slip faulting (Fig. 11). Thrust faulting mechanisms are consistent with the idea that extensional stresses are predominant in those zones where deep earthquakes are absent (Isacks and Molnar, 1971). It is difficult to explain the strike-slip mechanism of event 4 but it comes as no surprise since a strike-slip mechanism solution for an intermediate depth earthquake was also obtained by Fitch and Molnar (1970).

Conclusions and discussion

The locations of earthquakes in the region studied here show that their focal depth decreases as a function of latitude from south to north. The maximum depth obtained in this study was about 250 km. Seismicity splits into two branches north of latitude 10.5°N. These are no intermediate depth earthquakes associated with the eastern branch. The trend of earthquake epicentres is northwesterly and northeasterly, south and north of 10.5°N, respectively.

Of the five events in northern Sumatra, three are shallow focus and two are intermediate depth. Mechanism solutions of shallow focus events are characterized by a large component of thrust faulting. The deduced orientation of slip vectors is nearly northeast. Intermediate depth events are characterized both by thrust and strike-slip faulting. Strike-slip faulting in the descending slab of lithosphere may be due to an abrupt change in the strike of an arc structure.

Nineteen of the earthquakes covered in this study are located in the Andaman–Nicobar Islands. Of these nineteen events, fourteen are shallow focus and five are intermediate depth. Mechanism solutions of the shallow focus events are characterized by thrust, normal and strike-slip faulting. The slip vectors inferred from these mechanisms show some variation. However, the occurrence of thrust and normal faulting shows that the Andaman–Nicobar Islands form an arc-type structure. Strike-slip faulting obtained for an earthquake that occurred along the eastern branch of seismic activity supports Chandra's (1984) suggestion that this branch behaves like a series of spreading zones separated by fracture zones.

Although there were limitations in the data that were used for this study, the results of this investigation show that the Andaman–Nicobar Islands are like an island-arc structure.

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