報　　文

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# On the Deep Structure and Process in the Island Arcs of Southeast Asia

By

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The deep structure of island arcs bordering the west of the Pacific basin has been studied by many geoscientists in relation to the distribution of intermediate and deep earthquake foci. It is generally accepted that they are located in a certain earthquake zone that dips away from the oceanic trench to the continent. BENIOFF (1955) classified their space distribution into two types, namely marginal continental and oceanic, and concluded the place where the intermediate and deep earthquakes occur is just a kind of the thrust plane, along which the continental blocks are overriding the oceanic ones. Recently, TAKEUCHI and UYEDA (1965) explained them by the convection current hypothesis in the upper mantle. The regional patterns of earthquake generating stresses seem to support these hypotheses (HONDA et al. 1957, BALAKINA 1967, RITSEMA, 1957).

The authors doubted those hypotheses and reexamined the data on the distribution of hypocenters (GUTENBERG and RICHTER, 1954) and the earthquake generating stresses (FARA, 1964) in the Indonesian archipelago.

The earthquake foci in the region are displayed in Figs. 1, 2 and 3. It might be concluded from these figures that nearly all deep earthquake epicenters are confined to such inland sea basins as Java, Flores, Banda and Celebes seas. The depth of those foci is relatively uniform in the regions. Intermediate earthquakes about 200 km depth occur along the Molucca pass and southeast of Mindanao. Along the island arcs from Sumatra to Philippines many shallow and intermediate shocks are recorded. From these data it might be concluded that the depth of the hypocenters increases continuously from the outside of the arcs to the continent in the first approximation as Berlage (UMGROVE, 1949) pointed out.

The authors think that this is all a mere show. The distribution of earthquake foci is not continuous as supposed from the figure drawn by Berlarge but there is discontinuity in the area between the island arcs and the inland sea basins. The relative independence of seismic activity in both regions might be read from Fig. 4 of the vertical NE-SW section along the south of Philippines.

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The opinion might be substantiated by the radiation pattern of earthquakes in both regions (Figs. 6, 7, 8). The earthquake generating stresses in the inland sea basins are characterized by the general tendency that the maximum compression axes are nearly vertical and their horizontal components are roughly parallel to the island arcs, on the other hand the maximum tension axes are nearly horizontal and perpendicular to the arcs. The generating stresses of earthquakes along the island arcs are in a striking contrast to those in the inland sea basins. They are generally characterized by the horizontal component of maximum compression axes to be perpendicular to the island arcs and that of maximum tension axes to be parallel to them, as many authors pointed out already. Along the Molucca pass the maximum compression axes are perpendicular to the topographical features as seen from Fig. 6.

Those phenomena stated above might be very difficult to be explained either by the thrust plane hypothesis or the convection current hypothesis. The authors think that the seismic activity is relatively independent in each tectonic unit of islands and inland sea basins. This shows the deep processes in each tectonic unit are relatively independent, so the crustal deformation should be explained by the deep process beneath each unit. The current hypothesis supposed by VENING MEINESZ (1954) must be rejected.

It is said that the inland sea basins are formed in the young geologic time (BELOUSSOV et al. 1961, van BEMMELEN 1954) and the process is now in progress. The intermediate and deep seismic activities in the basins would be related to the oceanization which is very important in the recent geotectonic movement. The horizontal tension state may be explained by the process. The same conclusion came from the study of seismic activity in the Japanese islands (Y. SUZUKI, 1968 a, b)

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## 東南アジアの島弧の深部構造とそこでの変化過程について

鈴木 尉元　小玉 喜三郎

### 要　旨

東南アジアの島弧の震源分布と発震機構の資料を再検討した。その結果，深発地震の震央は，弧内海盆にその分布が大体限られること，その中ではあまり深度変化はみられないこと，これと浅～中発地震の発生する島弧の震源とは不連続的に移りかわると考えられることを述べた。発震機構の資料によると，弧内海盆に起こる地震の起震歪力と島弧のそれともきわめて対照的で，従来，対流説がよりどころとしていたような分布をとらないことをのべた。

Table 1

| Date day. m. y. | Epicentral coordinates | | Depth (R) | Mag. | Pres | Tens (Azimuth, Plunge) | Null |
|---|---|---|---|---|---|---|---|
| 04.06.30 | 06.5 S | 128.5 E. | 06 | | S 25W22 | S 89 E 45 | N48W37 |
| 28.03.31 | 07. S | 129.5 E. | 01 | | S 10W15 | S 87 E 25 | N52W60 |
| 24.06.33 | 05.0 S | 104.2 E. | 00 | | S 14W18 | N35W63 | S 83 E 18 |
| 24.06.33 | 05.0 S | 104.2 E. | 00 | 7.5 | N32 E 12 | S 46 E 45 | N69W43 |
| 10.04.34 | 07. S | 116. E. | 00 | | S 55W 2 | N35W 6 | S 53 E 83 |
| 10.04.34 | 07.0 S | 116.0 E. | 00 | 6.8 | S 55W02 | N35W06 | S 53 E 83 |
| 29.06.34 | 06.7 S | 123.7 E. | 11 | | N38 E 34 | S 32 E 27 | S 87W44 |

| Date day. m. y. | Epicentral coordinates | | Depth (R) | Mag. | Pres | Tens | Null |
|---|---|---|---|---|---|---|---|
| | | | | | (Azimuth, Plunge) | | |
| 04.10.35 | 06. N | 125. E. | 07 | | N50W52 | S84E33 | S17W17 |
| 25.11.35 | 05.5N | 094.0E. | 00 | 6.5 | S 5E60 | N65W16 | N33E24 |
| 28.12.35 | 00.2S | 098.0E. | 00 | 7.9 | S27E13 | N58E22 | N88W62 |
| 20.01.36 | 06. N | 127. E. | 01 | | N40E 1 | S50E 7 | N61W83 |
| 28.04.36 | 06.5S | 129. E. | 03 | | N 2W43 | S81W 7 | S17E46 |
| 08.05.36 | 05.7S | 112.7E. | 09 | | N18E78 | S18W12 | N72W 0 |
| 10.06.36 | 05.5S | 147. E. | 02 | | N56E 2 | S33E31 | N37W59 |
| 23.08.36 | 06. N | 095. E. | 01 | | S10E 0 | N80E44 | S80W46 |
| 23.08.36 | 06.0N | 095.0E. | 00 | 7.3 | S 9E 4 | N77E42 | S85W48 |
| 05.04.37 | 01. S | 133. E. | 01 | | S10E18 | N78E 8 | N35W71 |
| 01.07.37 | 03.0N | 096.0E. | 01 | 6.7 | S28E69 | N24E14 | N70W16 |
| 11.08.37 | 06.5S | 116.5E. | 09 | | S50W57 | N10W18 | N89E27 |
| 11.08.37 | 06.5S | 112.7E. | 09 | | S11W66 | N11E24 | N79W 0 |
| 27.09.37 | 08.8S | 110.8E. | 00 | 7.2 | S14E17 | N74E 8 | N41W71 |
| 01.02.38 | 05. S | 131.5E. | 00 | | S 6W 4 | S85E10 | N61W79 |
| 01.02.38 | 05.0S | 131.5E. | 00 | 8.2 | S 6W 4 | S85E10 | N61W79 |
| 08.04.38 | 06.0S | 094.5E. | 01 | 6.0 | S67E19 | S26W 9 | N40W69 |
| 18.08.38 | 03.8S | 102.8E. | 01 | | N30W18 | S30E72 | N60E 0 |
| 18.08.38 | 04.0S | 103.0E. | 01 | 6.9 | N64W10 | N43E58 | S20W30 |
| 25.08.38 | 05.0S | 102.0E. | 00 | 6.9 | N36W21 | S52W 4 | S48E68 |
| 20.10.38 | 09.2S | 123.0E. | 01 | | S20W44 | N55W15 | N49E43 |
| 15.11.38 | 04.8S | 098.9E. | 00 | | | | S38E78 |
| 15.11.38 | 05.0S | 099.0E. | 00 | 6.5 | S36E13 | N45E35 | S71W52 |
| 21.12.39 | 00. | 123. E. | 02 | | S13E14 | N30E71 | S80W12 |
| 21.03.40 | 10.5S | 107.5E. | 00 | | S67E 6 | N23E 1 | N73W84 |
| 21.03.40 | 10.5S | 107.5E. | 00 | 6.8 | S67E 6 | N23E 1 | N73W84 |
| 28.03.40 | 14.5N | 120.5E. | 02 | | N88W 1 | N 3E24 | S 1E66 |
| 28.03.40 | 14.2N | 120.5E. | 02 | 6.8 | N88W 1 | N 3E24 | S 1E66 |
| 18.06.40 | 05.4N | 123.0E. | 08 | | N45W88 | S45E02 | N45E 0 |
| 22.06.40 | 00. | 122.5E. | 03 | | S 3E 1 | N86E58 | S87W32 |
| 22.09.40 | 08.0N | 124.0E. | 10 | | S 5E68 | N72E 5 | N20W22 |
| 22.09.40 | 07.5N | 123.5E. | 10 | | N16E47 | S82W21 | S24E36 |
| 07.10.40 | 05. N | 126. E. | 01 | | N13E46 | S71E 5 | S24W44 |
| 31.01.41 | 06.5S | 128.5E. | 03 | | S 8W52 | N26W33 | N75E17 |
| 04.02.41 | 09. N | 124. E. | 09 | | N39E71 | N58W 2 | S32W19 |
| 25.02.41 | 09. S | 125. E. | 02 | | S 4W23 | N77E34 | N60W47 |
| 26.06.41 | 12.5N | 092.5E. | 00 | | N34W40 | S34E50 | N56E 0 |
| 26.06.41 | 12.5N | 092.5E. | 00 | 8.1 | N28E41 | S37W48 | S58E 5 |
| 17.09.41 | 00.1N | 122.7E. | 03 | | N36E46 | S52E 2 | S40W43 |
| 27.11.41 | 06.6S | 121.1E. | 07 | | S79E51 | N18W22 | S58W31 |
| 08.04.42 | 13.2N | 120.5E. | 00 | | S53E13 | N34E15 | S75W70 |
| 08.04.42 | 13.2N | 120.5E. | 00 | | S53E13 | N34E15 | S75W70 |
| 28.05.42 | 00. | 124. E. | 01 | | S13E16 | N75E 5 | N31W73 |
| 25.07.42 | 11.5N | 124.5E. | 01 | | S66W18 | N23W 1 | N69E72 |
| 29.07.42 | 02.7S | 127.7E. | 00 | | S00W85 | N00W05 | N90E 0 |
| 29.07.42 | 02.8S | 127.8E. | 00 | 7.0 | S00E85 | N00W05 | S90W 0 |

| Date day. m. y. | Epicentral coordinates | | Depth (R) | Mag. | Pres (Azimuth, Plunge) | Tens | Null |
|---|---|---|---|---|---|---|---|
| 01. 04. 43 | 06. 5 S | 106. E. | 00 | | N14W16 | S 46W60 | N84 E 24 |
| 01. 04. 43 | 06. 5 S | 106. 0 E. | 00 | 7. 0 | N14W16 | S 46W60 | N84 E 24 |
| 25. 05. 43 | 07. 5 N | 127. 5 E. | 00 | | N81 E 19 | S 8E 3 | N90W71 |
| 25. 05. 43 | 07. 5 N | 127. 5 E. | 00 | 7. 9 | N81 E 19 | S 8E 3 | N90W71 |
| 08. 06. 43 | 01. 0 S | 101. 0 E. | 00 | 7. 4 | S 42W57 | N64 E 31 | N32W10 |
| 09. 06. 43 | 01. 0 S | 101. 0 E. | 00 | 7. 6 | S 15W53 | N47 E 32 | N53W15 |
| 30. 06. 43 | 07. S | 122. E. | 11 | | N41W 0 | S 49W29 | N49 E 61 |
| 06. 11. 43 | 05. 7 S | 134. E. | 00 | | S 27 E 33 | S 66W 4 | N18W56 |
| 06. 11. 43 | 05. 8 S | 134. 0 E. | 00 | 7. 6 | S 27 E 33 | S 66W 4 | N18W56 |
| 26. 11. 43 | 02. 5 S | 100. 0 E. | 01 | 7. 1 | S 16 E 12 | N60 E 47 | S 84W40 |
| 01. 12. 43 | 04. 5 S | 144. E. | 01 | | S 54 E 13 | N35 E 4 | N73W77 |
| 05. 01. 44 | 03. 5 S | 102. 0 E. | 00 | 7. 0 | N18W 4 | N75 E 32 | S 66W58 |
| 22. 03. 44 | 08. 5 S | 123. 5 E. | 03 | | S 28 E 6 | N59 E 30 | S 73W60 |
| 31. 03. 44 | 05. 5 S | 131. E. | 00 | | S 12 E 14 | S 82W14 | N35 E 70 |
| 31. 03. 44 | 05. 5 S | 131. 0 E. | 00 | 7. 0 | S 12 E 14 | S 82W14 | N35 E 70 |
| 26. 04. 44 | 00. 7 S | 133. 5 E. | 00 | | N37W 7 | S 50W24 | N69 E 65 |
| 26. 04. 44 | 00. 8 S | 133. 5 E. | 00 | 7. 2 | N37W 7 | S 50W24 | N69 E 65 |
| 27. 04. 44 | 01. S | 133. E. | 00 | | N16W 6 | N79 E 37 | S 66W53 |
| 27. 04. 44 | 01. 0 S | 133. 0 E. | 00 | 7. 4 | N16W 6 | N79 E 37 | S 66W53 |
| 15. 11. 44 | 04. 5 N | 127. 5 E. | 00 | | N35 E 50 | S 35W40 | N55W 0 |
| 15. 11. 44 | 04. 5 N | 127. 5 E. | 00 | 7. 2 | S 35W35 | N35 E 55 | N55W 0 |
| 22. 04. 45 | 05. N | 123. E. | 10 | | S 30W47 | N83 E 29 | N25W28 |
| 09. 05. 45 | 07. 5 S | 124. E. | 08 | | N39 E 48 | S 34 E 15 | S 68W38 |
| 16. 10. 45 | 00. | 123. 7 E. | 00 | | N18 E 0 | S 72 E 38 | N72W52 |
| 16. 10. 45 | 00. 0 N | 123. 8 E. | 00 | 7. 1 | S 18W 0 | S 72 E 38 | N72W52 |
| 17. 01. 46 | 06. 2 S | 147. 7 E. | 01 | | N66W18 | S 23W 3 | S 78 E 72 |
| 17. 01. 46 | 06. 2 S | 147. 8 E. | 01 | 7. 2 | N66W18 | S 23W 3 | S 78 E 72 |
| 26. 03. 46 | 03. 0 S | 102. 0 E. | 00 | 6. 7 | S 45W 7 | S 47 E 14 | N20W47 |
| 08. 05. 46 | 00. 5 S | 099. 5 E. | 00 | 7. 1 | S 65W16 | N17W26 | S 52 E 59 |
| 15. 06. 46 | 03. S | 128. E. | 01 | | N80 E 21 | S 9E 3 | S 88W68 |
| 10. 11. 46 | 08. 0 S | 078. 0W. | 00 | | N83 E 6 | S 3 E 34 | N15W55 |
| 27. 05. 47 | 01. 7 S | 135. 5 E. | 01 | | S 30 E 24 | S 62W 4 | N19W65 |
| 27. 05. 47 | 01. 8 S | 135. 5 E. | 01 | 7. 3 | S 30 E 24 | S 62W 4 | N19W65 |
| 27. 05. 47 | 01. 7 S | 135. 5 E. | 01 | | S 22 E 34 | S 79W16 | N 9 E 52 |
| 27. 05. 47 | 01. 8 S | 135. 5 E. | 01 | 7. 2 | S 22 E 34 | S 79W16 | N 9 E 52 |
| 24. 01. 48 | 11. N | 122. E. | 00 | | S 31W12 | S 60 E 5 | N 8 E 77 |
| 24. 01. 48 | 11. 0 N | 122. 0 E. | 00 | 8. 2 | S 31W12 | S 60 E 5 | N 8 E 77 |
| 28. 01. 48 | 01. 5 N | 126. 5 E. | 01 | | S 68W51 | S 27 E 4 | N60 E 39 |
| 01. 03. 48 | 03. S | 127. 2 E. | 00 | | S 76 E 6 | S 18W36 | N 5 E 53 |
| 01. 03. 48 | 03. 0 S | 127. 2 E. | 00 | 7. 5 | S 76 E 6 | S 18W36 | N 5 E 53 |
| 27. 03. 49 | 03. 2 N | 127. 7 E. | 00 | | N55 E 7 | S 35 E 7 | N80W80 |
| 27. 03. 49 | 03. 2 N | 127. 8 E. | 00 | 7. 0 | N55 E 7 | S 35 E 7 | N80W80 |
| 23. 04. 49 | 07. 5 S | 120. 7 E. | 00 | | N45 E 65 | S 45W25 | N45W 0 |
| 23. 04. 49 | 07. 5 S | 120. 8 E. | 00 | 7. 1 | S 45W25 | N45 E 65 | N45W 0 |
| 23. 04. 49 | 08. S | 121. E. | 01 | | S 45W12 | S 58 E 45 | N34W43 |
| 30. 04. 49 | 07. N | 125. E. | 02 | | N63W 1 | S 27W32 | N29 E 58 |

| Date day. m. y. | Epicentral coordinates | | Depth (R) | Mag. | Pres | Tens | Null |
|---|---|---|---|---|---|---|---|
| | | | | | (Azimuth, Plunge) | | |
| 09.05.49 | 05.0S | 095.0E. | 00 | 6.7 | S 4E29 | N53E45 | N75W31 |
| 24.06.49 | 06.2S | 105.7E. | 00 | | S 0W27 | N71E34 | N60W45 |
| 24.06.49 | 06.4S | 105.8E. | 00 | 7.0 | S 0W27 | N71E34 | N60W45 |
| 07.08.50 | 07.5N | 124.5E. | 01 | | S80E 2 | S11W31 | N 7E59 |
| 14.09.50 | 00.5N | 127. E. | 03 | | N 6E 6 | S84E 0 | S 6W84 |
| 19.09.50 | 02. S | 138.5E. | 00 | | S73W35 | N 8W12 | S82E52 |
| 19.09.50 | 02.0S | 138.5E. | 00 | 6.9 | S73W35 | N 8W12 | S82E52 |
| 08.10.50 | 04. S | 128.5E. | 00 | | S25E27 | N62E 6 | N40W63 |
| 08.10.50 | 04.0S | 128.5E. | 00 | 7.6 | S25E27 | N62E 6 | N40W63 |
| 02.11.50 | 07.5S | 129. E. | 03 | | S 1W32 | N83W10 | N22E56 |
| 02.11.50 | 07.5S | 129.0E. | 03 | 7.5 | S 5W35 | N78W 9 | N24E52 |
| 17.02.51 | 07. S | 146. E. | 03 | | N89E43 | S29W29 | N39W34 |
| 29.11.51 | 00.5N | 120.5E. | 00 | | N18E20 | N81W22 | S34E60 |
| 29.11.51 | 00.5N | 120.5E. | 00 | 6.5 | N18E20 | N81W22 | S34E60 |
| 29.11.51 | 00.5N | 120.5E. | 00 | | S86E22 | S15W25 | N32W55 |
| 29.11.51 | 00.5N | 120.5E. | 00 | 6.5 | S86E22 | S15W25 | N32W55 |
| 11.02.52 | 05.5S | 109.8E. | 10 | | S35E38 | N55E 0 | N35W52 |
| 14.02.52 | 07.7S | 126.5E. | 00 | | S 8E11 | N81E 8 | N45W76 |
| 19.03.52 | 09.5N | 126.0E. | 00 | | S15E58 | N75E 0 | N15W32 |
| 08.05.52 | 02.5N | 127. E. | 00 | | S69W 3 | S22E 9 | N 3W81 |
| 08.05.52 | 02.5S | 127.0E. | 00 | 6.7 | S69W 3 | S22E 9 | N 3W81 |
| 13.07.52 | 03.1S | 127.0E. | 00 | | N88E18 | S40W64 | N 8W18 |
| 13.07.52 | 03.1S | 127.0E. | 00 | | N88E18 | S40W64 | N 8W18 |
| 06.11.52 | 05. S | 145.5E. | 00 | | S19W 0 | N71W14 | S71E76 |
| 06.11.52 | 05.0S | 145.5E. | 00 | 7.3 | S19W 0 | N71W14 | S71E76 |
| 20.01.53 | 01.5N | 126.0E. | 00 | | S44E50 | N 5W33 | S72W19 |
| 06.04.53 | 07.3S | 131.0E. | 00 | | S19E44 | S76W 5 | N 9W46 |
| 25.06.53 | 08.5S | 123.5E. | 00 | | N69E 0 | S21E 8 | N21W82 |
| 07.07.53 | 01.0N | 100.0E. | 03 | | N67W13 | N52E63 | S18W22 |
| 13.11.53 | 03.5N | 096.0E. | 00 | | N64E 1 | N27W 1 | S18W89 |
| 02.12.53 | 02.7S | 141.5E. | 00 | | N45W11 | N45E 0 | S45E10 |
| 01.01.54 | 09.0S | 123.5E. | 01 | | S 9W17 | N75W19 | N61E64 |
| 20.02.54 | 06.9S | 124.5E. | 09 | | N59E47 | N68W29 | S 4W28 |
| 03.03.54 | 05.5S | 142.5E. | 00 | | S56W14 | N33W 6 | N78E75 |
| 06.06.54 | 03.0S | 135.5E. | 00 | | | | N21W 0 |
| 02.07.54 | 13.0N | 124.0E. | 00 | 7.0 | N71E 1 | S19E 1 | N64W88 |
| 03.07.54 | 06.5S | 105.5E. | 01 | | S37W22 | N37E68 | N53W 0 |
| 20.09.54 | 01.5S | 120.5E. | 00 | | S36W46 | S80E23 | N 7W35 |
| 03.10.54 | 01.5S | 127.5E. | 00 | | N65E 4 | S25E10 | N48W79 |
| 02.11.54 | 08.0S | 119.0E. | 00 | | S48W 9 | S44E14 | N 9W74 |
| 31.03.55 | 08. N | 124. E. | 00 | | N44E 1 | S45E24 | N47W66 |
| 31.03.55 | 08.0N | 124.0E. | 00 | 7.5 | N44E 1 | S45E24 | N47W66 |
| 17.05.55 | 06.5N | 094. E. | 00 | | N71E 8 | S18E11 | N55W76 |
| 17.05.55 | 06.5N | 094.0E. | 00 | 7.2 | N71E 8 | S18E11 | N55W76 |
| 29.05.55 | 10. S | 110.5E. | 00 | | S17E24 | N72E 1 | N21W66 |
| 29.05.55 | 10.0S | 110.5E. | 00 | 6.5 | S17E24 | N72E 1 | N21W66 |

| Date day. m. y. | Epicentral coordinates | | Depth (R) | Mag. | Pres | Tens | Null |
|---|---|---|---|---|---|---|---|
| | | | | | (Azimuth, Plunge) | | |
| 21. 08. 55 | 03. 0 S | 137. 5 E. | 00 | | N26E 8 | N69W35 | S53E54 |
| 15. 09. 55 | 05. S | 134. 5 E. | 00 | | S89E40 | S 4W 4 | N82W50 |
| 15. 09. 55 | 05. 0 S | 134. 5 E. | 00 | 6. 7 | S89E40 | S 4W 4 | N82W50 |
| 10. 02. 57 | 10. N | 126. E. | 00 | | S73W12 | N 8W39 | S31E49 |
| 10. 02. 57 | 10. 0 N | 126. 5 E. | 00 | 6. 7 | S73W12 | N 8W39 | S31E49 |
| 10. 02. 57 | 10. N | 26. 1 E. | 00 | | S31W13 | S60E 4 | N12E77 |
| 10. 02. 57 | 10. 0 N | 126. 5 E. | 00 | 6. 8 | S31W13 | S60E 4 | N12E77 |
| 10. 02. 57 | 10. 5 N | 126. 5 E. | 00 | | S28W 6 | S62E 3 | N 1E84 |
| 10. 02. 57 | 10. 5 N | 126. 5 E. | 00 | 6. 7 | S28W 6 | S62E 3 | N 1E84 |
| 11. 02. 57 | 10. N | 126. E. | 00 | | S23W 2 | S67E 2 | N22W87 |
| 11. 02. 57 | 10. 0 N | 126. 0 E. | 00 | 6. 5 | S23W 2 | S67E 2 | N22W87 |
| 23. 03. 57 | 05. 5 S | 131. E. | 01 | | N77E38 | N15W 3 | S72W52 |
| 23. 03. 57 | 05. 5 S | 131. 0 E. | 01 | 7. 0 | N77E38 | N15W 3 | S72W52 |
| 16. 04. 57 | 04. 5 S | 107. 5 E. | 09 | | S72E64 | N26W 4 | N62W25 |
| 16. 04. 57 | 04. 5 S | 107. 5 E. | 09 | 7. 5 | S72E64 | N26W 4 | N62W25 |
| 02. 05. 57 | 07. 5 S | 120. E. | 09 | | S84E54 | S14W 6 | N72W36 |
| 02. 05. 57 | 07. 5 S | 120. 0 E. | 09 | 6. 7 | S84E54 | S14W 6 | N72W36 |
| 22. 06. 57 | 01. 5 S | 137. E. | 00 | | S82E 5 | S 8W 5 | N37W83 |
| 22. 06. 57 | 01. 5 S | 137. 0 E. | 00 | 7. 2 | S82E 5 | S 8W 5 | N37W83 |
| 24. 09. 57 | 05. 5 N | 127. 5 E. | 00 | | S42W28 | N48W 0 | N42E62 |
| 27. 09. 57 | 08. 7 S | 110. 7 E. | 00 | | S14E17 | N74E 8 | N41W71 |
| 25. 06. 58 | 03. 0 S | 144. 5 E. | 00 | | | | |
| 25. 06. 58 | 03. 0 S | 144. 5 E. | | 6. 3 | S 2W 0 | S88E 0 | N 0E90 |
| 15. 08. 58 | 01. 5 N | 125. 0 E. | 03 | 6. 8 | | | |

(after FARA (1964))

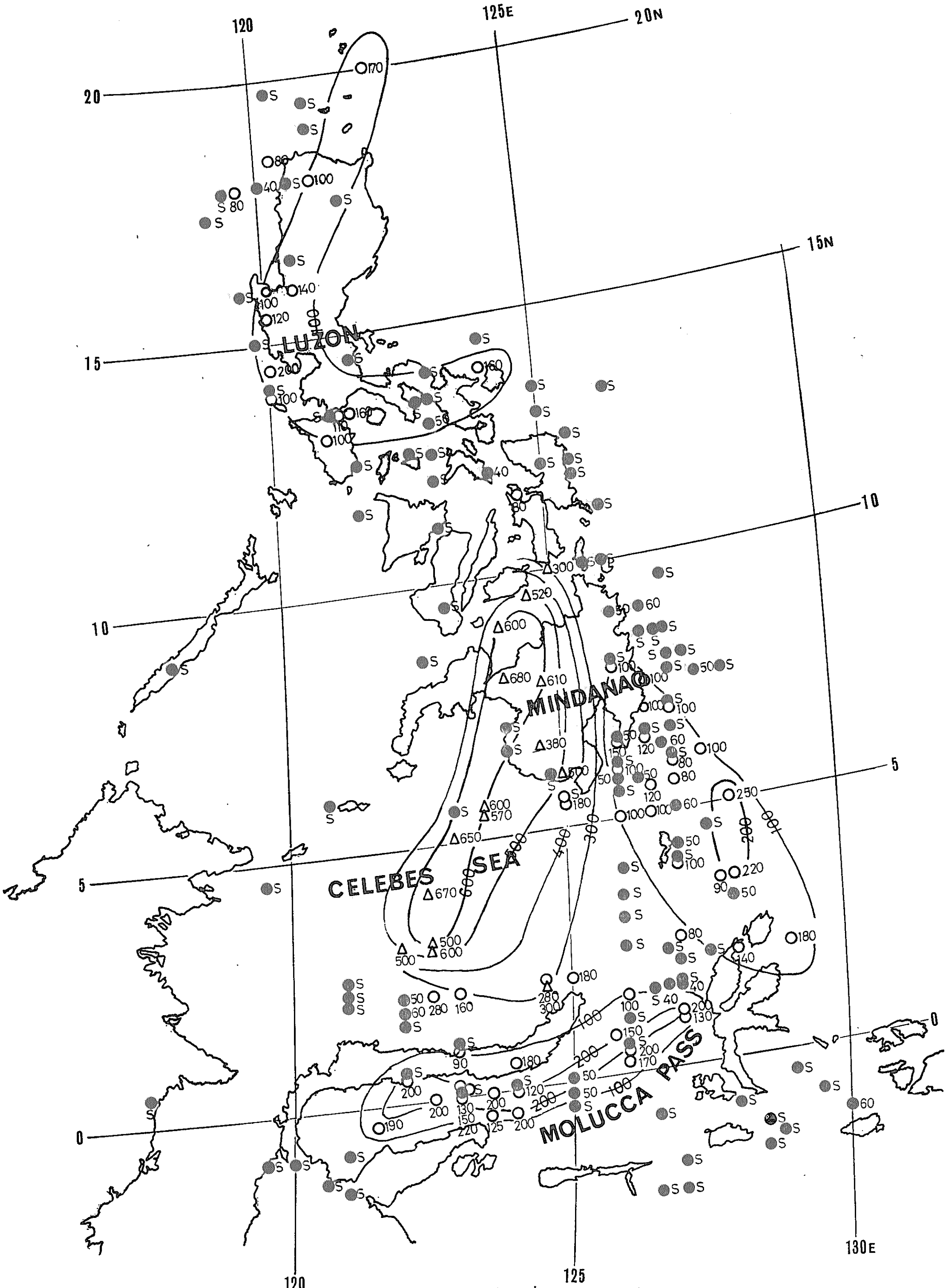



Fig. 1 Distribution of earthquake foci and their isobathen in the surroundings of the Philippines.

● epicenter (<70)
○ ibid (70-300)
△ ibid (>300)
$^{50}_{200}$ depth of earthqake foci (km)
—— isobathen

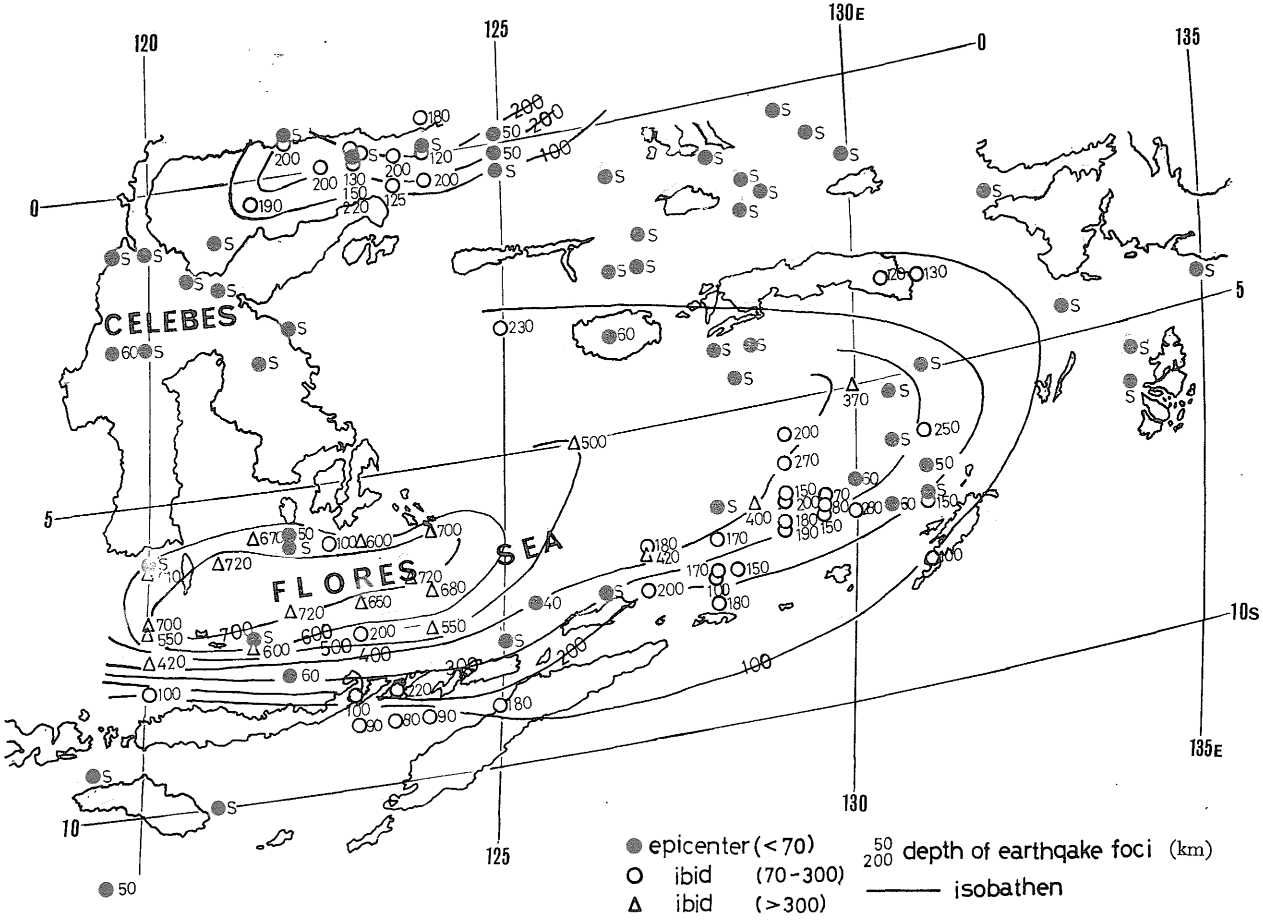



Fig. 2 Distribution of earthquake foci and their isobathen in the surroundings of Flores sea.

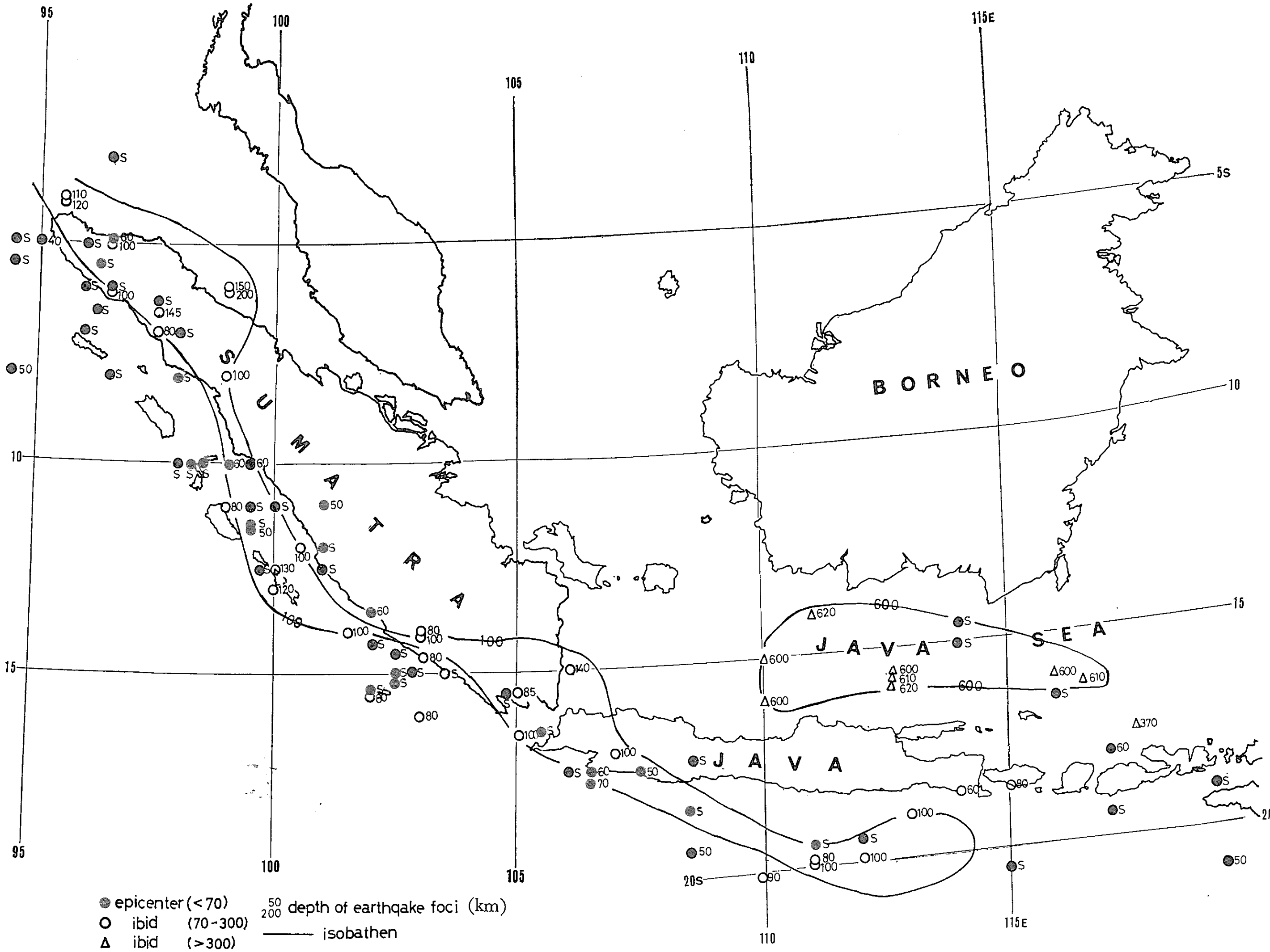



Fig. 3 Distribution of earthquake foci and their isobathen in the surroundings of Sumatra.

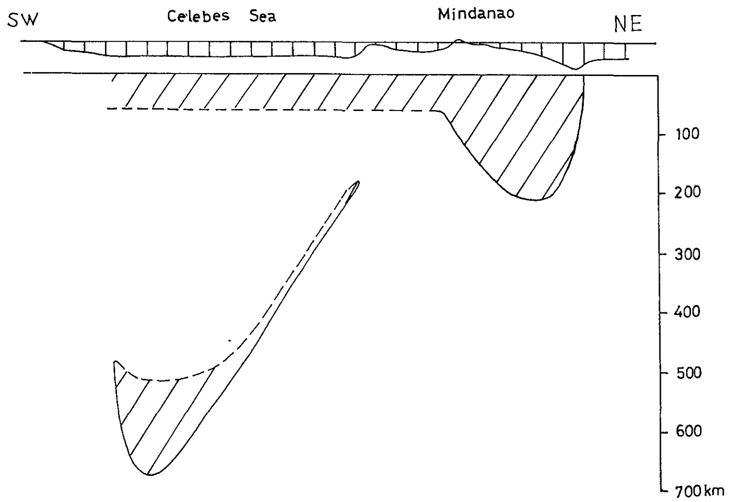



Fig. 4 Schematic section of topography (upper) and earthquake foci (lower) in the region from Mindanao to Celebes sea.

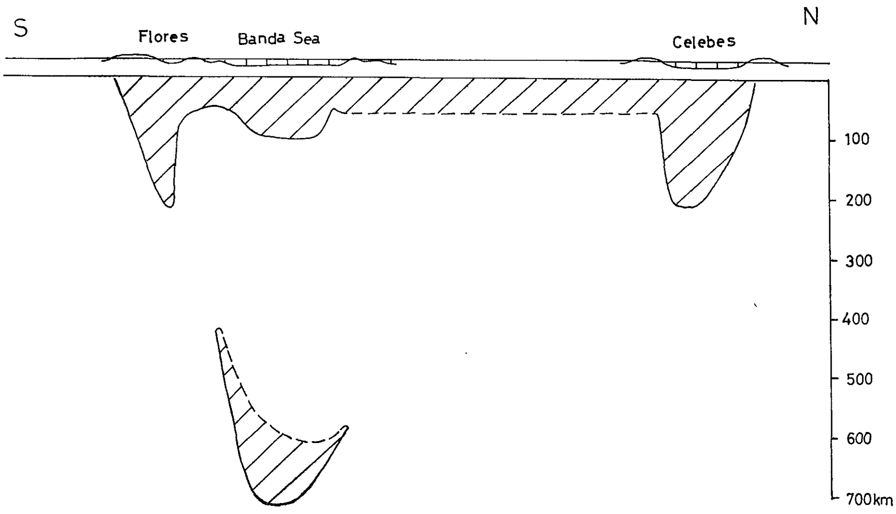



Fig. 5 Schematic section of topography (upper) and earthquake foci (lower) in the region from Celebes to Flores sea.

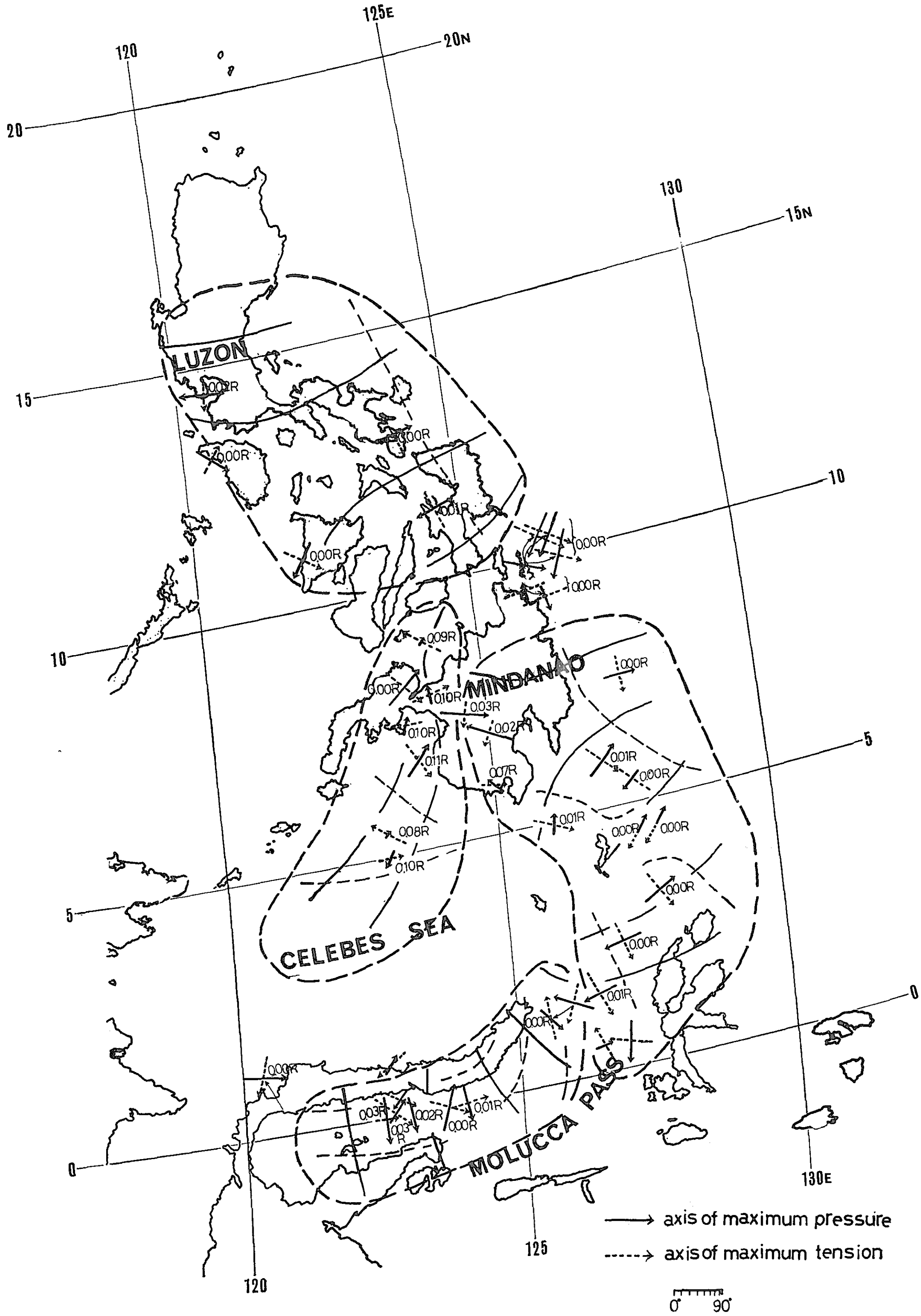



Fig. 6 The direction of maximun pressure (solid lines) and maximum tension (dotted lines) in the surroundings of the Philippines. Arrow indicates the direction of inclination. Length of each line is proportional to the cosine of the plunge.

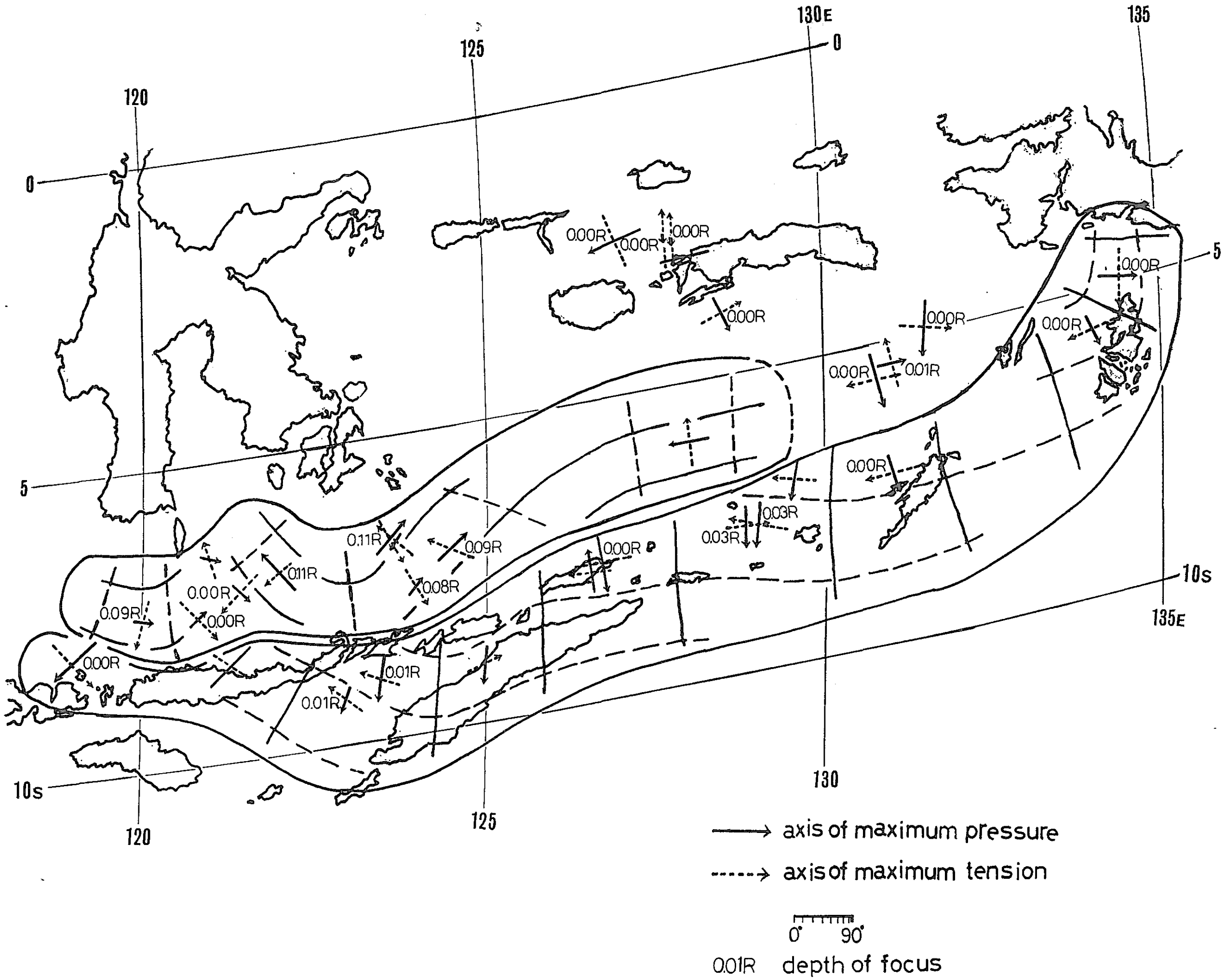
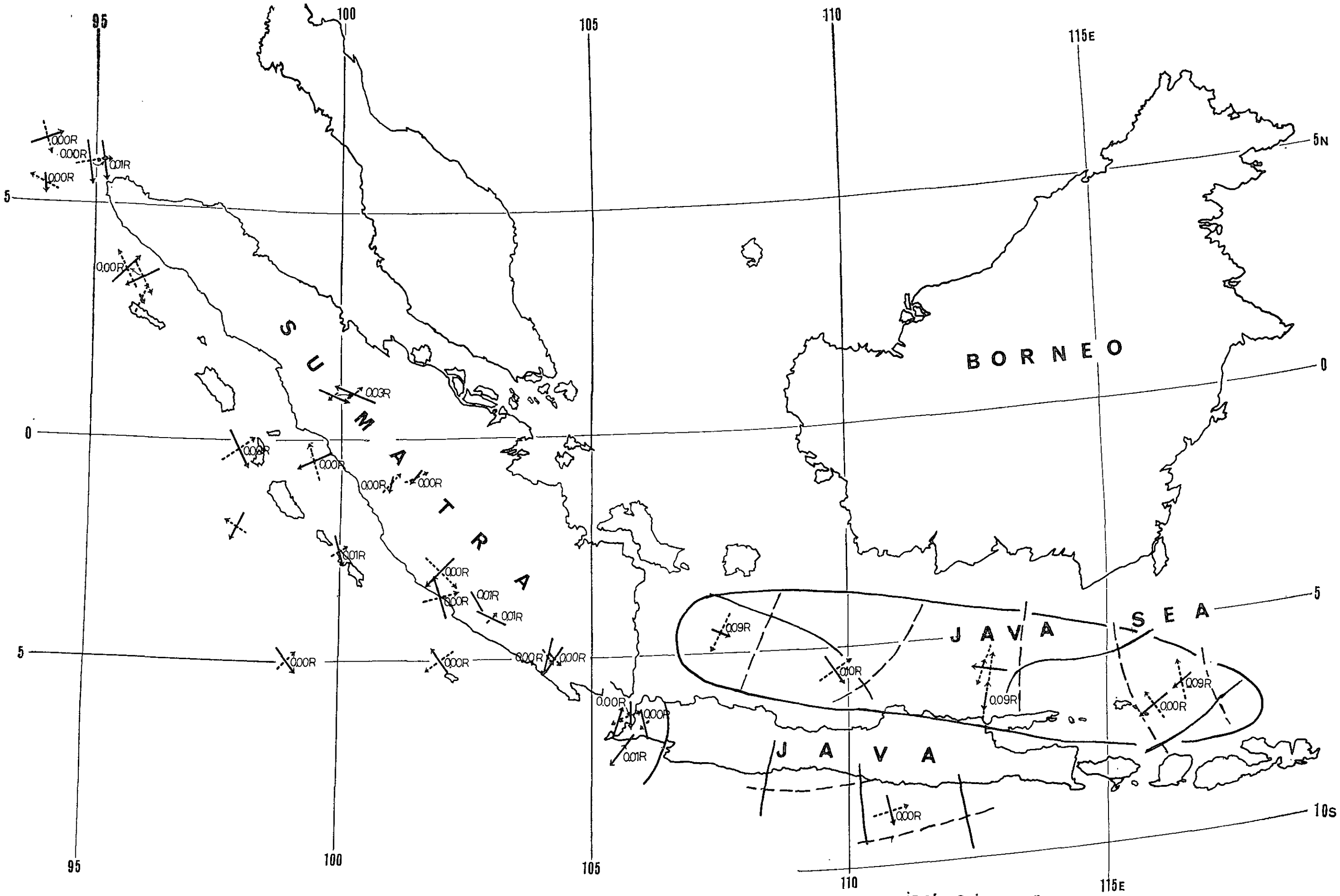



Fig. 7 The direction of maximum pressure (solid lines) and maximum tension (dotted lines) in the surroundings of Flores sea.



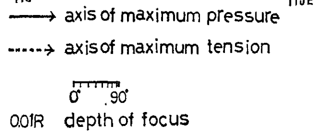




Fig. 8 The direction of maximum pressure (solid lines) and maximum tension (dotted lines) in the surroundings of Sumatra.