ΣΕΙΣΜΟΛΟΓΙΑ.— **On the Earthquake Activity Occurring per Month in Greece,** by *A. G. Galanopoulos* *.

ABSTRACT

Evidence is presented that the monthly number of earthquakes tends to be relatively higher in the spring season, while the amount of the seismic energy release per month seems to be relatively higher in the summer months.

There is a good reason to believe that the fault-plane lubrication and/or the intrinsic pore-fluid pressure, conditioning the effective coefficient of internal friction, is affected by the downward percolation through fissured rocks well below the upper layer of the Earth.

A decrease of the effective coefficient of internal friction facilitates the process of slippage at depth within an active fault zone as well as the breaking of the fault-plane asperities and consequently the occurrence of earthquakes. The assumed decrease of the breaking or ultimate strength of the rocks involved may account for the relatively higher number of earthquakes observed in the spring season.

The relatively higher amount of seismic energy release per month in the summer months might be ascribed to the increase of the effective coefficient of internal friction in the drought season. An increase of the coefficient in question handicaps the process of slippage at depth within an active fault zone. Halting the process of slippage by stronger asperities or barriers leads to a higher strain accumulation at depth and consequently to the occurrence of relatively fewer but larger earthquakes.

INTRODUCTION

Earthquakes are results of disturbance of the equilibrium of inner deformed strata of the earth under critical strain. When the strength of the strained rocks is very close to their breaking point, their disturbance might be caused by additional strain accumulation either by inner orogenic forces or by minor forces having their seat at the surface or out of the surface of the earth. The mountainbuilding, strain-producing forces are the main causes of the earthquakes (Entstehungsursachen). The outside acting forces are usually known as triggering forces (Auslösungsursachen).

As triggering forces have been recognized so far the tidal forces (Tamrazyan, 1970), the transportation and deposition of weathering debris (Galanopoulos, 1971; 1981), the precipitation and the floods, the passage of ba-

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rometric highs or lows over critically strained strata, the seasonal peaks in loading on faulted bottom of artificial lakes (Galanopoulos, 1967) and particularly the fault - plane lubrication in the neighbourhood of dam sites (Carder, 1970; Gupta and Rastogi, 1976).

DATA USED

Many laymen in Greece believe that earthquakes not very rarely occur in the summer season when the weather is very hot and calm (κουφόβραση)*. To find out if there is any bit of truth in this widespread notion we made a sample of all earthquakes with maximum intensity $I_o \geqslant$ VII on Mercalli - Sieberg scale and a focal depth $h \leqslant 21$ km. We have had the haunch that nearly all the shocks associated with substantional damage ($\geqslant$ VII) have not passed unobserved since the installation of the Mainka seismograph in Greece and that a lot of them with a focus in the upper layer (about 21 km thick) may have been triggered by external forces.

The data have been compiled from the revised list of strong shocks with $M_s \geqslant 5\ 1/2$ occurred in and around the Aegean microplate (N^{43}_{32}, E^{30}_{17}) since 1902 (Galanopoulos, 1977). Since 1974 the data have been taken from Table II annexed to this paper. It is intuitively evident that the compiled data properly treated has a far greater chance to reveal if there is any relation with triggering forces than the whole set of data listed in the above mentioned catalogues.

FIRST EVIDENCE

The sample data has been arranged per month and thus the montly number of shocks has been resulted. Thereafter the corresponding amount of

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* The still-prevalent notion of «earthquake weather» comes from Aristotle. He theorized that the winds of the atmosphere were drawn into the earth, which was filled with caverns and passageways. The winds, he believed, were agitated by fire and moved about trying to escape, thus causing earthquakes and sometimes erupting as volcanoes. He taught that when air was drawn into the earth prior to an earthquake, the air above the earth became calmer and thinner, making it hard to breathe. Four hundred years later, Pliny wrote: «Tremors of the earth never occur except when the sea is calm and the sky so still that birds are unable to soar because all the breath that carries them has been withdrawn». Because such conditions are often present in hot, humid weather, such weather became known as «earthquake weather» and presumably signaled the coming of an earthquake (Gere and Shah, 1984).

seismic and strain energy release has been calculated by the very known Gutenberg - Benioff formulas: Log E = 11.8 + 1.5 M_s and Log $E^{1/2}$ = 5.9 + 0.75 M_s, respectively (Benioff, 1951). Then the resulted values ΣN, ΣE and $\Sigma E^{1/2}$ (see Table I) have been plotted against the related months in three graphs. To make the monthly trend of the earthquake activity, expressed in total numbers of earthquakes and total amounts of seismic and strain energy release, more conspicuous, the real values per month have been smoothed out by the widely used in Meteorology method: (a + 2b + c) : 4 and with the new values: $\overline{\Sigma N}$, $\overline{\Sigma E}$, $\overline{\Sigma E}^{1/2}$ another set of graphs has been drafted.

On the raw and smoothed graphs the total number of earthquakes (see Fig. 1 and 2) shows a well expressed maximum in March and another minor in August. On the contrary the seismic energy release (see Fig. 3 and 4) shows a conspicuous maximum in August and a minor one in March. The difference in the two sets of graphs indicates that the number of earthquakes tends to be relatively higher in the spring. Nevertheless, the amount of the seismic energy release seems to be relatively higher in the summer.

The difference in the two sets of graphs might be attributed to the decrease of the effective coefficient of internal friction after an extensive fault - plane lubrication following the rain season. A decrease of the coefficient in question faciliatates the process of slippage at depth within an active fault zone as well as the breaking of the fault - plane asperities, and consequently the occurrence of earthquakes (Snow, 1972; Fairhurst, 1973). Thus the assumed process of fault - plane lubrication through fissured rocks may account for the relatively higher number of earthquakes observed in the spring season. A time delay in the manifestation of the increased earthquake occurrence after a heavy rain spell is very reasonable and has been repeatedly attested in many dam sites (Gupta and Rastogi, 1976). Anomalous changes of well water level seem to be spreading with a speed of about 3 - 4 km per month (Zhi-Zhen and Wu, 1984).

The relatively higher amount of seismic energy release in the summer might be ascribed to the increase of the effective coefficient of internal friction in the drought season. An increase of the coefficient in question handicaps the process of slippage within an active fault zone. Halting the process of slippage, i.e. a locking of fault planes by asperites or barriers that act a stress concentrators (Aki, 1979; Papageorgiou and Aki, 1982) leads to a higher strain accumulation at depth and concequently to the occurrence of relatively fewer

T A B L E I

Earthquake actvity per month expressed in terms of ΣN, ΣE, $\Sigma E^{1/2}$ in various sample periods

Months	1911-1980 ($I_0 \geqslant VII, h \leqslant 21$)			1911 - 1950			1951 - 1980			1911 - 1980		
	ΣN	ΣE	ΣE ½	ΣN	ΣE	ΣE ½	ΣN	ΣE	ΣE ½	ΣN	ΣE	ΣE ½
January	10	8.48	2.47	22	20.11	4.73	38	14.45	6.36	60	34.56	11.09
February	21	129.43	7.82	26	90.45	8.69	32	123.94	8.70	58	214.39	17.39
March	27	154.86	14.11	25	34.15	6.71	73	148.06	19.20	98	182.21	25.91
April	21	83.38	9.46	22	67.06	7.97	86	156.74	23.81	108	223.80	31.78
May	13	23.31	4.38	20	7.69	3.32	66	50.49	13.98	86	58.18	17.30
June	10	29.69	3.78	21	30.46	5.08	56	32.54	10.81	77	63.00	15.89
July	12	128.27	6.76	16	42.26	5.86	61	167.57	17.78	77	209.83	23.64
August	25	336.46	12.80	26	315.74	12.90	56	92.87	13.97	82	408.61	26.87
Septemper	18	30.01	4.98	23	51.16	7.83	49	34.61	10.86	72	85.77	18.69
October	14	29.78	4.19	18	33.71	4.91	51	42.22	10.11	69	75.93	15.02
November	19	32.31	6.38	21	18.01	4.69	54	67.93	14.25	75	85.94	18.94
December	13	9.86	3.17	11	8.60	2.67	45	28.02	8.88	56	36.62	11.55
TOTAL	203	995.84	80.30	251	719.40	75.36	667	959.44	158.71	918	1678.84	234.07

but larger earthquakes. Some of them may have caused too much concern to the people and exerted an important influence on the welfare of the country. This might account, at least to some extent, for the widespread belief that earthquakes not rarely occur in the summer when the weather is very hot and calm (κουφόβραση).

The minor peak in the total number of earthquakes appeared in August results from the relatively higher number of aftershocks registered with Ms $\geqslant$ 5 1/2 in the case of large and great shocks. The second less conspicuous maximum in the graphs of the total amount of seismic energy release observed in March corresponds to the simultaneous maximum of the total number of earthquakes per month.

The strain energy release graphs (see Fig. 5 and 6) show a trend very similar to that of the number of earthquakes per month (see Fig. 1 and 2). This indicates that the strain energy release is almost proportional to the number of earthquakes.

INDEPENDENT EVIDENCE

To get an independent evidence for the reliability of the monthly trend of the earthquake activity derived from a selected sample ($I_o \geqslant$ VII, h $\leqslant$ 21 km), we applied the above described procedure to the whole unbiassed body of data listed in the above mentioned catalogues regardless of focal depths and effects. However, as the data used are not complete to the same extent over the whole time period, 1911 - 1980, they have been subdivided in two periods: 1911 - 1950 and 1951 - 1980. The second period starts with the monitoring of the earthquake activity under my own quidance. The difference is reflected in the number of the registered shocks: 251 for the period 1911 - 1950 (with 64 earthquakes in each of the three last decades: 1921 - 1930, 1931 - 1940 and 1941 - 1950) and 667 for the period 1951 - 1980 (see Table I).

The earthquake activity expressed in ΣN, ΣE and $\Sigma E^{1/2}$ was plotted for the two subperiods 1911 - 1950 and 1951 - 1980, as well as for the whole period 1911 - 1980. In the elaboration of the plots ΣE and $\Sigma E^{1/2}$ we disregarded the values 1520×10^{21} ergs and 12.23×10^{11} $(ergs)^{1/2}$ corresponding to the 8 1/4 Ms intermediate focal depth earthquake of June 26, 1926. The first value of seismic energy release is about 68 % of the amount corresponding to the ΣE for the period 1911 - 1950 and 47 % of the amount found for

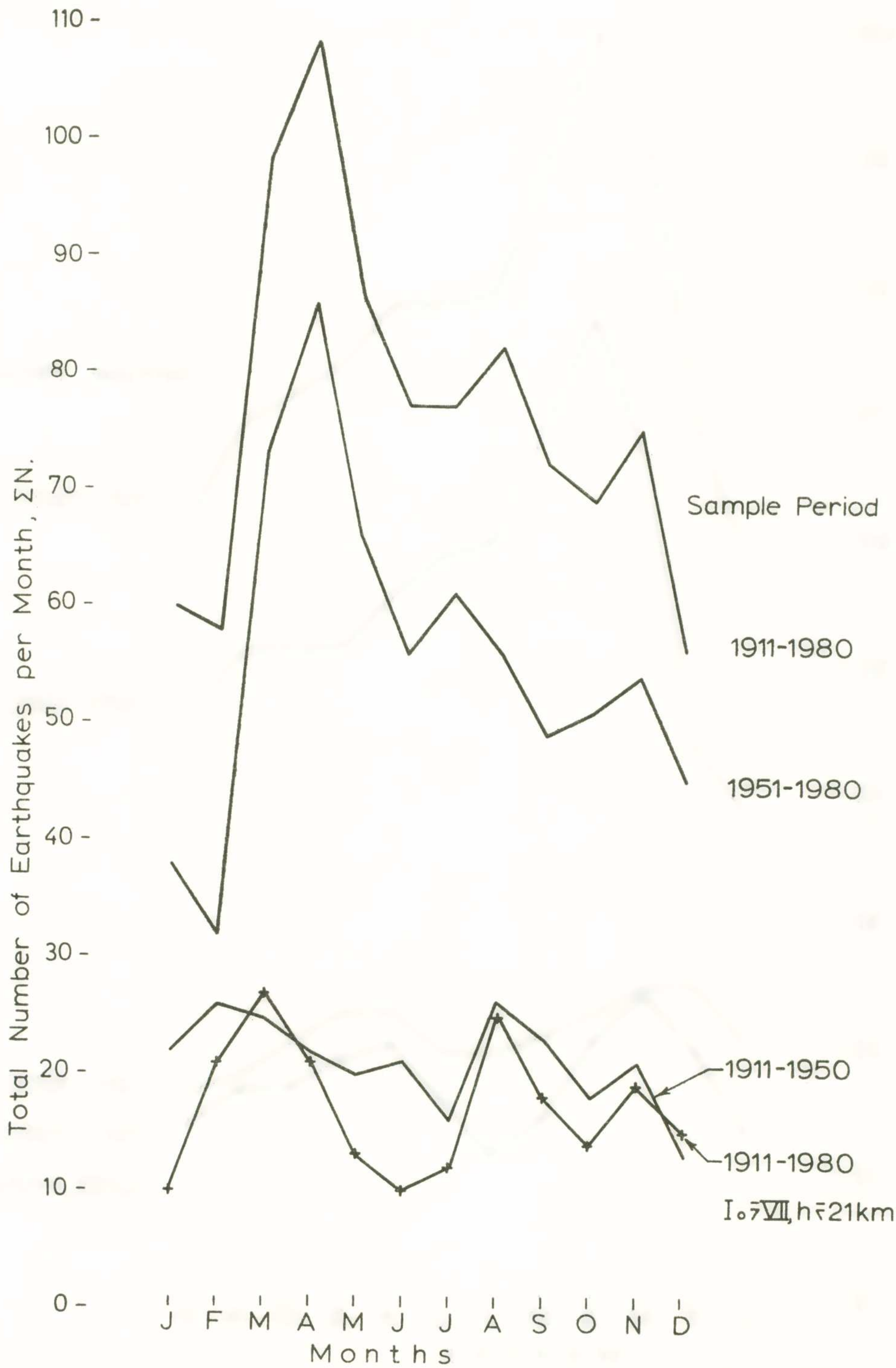

Fig. 1. Raw graph of the total number of earthquakes per month in various sample periods.

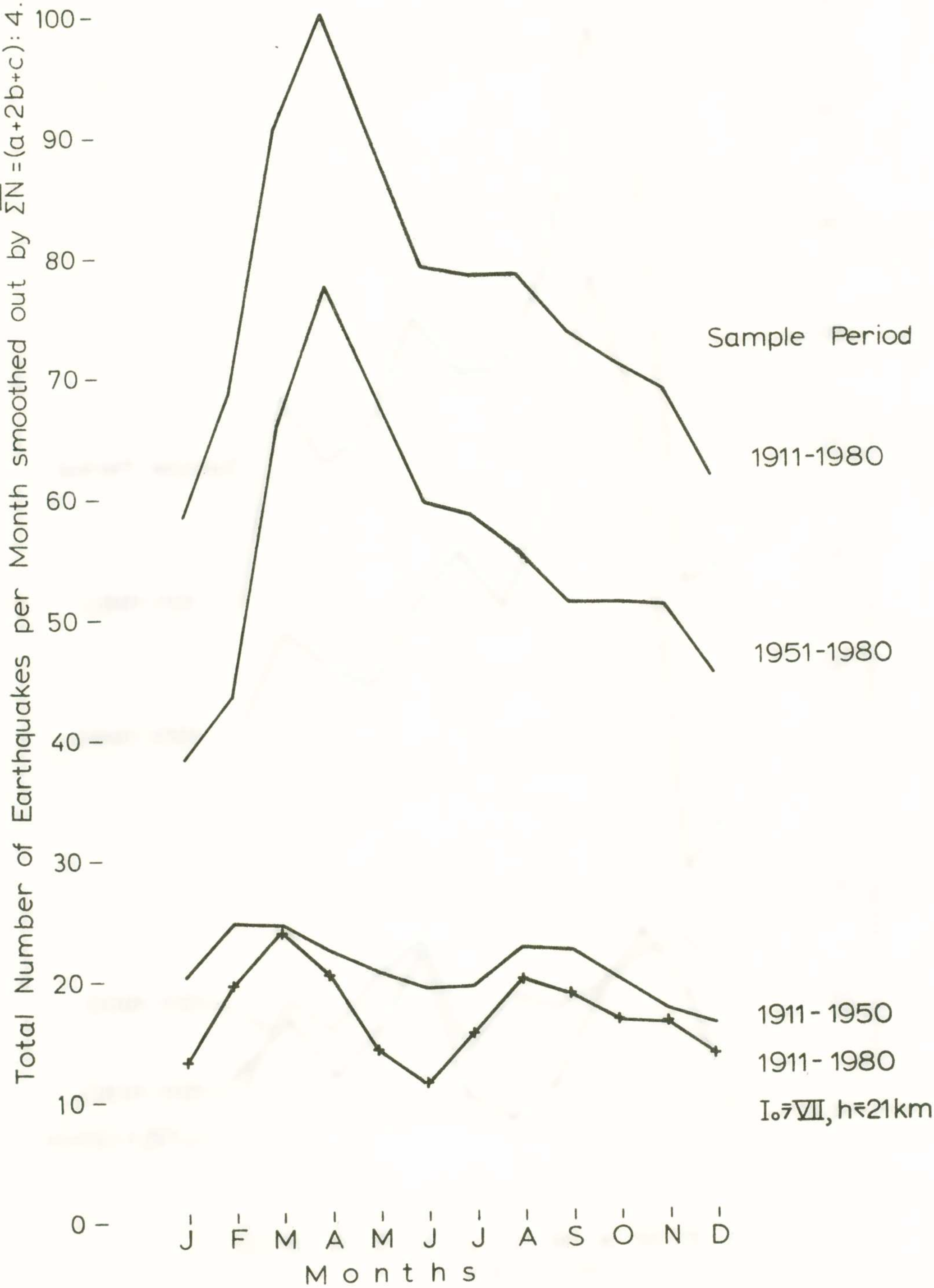

Fig. 2. Smoothed graph of the total number of earthquakes per month in various sample periods.

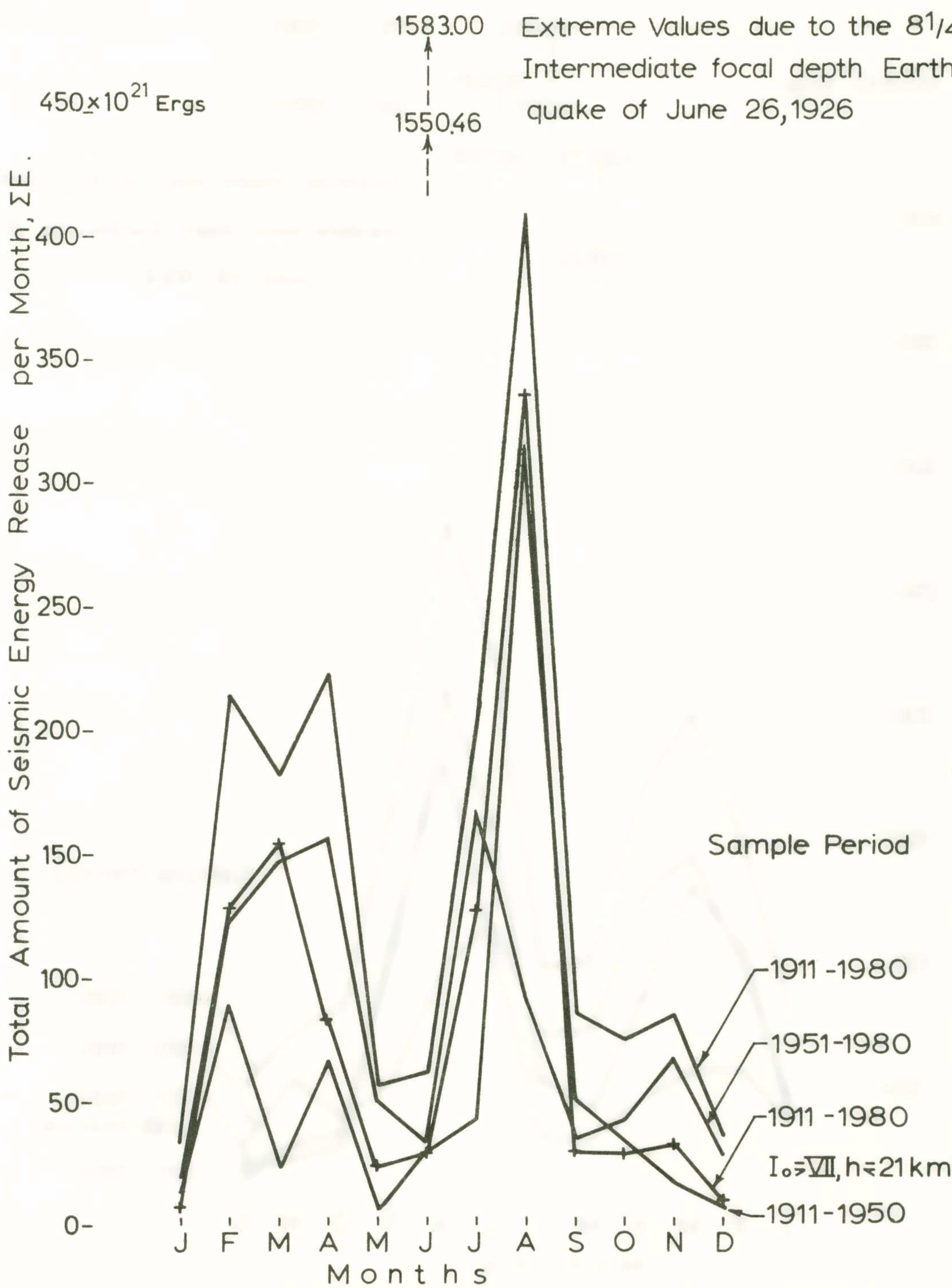

Fig. 3. Raw graph of the seismic energy release sum per month in various sample periods.

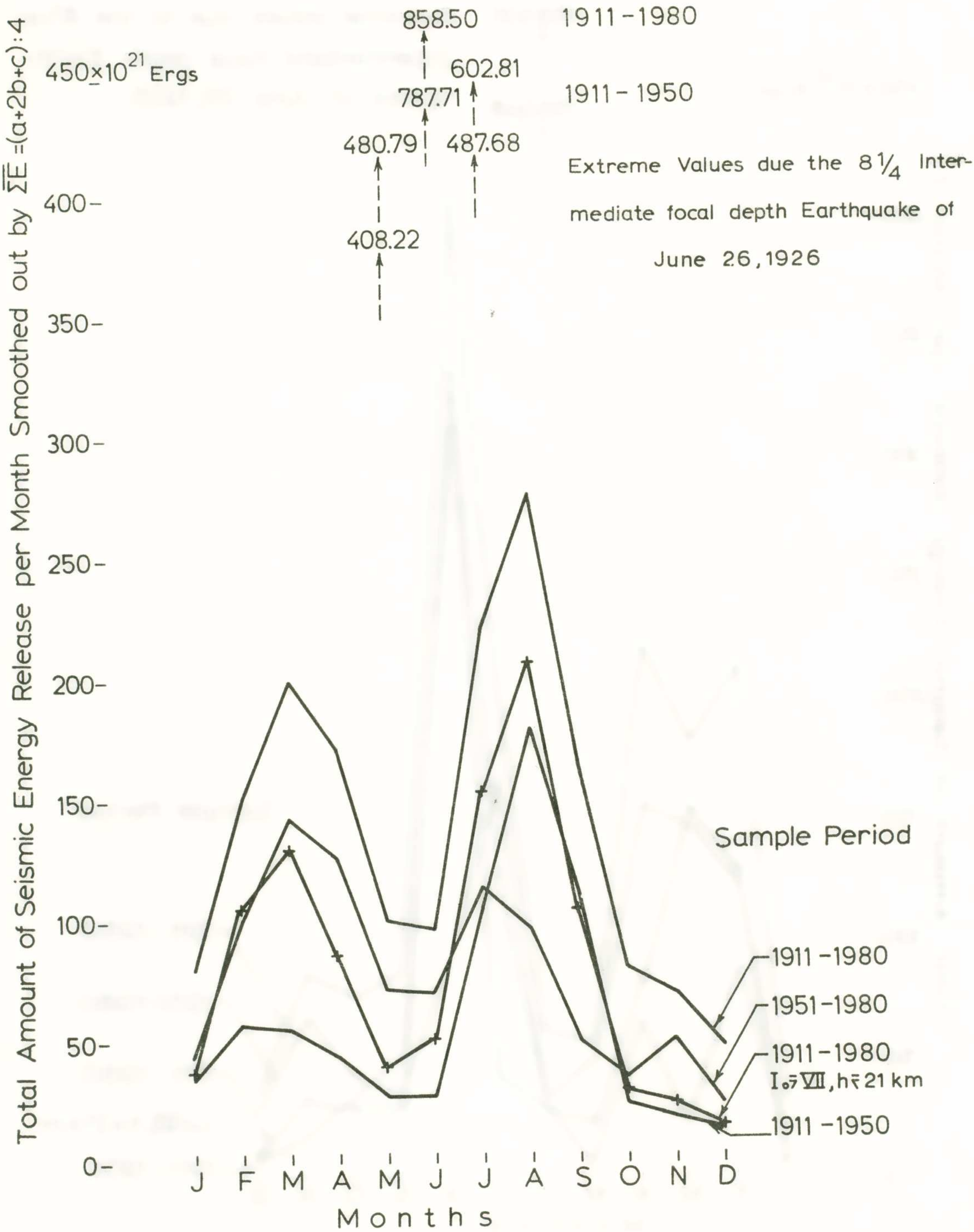

Fig. 4. Smoothed graph of the seismic energy release sum per month in various sample periods.

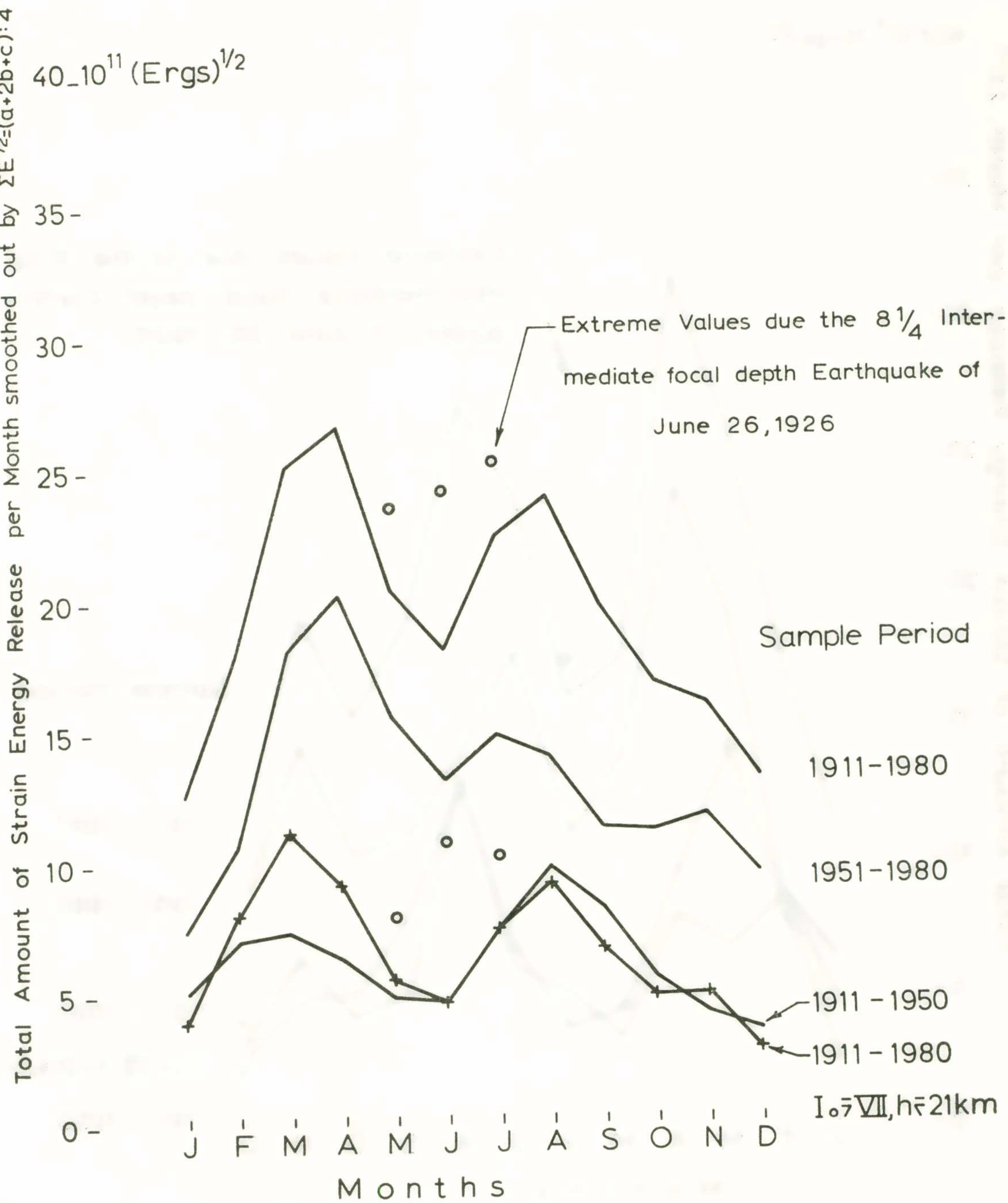

Fig. 5. Raw graph of the strain energy release sum per month in various sample periods.

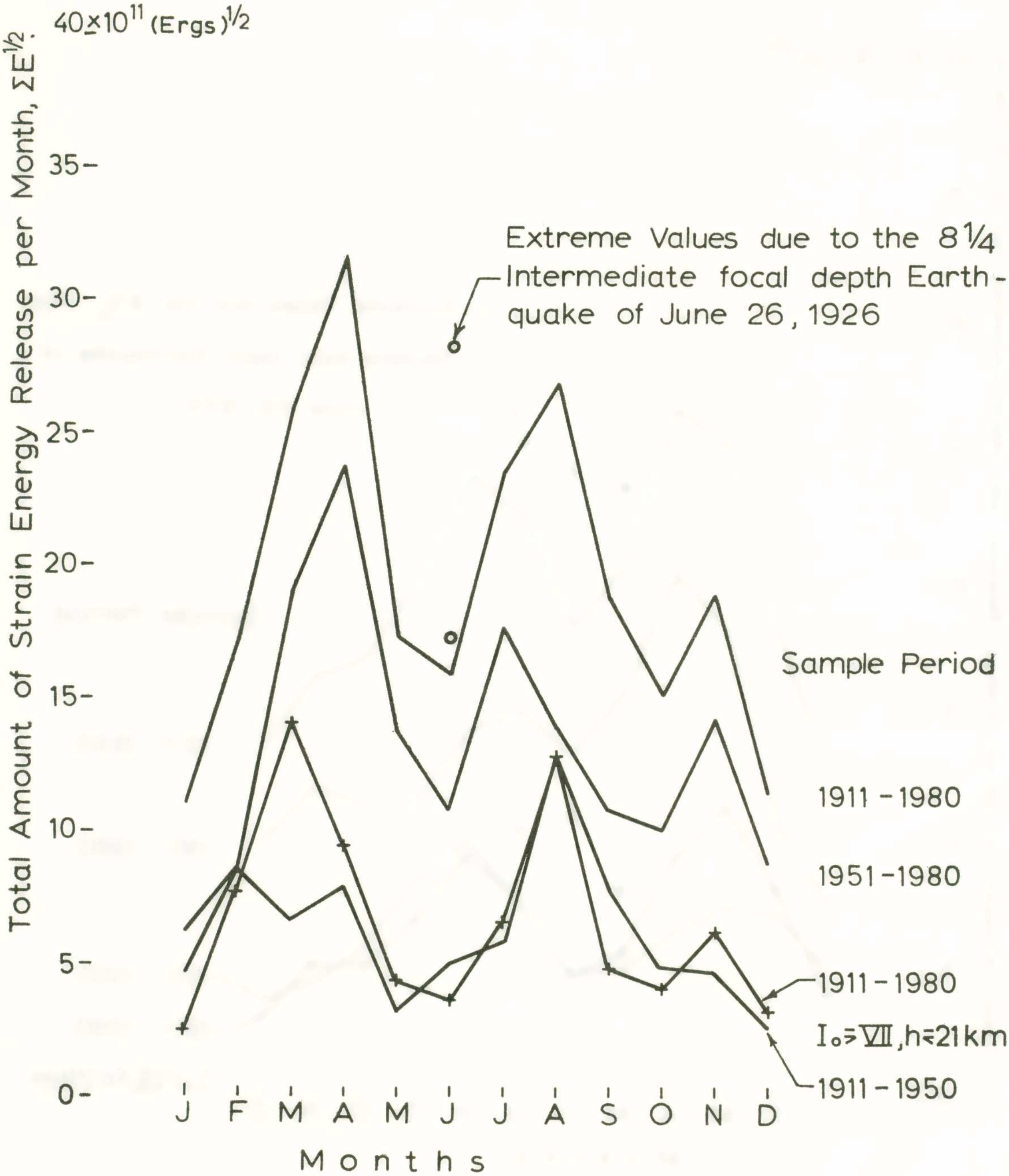

Fig. 6. Smoothed graph of the strain energy release sum per month in various sample periods.

the whole period 1911 - 1980. The strain energy value is about 14% of the amount corresponding to the $\Sigma E^{1/2}$ for the period 1911 - 1950 and only 5 % of the amount derived for the whole period 1911 - 1980. This might be considered as another evidence that in a large sample the total amount of the strain energy release, regadless of magnitude range and focal depth, is almost proportional to the total number of earthquakes*.

The new graphs showing the total number of earthquakes per month in the period 1911 - 1950 (see Fig. 1 and 2) indicate a less pronounced trend but similar to that appeared in the previous facsimile plotting. In the graphs prepared for the two other periods 1951 - 1980 and 1911 - 1980 there is a conspicuous peak in April but the summer months fail to show any other well expressed high.

In the graphs showing the total amount of seismic energy release per month (see Fig. 3 and 4) the maxima in the summer season are conspicuously higher than those appeared in the spring months. The trend of the earthquake activity expressed in terms of ΣE is very similar to that appeared in the previous facsimile graphs. This lends a fair support to the validity of the previously found trend of the monthly earthquake activity and in addition it points out that the advanced explanation holds for all sample periods. This means that the fault - plane lubrication and/or the intrinsic pore - fluid pressure conditioning the effective coefficient of internal friction is affected by the downward percolation through fissured rocks well below the depth of 21 km assumed for the thickness of the first layer of the Earth. The one month time lag in the manifestation of the peak in the total number of earthquakes per month in the new graphs (April instead of March) indicates a downward per-

* If we take into account the discarded strain energy release value, 12.23×10^{11} (ergs) $^{1/2}$, of the 1926 earthquake, the respective totals for the subperiod 1911 - 1950 and the whole period 1911 - 1980 (see Table I) amount to 87.59 and 246.30 units. In that case the average annual strain energy release equals to $87.59:40 = 2.19$ for the subperiod 1911 - 1950, $246.30:70 = 3.52$ for the whole period 1911 - 1980 and $158.71:30 = 5.29$ for the subperiod 1951 - 1980. The respective average annual number of earthquakes are 6, 13 and 22.

The annual strain energy release values and the respective annual numbers of earthquakes suggest a linear relationship: $\Sigma E^{1/2} = 0.194N + 1.017$, S.D. $= \pm 0.017$.

Regression analysis of the strain energy release values per month for the whole period 1911 - 1980 (see Table I) shows a linear relationship: $SE^{1/2} = 0.34N - 6.76$, S.D. $= \pm 3.36$.

colation deeper than at 21 km depth, i.e. the maximum focal depth of the previously sampled earthquakes.

The trend of the amount of strain energy release per month in the new sample periods (see Fig. 5 and 6) is very similar to that previously found for the selected sample period 1911 - 1980 ($I_0 \geqslant VII$, $h \leqslant 21$ km).

CONCLUSION

It is worth noting that the earthquake activity trend is not violated by taking into account the disregarded seismic energy and strain energy values of the June 26, 1926 earthquake. This substantiates the previously obtained view that the monthly number of earthquakes tends to be relatively higher in the spring season, while the amount of the seismic energy release per month seems to be relatively higher in the summer months There is then a core of truth in the legend that large earthquakes not rarely occur indeed in the summer when the weather is very hot and calm.

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ΠΕΡΙΛΗΨΗ

ΤΑΣΗ ΣΥΓΚΕΝΤΡΩΣΕΩΣ ΤΗΣ ΣΕΙΣΜΙΚΗΣ ΔΡΑΣΕΩΣ ΣΤΟΝ ΕΛΛΗΝΙΚΟ ΧΩΡΟ ΣΕ ΟΡΙΣΜΕΝΕΣ ΕΠΟΧΕΣ ΤΟΥ ΕΤΟΥΣ

Εἶναι γενικὰ παραδεδεγμένο ὅτι τὰ αἴτια γενέσεως τῶν σεισμῶν (Entstehungsursachen) εἶναι σαφῶς ἐνδογενῆ. Σὲ περιοχὲς ὅμως ποὺ ὑπάρχουν ὥριμες ἐλαστικὲς τάσεις, δηλαδὴ σὲ περιοχὲς ποὺ ἡ παραμόρφωση τῶν πετρωμάτων ἀπὸ τὶς ὀρογενετικὲς δυνάμεις εἶναι πολὺ πλησίον τοῦ ὁρίου ἀντοχῆς διαρρήξεώς των, εἶναι δυνατὸν ὁρισμένα φυσικὰ φαινόμενα, τὰ ὁποῖα ἐνεργοῦν ἐπὶ τῆς ἐπιφανείας τῆς Γῆς, νὰ ἐπιφέρουν ἀπότομη διατάραξη τῆς ἐλαστικῆς ἰσορροπίας τῶν ἐσωτερικῶν στρωμάτων, δηλαδὴ ἐπίσπευση τοῦ χρόνου ἐκλύσεως τῆς ἐλαστικῆς ἐνεργείας ποὺ ἔχει συσσωρευθεῖ σὲ ὁρικὸ ποσὸ σὲ ὁρισμένες ἀσθενεῖς θέσεις των, ὅπως εἶναι οἱ μικρὲς ἢ μεγάλες προεξοχὲς (asperities) τῶν ρηξιγενῶν ἐπιφανειῶν διερρηγμένων περιοχῶν. Ἔτσι γιὰ τὴ γένεση τῶν σεισμῶν συνεργάζονται συνήθως δύο αἴτια: ἄμεσα καὶ ἔμμεσα αἴτια, ἢ κύρια καὶ δευτερεύοντα.

Τὰ ἔμμεσα ἢ δευτερεύοντα αἴτια (auslösende Behenursachen ἢ triggering forces), τὰ ὁποῖα προκαλοῦν τὴν ἔκλυση τῶν σεισμῶν, ἢ μᾶλλον τὴν ἐπίσπευση τοῦ χρόνου γενέσεώς των, ὡς προκύπτει ἀπὸ διάφορες στατιστικὲς ἔρευνες εἶναι κατὰ τὸ πλεῖστον ἐξωγενῆ. Στὴ διεθνῆ βιβλιογραφία ἀναγνωρίζονται ὡς πιθανὰ αἴτια ἐκλύσεως τῶν σεισμῶν τὰ κατακρημνίσματα καὶ οἱ πλημμυρίδες, ἡ ἀπότομη φόρτωση τοῦ πυθμένος τεχνητῶν λιμνῶν, ἡ μεταφορὰ τῶν προϊόντων ἀποσαθρώσεως ἀπὸ τὴν ἐνδοχώρα στὶς παρυφὲς τῶν θαλασσῶν, ἡ διαφορὰ τῶν βαρομετρικῶν πιέσεων ἐπάνω ἀπὸ διερρηγμένες ἀσταθεῖς περιοχές, ἡ κύμανση τῶν πόλων ἀδρανείας τῆς Γῆς καὶ οἱ παλιρροϊκὲς δυνάμεις.

Σὲ πολλοὺς ἀδαεῖς ἐπικρατεῖ ἡ ἄποψη ὅτι οἱ σεισμοὶ τὸ καλοκαίρι συμβαίνουν πολλὲς φορὲς ὅταν ἐπικρατεῖ νηνεμία καὶ πολὺ ζέστη, κοινῶς «κουφόβραση». Γιὰ νὰ ἐλέγξομε ἐὰν ὑπάρχει κάποια δόση ἀληθείας στὴν δοξασία αὐτή, ποὺ εἶναι εὐρύτατα διαδεδομένη στὴν Ἑλλάδα, συλλέξαμε ὅλους τοὺς σεισμοὺς ποὺ εἶχαν προκαλέσει βλάβες VII βαθμοῦ καὶ ἄνω, καὶ προήρχονταν ἀπὸ βάθος ὄχι μεγαλύτερο ἀπὸ 21 χιλιόμετρα. Ἡ ἐπιλογὴ αὐτὴ ἔγινε μὲ τὸ σκεπτικὸ ὅτι σχεδὸν ὅλοι οἱ σεισμοὶ ποὺ εἶχαν προκαλέσει ἀξιόλογες βλάβες θὰ ἔχουν ἀναγραφεῖ ἀπὸ τοὺς σεισμογράφους Mainka ποὺ λειτουργοῦν στὴν Ἑλλάδα συνεχῶς ἀπὸ τὸ 1911 μέχρι σήμερα, καὶ ἴσως πολλοὶ ἀπὸ αὐτοὺς ποὺ εἶχαν τὴν ἑστίαν των στὸ ἀνώτερο στρῶμα τῆς Γῆς νὰ εἶχαν διεγερθεῖ ἀπὸ ἐξωγενεῖς δυνάμεις.

Τὸ ὑλικὸ ποὺ συλλέξαμε ἀπὸ τὸ 1911 μέχρι τὸ 1980 κατετάγη κατὰ μήνα, καὶ ἔπειτα ὑπολογίσθηκε τὸ σύνολο τῆς σεισμικῆς καὶ ἐλαστικῆς ἐνεργείας ποὺ παρήχθη κατὰ μήνα στὸ διάστημα τῶν 70 χρόνων ποὺ παρῆλθαν ἀπὸ τὸ 1911 μέχρι τὸ 1980. Τὰ στοιχεῖα αὐτά, δηλ. τὸ σύνολο τῶν σεισμῶν, ΣΝ, τὸ σύνολο τῆς σεισμικῆς ἐνεργείας, ΣΕ, καὶ τὸ σύνολο τῆς ἐλαστικῆς ἐνεργείας, $ΣΕ^{1/2}$, κατὰ μήνα χαρτογραφήθηκαν καταλλήλως.

Ἐκ τῆς χαρτογραφήσεως αὐτῆς προέκυψε ὅτι ὁ ὁλικὸς ἀριθμὸς τῶν σεισμῶν κατὰ μήνα παρουσιάζει ἕνα σαφῶς ἐκπεφρασμένο μέγιστο τὸν Μάρτιο καὶ ἕνα ἄλλο μικρότερο τὸν Αὔγουστο. Ὅλως ἀντιθέτως, ἡ σεισμικὴ ἐνέργεια δεικνύει ἕνα σαφὲς μέγιστο τὸν Αὔγουστο καὶ ἕνα μικρότερο τὸ Μάρτιο. Αὐτὸ ὑποδεικνύει ὅτι ὁ ἀριθμὸς τῶν σεισμῶν τείνει νὰ εἶναι μεγαλύτερος τὴν ἄνοιξη, ἐνῶ ἡ σεισμικὴ ἐνέργεια ποὺ ἐκλύεται κατὰ μήνα φαίνεται νὰ εἶναι σχετικῶς μεγαλυτέρα τὸ καλοκαίρι.

Ἡ διάφορος αὐτὴ τάση τῆς σεισμικῆς δράσεως, ἐκπεφρασμένης σὲ σύνολο σεισμῶν καὶ σὲ σύνολο σεισμικῆς ἐνεργείας κατὰ μήνα μπορεῖ νὰ ἀποδοθεῖ σὲ μείωση τοῦ ἐνεργοῦ συντελεστοῦ ἐσωτερικῆς τριβῆς λόγω ἐκτεταμένης λιπάνσεως τῶν ρηξιγενῶν ἐπιφανειῶν σὲ ἀρκετὸ βάθος μετὰ τὴν μακρὰ περίοδο τῶν βροχῶν κατὰ τοὺς φθινοπωρινοὺς καὶ χειμερινοὺς μῆνες. Μείωση τοῦ ἐνεργοῦ συντελεστοῦ ἐσωτερικῆς τριβῆς σὲ μιὰ σεισμικῶς ἐνεργὸ περιοχὴ διευκολύνει τὴν ὀλίσθηση σὲ βάθος τῶν ρηξιγενῶν τεμαχῶν, καθὼς ἐπίσης τὴν θραύση τῶν προεξοχῶν τῶν ρηξιγενῶν ἐπιφανειῶν, καὶ ἑπομένως τὴν γένεση ἀντιστοίχων σεισμῶν. Σὲ πολλὲς περιοχὲς φραγμάτων ἔχει διαπιστωθεῖ ὅτι ἡ ἐκδήλωση τῆς σεισμικῆς δράσεως γίνεται ἀρκετὸ χρόνο μετὰ τὴν φόρτωση τοῦ πυθμένος τῆς τεχνητῆς λίμνης. Ἔτσι ὁ προτεινόμενος μηχανισμὸς φαίνεται νὰ δικαιολογεῖ τὸν σχετικῶς μεγαλύτερο ἀριθμὸ σεισμῶν ποὺ παρατηρεῖται κατὰ τοὺς μῆνες τῆς ἀνοίξεως.

Τὸ σχετικῶς μεγαλύτερο ποσὸ σεισμικῆς ἐνεργείας ποὺ παρατηρεῖται κατὰ τὸ θέρος μπορεῖ νὰ ἀποδοθεῖ στὴν αὔξηση τοῦ ἐνεργοῦ συντελεστοῦ ἐσωτερικῆς τριβῆς κατὰ τὴν περίοδο τῆς ξηρασίας. Αὔξηση τοῦ ἐνεργοῦ συντελεστοῦ ἐσωτερικῆς τριβῆς προκαλεῖ αὔξηση τοῦ ὁρίου ἀντοχῆς διαρρήξεως τῶν προεξοχῶν τῶν ρηξιγενῶν ἐπιφανειῶν καὶ ἐμποδίζει τὴν ὀλίσθηση σὲ βάθος τῶν τεκτονικῶν τεμαχῶν σὲ μιὰ ἔμφορτο ἐλαστικῶν τάσεων διερρηγμένη περιοχή. Ἀναστολὴ τῆς ὀλισθήσεως σὲ βάθος ἄγει σὲ μεγαλύτερα συγκέντρωση ἐλαστικῶν τάσεων καὶ στὴν γένεση σχετικῶς ὀλιγοτέρων, ἀλλὰ σφοδροτέρων σεισμῶν. Μερικοὶ ἀπὸ τοὺς σεισμοὺς αὐτούς, λόγω τοῦ μεγάλου μεγέθους των, προκαλοῦν ἔντονη ἀνησυχία στοὺς κατοίκους καὶ διαταράσσουν γιὰ ὁρισμένο διάστημα τὴν εὐημερία τοῦ λαοῦ. Τὸ γεγονὸς αὐτὸ καὶ ἰδίως ἡ ἐπὶ μακρὸ χρόνο ἀνάμνηση αὐτοῦ, μπορεῖ νὰ δικαιολογήσει, σὲ ὁρισμένο βαθμό, τὴν εὐρύτατα διαδεδομένη πίστη ὅτι οἱ σεισμοὶ τὸ καλοκαίρι συμβαίνουν συνήθως ὅταν ἐπικρατεῖ νηνεμία καὶ μεγάλη ζέστη, κοινῶς «κουφόβραση».

Ἡ χαρτογράφηση τῆς ἐλαστικῆς ἐνεργείας κατὰ μήνα ὑποδεικνύει ὅτι αὐτὴ παρουσιάζει τὴν ἴδια τάση μεταβολῆς μὲ τὸν ὁλικὸ ἀριθμὸ τῶν σεισμῶν κατὰ μήνα.

Γιὰ τὴν ἀνεξάρτητη ἀξιολόγηση τῆς εὑρεθείσης τάσεως συγκεντρώσεως τῆς σεισμικῆς δράσεως στὸν Ἑλληνικὸ χῶρο σὲ ὁρισμένες ἐποχὲς τοῦ ἔτους ὑποβλήθηκε στὴν αὐτὴ ἐπεξεργασία τὸ σύνολο τῶν σεισμῶν μεγέθους ἴσου ἢ μεγαλυτέρου τοῦ 5 1/2 ποὺ ἀναγράφηκε κατὰ τὴν περίοδο 1911 - 1980. Ἐπειδὴ ἡ παρακολούθηση τῆς σεισμικῆς δράσεως κατὰ τὴν περίοδο 1911 - 1950 ἦτο σχετικῶς ὀλιγότερο ἐπιμελής, ἡ χαρτογράφηση τῆς σεισμικῆς δράσεως ἐγένετο γιὰ τρεῖς περιόδους: 1911 - 1950, 1951 - 1980 καὶ 1911 - 1980.

Καὶ στὶς τρεῖς περιόδους ἡ σεισμικὴ δράση παρουσιάζει τὴν αὐτὴ ἀκριβῶς τάση: Οἱ σεισμοὶ τείνουν νὰ εἶναι αἰσθητῶς περισσότεροι τὴν ἄνοιξη, καὶ ἡ ἔκλυση σεισμικῆς ἐνέργειας καταφανῶς ἀνώτερη τὸ θέρος. Ἡ ἀνεξάρτητη αὐτὴ ἔνδειξη ὄχι μόνο ἐπιβεβαιώνει τὴν ἀξιοπιστία τῆς προηγουμένως εὑρεθείσης τάσεως μεταβολῆς τῆς σεισμικῆς δράσεως κατὰ μήνα, ἀλλὰ ὑποδεικνύει προσθέτως ὅτι ἡ λίπανση τῶν ρηξιγενῶν ἐπιφανειῶν, ἢ / καὶ ἡ πορικὴ πίεση ποὺ καθορίζουν τὸν ἐνεργὸ συντελεστὴ ἐσωτερικῆς τριβῆς ἐκτείνεται πολὺ κάτωθεν τοῦ βάθους τῶν 21 χιλιομέτρων πού εἶχε ἀρχικῶς ὑποτεθεῖ ὡς τὸ κατώτερο ὅριο τοῦ ἀνωτέρου στρώματος κατὰ τὴν ἐπιλογὴ τοῦ πρώτου δείγματος τῆς παρούσης ἐργασίας.

Τὸ μικρότερο μέγιστο εἰς τὸν ὁλικὸ ἀριθμὸ τῶν σεισμῶν πού ἐμφανίζεται τὸ καλοκαίρι προκύπτει ἀπὸ τὸν σχετικῶς μεγαλύτερο ἀριθμὸ μετασεισμῶν πού ἀναγράφονται μὲ μέγεθος 5 1/2 ἢ καὶ μεγαλύτερο στὴν περίπτωση μεγάλων ἢ πολὺ μεγάλων σεισμῶν. Τὸ δεύτερο, ὀλιγότερο ἐμφανές, μέγιστο πού ἐμφανίζεται τὴν ἄνοιξη στὴν μηνιαία πορεία τοῦ ὁλικοῦ ποσοῦ τῆς σεισμικῆς ἐνέργειας ἀντιστοιχεῖ στὸ σύγχρονο μέγιστο τοῦ ὁλικοῦ ἀριθμοῦ τῶν σεισμῶν κατὰ μῆνα.

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TABLE II ANNEXED

Continuation of the revised list of strong shocks with $M_S \geqslant 5\ 1/2$ occurred in and around the aegean microplate (N^{43}_{32}, E^{30}_{17}) since 1902 (Galanopoulos, 1977)

Nº	Date			Location Nº	Location Eº	Focal depth h	Highest intensity I_0	Surface wave magnitude M_S
736	1974,	Jan.	27	35.0,	25.4	35	—	5 1/2
737		Febr.	1	38.5,	27.2	24	VII	5 3/4
738		Febr.	5	36.7,	26.9	156	—	5 3/4
739		March	8	34.7	24.7	47	—	5 3/4
740		March	12	36.8,	26.4	45	—	5 1/2
741		March	13	34.6,	24.7	46	—	5 3/4
742		March	22	40.6,	20.5	27	VI	5 1/2
743		April	1	35.6,	22.4	58	—	5 1/2
744		April	7	34.7,	24.7	38	—	6
745		May	12	36.7,	26.9	149	—	5 1/2
746		May	19	35.5,	26.3	84	V	6 1/4
747		June	18	38.4,	20.4	24	V - VI	5 1/2
748		June	22	41.2,	23.0	8	VI	5 1/2
749		July	9	36.6,	28.5	49	V	6
750		Sept.	5	35.7,	24.7	53	V	5 3/4
751		Sept.	17	40.3,	20.6	17	VII - VIII	6
752		Sept.	29	35.4,	27.9	49	—	5 1/2
753		Oct.	20	39.6,	18.8	0	—	5 3/4
754		Oct.	25	34.7,	23.4	41	—	5 1/2
755		Nov.	14	38.5,	23.1	27	VII	6
756		Nov.	14	38.5,	23.0	6	VI - VII	6
757		Nov.	14	38.5,	23.1	35	VI - VII	6
758		Dec.	2	38.4,	22.3	34	V - VI	5 1/2
759		Dec.	14	38.2,	20.7	32	—	6 1/4
760		Dec.	14	38.4,	20.4	37	—	5 1/2
761		Dec.	20	39.7,	20.5	47	V - VI	6
762	1975,	Jan.	3	35.6,	27.3	42	—	5 3/4
763		Jan.	8	38.2,	22.7	26	V - VI	6

Table II (cont.)

N°	Date			Location N°	Location E°	Focal depth h	Highest intensity I_0	Surface wave magnitude M_S
764	1975,	Jan.	8	38.1,	22.7	33	—	5 1/2
765		Jan.	9	34.8,	24.0	41	—	5 1/2
766		Jan.	24	41.1,	19.8	46	V - VI	5 1/2
767		Jan.	26	36.7,	24.4	32	VI - VII	5 3/4
768		Febr.	15	35.8,	26.9	46	—	5 3/4
769		March	17	40.5,	26.0	2	—	5 1/2
770		March	17	40.5,	25.9	22	—	6
771		March	17	40.4,	26.2	5	—	5 1/2
772		March	17	40.5,	26.1	18	V	6 1/4
773		March	27	40.4,	26.1	15	VII - VIII	6 1/2
774		March	27	40.4,	26.2	22	VI	5 1/2
775		April	4	38.1,	22.0	56	VI	6 1/2
776		April	24	37.5,	22.6	68	—	5 3/4
777		April	28	34.6,	28.5	37	—	5 3/4
778		May	13	38.2,	22.7	45	VI	5 1/2
779		May	19	38.3	22.3	26	V - VI	5 3/4
780		June	30	38.5,	21.6	3	VII - VIII	6 1/4
781		July	25	38.4,	21.9	38	VI	5 3/4
782		July	29	34.8,	24.9	47	V	5 3/4
783		Sept.	12	36.3,	21.9	43	—	6 1/4
784		Sept.	13	38.5,	22.0	40	V	5 3/4
785		Sept.	16	41.5,	19.3	25	VIII	6 1/4
786		Sept.	17	36.4,	23.1	35	—	6
787		Sept.	17	38.2,	20.4	15	—	5 1/2
788		Sept.	22	35.2,	26.3	55	V	6 1/2
789		Oct.	12	37.9,	23.1	35	VI	6
790		Nov.	12	36.3,	28.1	64	V	6 1/2
791		Nov.	13	33.4,	22.8	0	—	6
792		Nov.	22	39.9,	20.1	34	VII - VIII	6 1/4
793		Dec.	21	38.5,	21.7	2	VII - VIII	6 1/4
794		Dec.	31	38.5,	21.7	19	IX	6 1/2

Table II (cont.)

N°	Date			Location N°	Location E°	Focal depth h	Highest intensity I_0	Surface wave magnitude M_S
795	1975,	Dec.	31	38.5,	21.6	23	—	5 1/2
796	1976,	Jan.	18	38.8,	20.5	5	VII - VIII	6 1/4
797		Febr.	22	39.4,	22.1	19	VII - VIII	6 1/4
798		Febr.	23	38.3,	25.6	4	—	5 3/4
799		March	2	40.7,	19.6	11	VII	5 3/4
800		April	19	35.5,	24.7	64	—	5 3/4
801		May	6	34.7,	23.8	38	—	5 1/2
802		May	8	39.3,	29.1	33	—	5 3/4
803		May	11	37.4,	20.4	10	—	6 1/2
804		May	11	37.3,	20.5	27	—	6
805		May	18	34.9,	25.4	71	—	5 3/4
806		June	9	39.2,	29.1	12	—	5 1/2
807		June	12	37.5,	20.6	17	V	6 1/2
808		June	14	39.3,	29.2	23	—	5 1/2
809		June	25	35.1,	23.2	22	—	6 1/4
810		Aug.	17	36.7,	27.1	160	—	6
811		Aug.	19	37.7,	29.0	20	VII - VIII	6
812		Aug.	22	39.3,	29.0	23	—	6
813		Sept.	30	37.4,	20.3	10	—	6
814		Oct.	21	35.8,	27.0	89	—	5 1/2
815		Nov.	12	38.5,	26.7	6	V - VI	5 3/4
816		Nov.	13	35.1,	23.4	48	—	6 1/4
817*		Nov.	18	39.3,	26.7	10+	VIII	6 3/4
818		Nov.	28	37.2,	20.2	5	—	5 3/4
819		Nov.	29	34.8,	25.7	37	—	5 1/2
820		Dec.	27	39.0,	20.5	31	VII	6
821		Dec.	30	37.8,	22.8	35	V	5 1/2
822	1977,	Jan.	16	37.8,	22.9	45	VII	5 1/2
823		Febr.	24	38.5,	27.7	20	—	5 3/4

* The shock of 1976, Nov. 18, must be deleted. The same mistake must be deleted from the author's cataloques of the 1981 paper (A. G. Galanopoulos, 1981).

Table II (cont.)

N°	Date			Location N°	Location E°	Focal depth h	Highest intensity I_0	Surface wave magnitude M_S
824	1977,	March	28	36.8,	27.5	35	—	5 1/2
825		May	13	39.1,	23.5	0	VI - VII	5 1/2
826		May	27	35.1,	26.6	65	—	5 1/2
827		June	21	35.5,	29.6	44	—	5 3/4
828		July	30	36.8,	21.6	49	—	5 3/4
829		Aug.	5	34.3,	26.8	33	—	5 1/2
830		Aug.	15	38.8	17.0	58	—	6
831		Aug.	18	35.3,	23.5	47	—	6 1/2
832		Aug.	31	37.7,	21.2	49	—	5 1/2
833		Sept.	10	34.9,	23.1	24	—	6
834		Sept.	11	34.9,	23.0	4	—	6 1/2
835		Sept.	12	34.9,	23.2	38	—	6
836		Sept.	13	34.9,	23.2	38	—	5 1/2
837		Sept.	14	34.9,	23.1	19	—	6
838		Sept.	23	41.5,	20.1	37	VI	6
839		Oct.	22	34.9,	23.2	28	—	6 1/4
840		Oct.	27	35.4,	27.6	46	—	6
841		Oct.	27	37.9,	27.9	16	VI	6
842		Nov.	3	42.1	24.0	11	VII	6 1/4
843		Nov.	28	36.0	27.8	81	V	6 1/2
844		Dec.	3	40.9,	19.9	42	VI	5 1/2
845		Dec.	9	38.3,	27.7	27	VII	5 3/4
846		Dec.	16	38.4,	27.2	24	VI	6 1/4
847		Dec.	29	38.3,	22.2	37	V - VI	6
848	1978,	Jan.	12	35.8,	22.3	59	—	5 1/2
849		Jan.	28	34.9,	23.8	45	—	5 3/4
850		Jan.	29	34.9,	25.7	35	VII - VIII	6 1/4
851		March	1	36.0,	27.1	94	—	5 1/2
852		March	7	34.5,	25.2	41	—	6 1/4
853		March	7	34.3,	25.3	40	—	5 1/2
854		March	16	36.7,	21.6	49	—	5 1/2

Table II (cont.)

N°	Date			Location N°	Location E°	Focal depth h	Highest intensity I_0	Surface wave magnitude M_S
855	1978,	April	8	36.9,	23.2	48	—	5 1/2
856		April	27	39.0	21.9	36	V	6
857		May	23	40.7,	23.2	9	VII	6 1/2
858		May	24	40.7,	23.3	8	—	5 3/4
859		May	24	40.7,	23.3	19	—	5 1/2
860		June	2	40.8,	23.2	19	VI	6
861		June	15	40.8,	27.7	28	—	5 1/2
862		June	19	40.8,	23.2	10	VI	6 1/4
863		June	19	40.7,	23.2	8	—	5 3/4
864		June	20	40.8,	23.2	3	VIII - IX	6 1/2
865		June	20	40.7,	23.2	11	—	5 1/2
866		June	21	40.8,	23.1	1	—	5 3/4
867		June	24	41.7,	20.2	10	—	5 3/4
868		July	4	40.7,	23.1	18	VI - VII	6
869		July	29	37.6,	30.0	28	—	5 1/2
870		Aug.	18	41.8,	20.3	10	VI - VII	6 1/4
871		Aug.	25	34.1,	25.2	10	—	5 1/2
872		Sept.	1	39.1,	21.5	24	V - VI	5 3/4
873		Sept.	7	37.8,	21.0	43	V - VI	5 1/2
874		Sept.	9	38.4,	23.2	23	V - VI	5 3/4
875		Sept.	14	38.9,	20.6	41	V - VI	5 1/2
876		Sept.	30	37.3,	20.3	24	—	5 1/2
877		Oct.	18	35.0,	26.0	10	—	5 1/2
878		Nov.	28	36.0,	26.4	114	—	5 3/4
879		Dec.	3	40.9,	19.6	38	V - VI	5 1/2
880	1979,	Febr.	16	36.7,	25.8	40	—	5 3/4
881		Febr.	26	41.5,	20.1	28	—	5 3/4
882		March	13	38.5,	24.3	19	—	5 3/4
883		March	26	37.7,	21.6	46	VII	5 1/2
884		April	9	41.9,	19.0	13	VI	6 1/4
885		April	15	42.0	19.0	4	IX	7

Table II (cont.)

Nº	Date			Location Nº	Location Eº	Focal depth h	Highest intensity I_0	Surface wave magnitude M_S
886	1979,	April	15	41.9	19.3	10	—	6
887		April	15	42.3,	18.7	7	—	6 1/2
888		April	16	41.8,	19.4	8	—	5 1/2
889		April	16	41.9,	19.2	21	—	6 1/4
890		April	17	42.5,	18.6	10	—	6
891		April	18	42.1,	19.0	2	—	5 3/4
892		April	19	41.9,	19.1	12	VI	5 3/4
893		April	21	41.8,	19.1	10	—	5 1/2
894		April	22	41.9,	19.1	4	—	5 1/2
895		April	30	42.2,	18.8	10	—	5 1/2
896		May	11	40.7,	23.3	5	—	5 3/4
897		May	12	42.3,	18.7	11	VI	6
898		May	14	41.9,	19.2	9	—	5 1/2
899		May	15	34.6,	24.4	43	—	6 1/2
900		May	18	34.9,	23.4	55	—	5 3/4
901		May	22	34.9,	22.1	37	—	5 1/2
902		May	24	42.2,	18.7	5	VIII	6 3/4
903		June	1	39.2,	20.5	47	—	5 1/2
904		June	2	40.3,	24.1	10	—	5 1/2
905		June	4	42.1,	18.8	8	—	5 1/2
906		June	14	38.8,	26.6	15	VI	6 1/2
907		June	15	34.9,	24.2	41	—	6 1/4
908		June	16	38.7,	26.6	11	—	6 1/4
909		June	17	38.7,	26.6	6	—	5 3/4
910		June	19	38.6,	26.6	21	—	5 3/4
911		June	20	42.2,	18.7	49	—	5 1/2
912		July	18	39.7,	28.6	7	VII - VII	6 1/4
913		July	23	35.5,	26.4	36	V - VI	6 1/2
914		Aug.	11	35.4,	26.3	40	—	5 3/4
915		Aug.	22	35.9,	27.4	90	V	6 1/4
916		Aug.	31	40.7,	23.4	11	V	5 1/2

Table II (cont.)

Nº	Date			Location Nº	Location Eº	Focal depth h	Highest intensity I_0	Surface wave magnitude M_S
917	1979,	Oct.	21	41.1,	19.9	2	V	5 1/2
918		Nov.	2	39.5,	20.2	42	VII	5 1/2
919		Nov.	2	39.4,	20.4	26	VIII	6 1/2
920		Nov.	8	41.1,	19.6	13	VI	5 3/4
921		Nov.	11	39.5,	20.3	27	VII	6 1/4
922		Dec.	1	37.3,	21.7	43	—	5 3/4
923		Dec.	10	35.0,	23.2	58	—	5 1/2
924	1980,	Febr.	28	38.2,	23.2	30	VII	5 1/2
925		March	4	35.5,	23.1	51	—	5 3/4
926		March	9	38.7,	20.5	42	—	5 1/2
927		March	29	36.0,	28.2	72	—	5 1/2
928		April	12	38.7,	20.5	26	—	6
929		April	12	38.6,	20.5	10	—	5 3/4
930		May	2	35.7,	29.8	38	—	6 1/4
931		May	16	35.9,	27.3	57	—	6 1/4
932		June	12	38.7,	20.4	8	—	5 1/2
933		June	13	33.7,	23.1	19	—	6
934		July	2	38.3,	22.0	39	VI	5 1/2
935		July	2	38.1,	22.0	20	VI	5 3/4
936		July	4	39.3,	22.9	36	VI - VIII	5 3/4
937		July	6	39.2,	22.9	23	VI - VII	5 3/4
938		July	7	39.3,	22.9	41	VI - VII	6
939		July	8	39.2,	22.9	39	—	5 1/2
940		July	9	39.3,	22.9	35	—	6 1/4
941		July	9	39.3,	22.9	47	VIII - IX	6 1/2
942		July	9	39.2,	22.6	31	—	6 1/2
943		July	10	39.3,	22.9	23	—	6
944		July	10	39.3,	22.9	22	VII	6 1/4
944		July	10	39.3,	22.9	22	VII	6 1/4
945		July	15	39.3,	23.1	25	—	5 1/2
946		July	16	39.3,	22.6	31	VI	6 1/4

Table II (cont.)

N°	Date			Location N°	Location E°	Focal depth h	Highest intensity I_0	Surface wave magnitude M_S
947	1980,	July	19	41.5,	20.3	22	VI - VII	6
948		July	29	39.3,	23.0	34	VI	6
949		Aug.	8	34.0,	25.7	33	—	5 1/2
950		Aug.	11	39.3,	22.7	27	VI	6 1/4
951		Aug.	12	39.3,	22.7	31	—	5 1/2
952		Sept.	26	39.3,	22.8	42	—	5 1/2
953		Oct.	4	37.0,	28.8	26	—	6 1/4
954		Oct.	21	39.3,	23.0	4	VI	5 1/2
955		Oct.	21	39.3,	23.0	7	V - VI	5 3/4
956		Nov.	7	42.7,	18.7	47	—	5 1/2
957		Nov.	9	35.1,	22.9	45	—	5 3/4
958		Nov.	12	39.0,	24.3	1	V	5 3/4
959		Nov.	29	38.5,	25.4	1	—	5 3/4
960		Dec.	11	34.6,	24.0	41	—	5 1/2
961		Dec.	25	36.9,	21.4	0	—	5 1/2
962	1981,	Jan.	22	34.2,	25.2	49	—	5 3/4
963		Febr.	9	34.1,	25.8	27	—	5 3/4
964		Febr.	10	34.3,	23.6	36	—	5 1/2
965		Febr.	11	34.3,	23.7	31	—	5 3/4
966		Febr.	24	38.2,	23.0	18	IX - X	6 3/4
967		Febr.	24	38.1,	23.0	40	—	5 1/2
968		Febr.	25	38.1,	23.1	37	—	6 1/4
969		Febr.	25	38.1,	22.9	19	—	5 3/4
970		Febr.	25	38.2,	23.1	30	VIII	6 1/2
971		Febr.	25	38.2,	23.1	47	—	6
972		Febr.	25	38.2,	23.2	34	—	5 3/4
973		Febr.	25	38.2,	23.1	40	—	5 1/2
974		Febr.	25	38.2,	23.1	41	—	5 1/2
975		Febr.	25	38.2,	23.0	36	—	5 1/2
976		Febr.	26	38.2,	23.2	11	—	5 1/2
977		Febr.	28	38.2,	23.3	28	—	6

Table II (cont.)

N°	Date			Location N°	Location E°	Focal depth h	Highest intensity I_0	Surféce wave magnitude M_S
978	1981,	March	2	40.7,	23.2	23	—	5 1/2
979		March	4	38.3,	23.2	39	—	5 1/2
980		March	4	38.2,	23.3	32	IX - X	6 1/2
981		March	4	38.2,	23.2	36	—	5 1/2
982		March	5	38.1,	23.2	43	—	5 1/2
983		March	5	38.2,	23.1	31	—	6 1/4
984		March	7	38.2,	23.3	33	—	6 1/2
985		March	7	38.2,	23.2	28	—	5 1/2
986		March	10	39.4,	20.7	32	VII - VIII	6 1/2
987		March	12	38.2,	23.3	27	—	5 3/4
988		March	12	40.8,	28.1	12	—	5 3/4
989		March	14	38.4,	21.6	10	—	5 1/2
990		March	18	38.1,	22.7	17	—	5 3/4
991		March	18	38.1,	23.2	12	—	5 1/2
992		March	20	36.2,	22.6	109	—	5 1/2
993		April	10	38.9,	21.0	42	VI - VII	5 1/2
994		April	14	38.4,	22.0	18	VI	5 3/4
995		April	18	38.3,	23.2	38	—	5 1/2
996		May	6	39.3,	22.8	32	—	6
997		May	8	35.8,	27.2	110	—	5 3/4
998		May	9	34.2,	25.8	53	—	5 1/2
999		May	9	38.2,	23.3	36	—	5 1/2
1000		May	11	36.8,	28.1	22	—	6
1001		May	16	37.8,	20.2	30	—	5 1/2
1002		May	17	37.9,	20.3	45	—	5 3/4
1003		May	23	39.1,	24.4	10	—	5 1/2
1004		May	25	38.7,	20.9	30	—	5 1/2
1005		May	27	38.8,	21.0	25	VII	6 1/4
1006		May	27	38.7,	21.0	20	VI	6
1007		May	27	38.8,	21.0	39	VII	6 1/4
1008		May	28	38.7,	20.9	7	—	5 1/2

Table II (cont.)

Nº	Date			Location Nº	Location Eº	Focal depth h	Highest intensity I_0	Surface wave magnitude M_S
1009	1981,	June	1	35.5,	26.3	81	—	6 1/4
1010		June	6	36.6	21.2	22	—	5 3/4
1011		June	24	37.8,	20.1	22	V - VI	6 1/4
1012		June	24	37.8,	20.1	20	—	6
1013		June	28	37.8,	20.1	23	—	5 3/4
1014		June	28	37.8,	20.1	13	—	6 1/2
1015		June	29	37.8,	20.1	26	—	5 3/4
1016		June	29	37.8,	20.0	11	—	5 3/4
1017		June	30	37.9,	20.2	42	—	5 3/4
1018		July	3	37.9,	20.0	16	—	5 3/4
1019		July	3	39.5,	20.7	41	VII	6 1/2
1020		July	11	37.8,	20.1	22	—	5 3/4
1021		July	12	37.9,	20.0	10	—	5 1/2
1022		July	12	37.9,	20.1	23	—	6
1023		July	17	34.9,	22.8	51	—	6 1/4
1024		Aug.	10	35.9,	29.9	53	—	5 1/2
1025		Sept.	7	41.2,	22.6	10	VI	5 1/2
1026		Sept.	13	34.8,	25.1	39	VI	6 1/4
1027		Sept.	14	34.7,	25.0	26	—	6
1028		Sept.	14	34.7,	25.0	9	—	5 1/2
1029		Sept.	14	38.0,	21.0	52	—	5 1/2
1030		Sept.	18	37.9,	20.1	27	—	5 1/2
1031		Sept.	30	34.0,	25.6	30	—	6
1032		Oct.	14	39.3,	25.4	10	—	5 3/4
1033		Oct.	31	37.7,	21.4	23	V - VI	5 1/2
1034		Dec.	4	36.1,	22.1	55	—	6
1035		Dec.	16	37.2,	20.4	24	—	5 1/2
1036		Dec.	19	39.2,	25.2	10	VIII	7 1/2
1037		Dec,	19	39.3,	25.4	3	—	5 1/2
1038		Dec.	19	39.3,	25.4	17	—	5 3/4
1039		Dec.	21	39.1,	25.3	25	—	5 3/4

Table II (cont.)

Nº	Date			Location Nº	Location Eº	Focal depth h	Highest intensity I_0	Surface wave magnitude M_s
1040	1981,	Dec.	21	39.3,	25.4	5	—	6
1041		Dec.	26	39.0	25.1	18	—	5 1/2
1042		Dec.	27	38.9,	24.9	10	—	6 1/2
1043		Dec.	29	38.7	24.8	2	—	6
1044	1982,	Jan.	9	38.4,	22.0	11	—	5 1/2
1045		Jan.	18	40.0,	24.4	10	VI	7
1046		Jan.	18	40.0,	24.6	10	—	6 3/4
1047		Jan.	18	39.7,	24.1	12	—	5 1/2
1048		Jan.	19	39.7,	24.3	10	—	5 3/4
1049		Jan.	19	39.6,	23.7	17	—	5 3/4
1050		Febr.	9	39.7,	24.3	6	—	5 1/2
1051		Febr.	11	34.8,	25.2	45	—	5 3/4
1052		Febr.	28	41.3,	20.4	9	—	5 1/2
1053		March	10	35.5,	26.0	85	—	5 1/2
1054		March	25	38.2,	22.7	43	—	5 1/2
1055		March	31	38.5,	20.3	12	—	6
1056		April	10	39.9,	24.6	2	—	6
1057		April	10	39.4,	25.5	12	—	6
1058		April	18	36.6,	27.1	155	—	5 3/4
1059		April	19	38.7,	26.9	10	—	5 1/2
1060		April	20	35.6,	23.3	66	—	6
1061		April	26	37.7,	21.5	35	VI	5 1/2
1062		May	2	41.9,	20.0	13	VI	5 1/2
1063		May	5	37.7,	21.6	43	—	5 1/2
1064		June	7	37.0,	27.9	10	—	5 1/2
1065		June	9	40.1,	28.9	10	—	5 1/2
1066		June	9	38.4,	21.9	41	—	5 1/2
1067		June	12	36.9,	27.9	10	—	5 1/2
1068		June	16	35.0,	24.2	37	—	5 1/2
1069		June	22	37.2,	21.3	41	VI	6 1/2
1070		July	8	39.1	25.1	4	—	5 3/4

Table II (cont.)

Nº	Date			Location Nº	Location Eº	Focal depth h	Highest intensity I_0	Surface wave magnitude M_S
1071	1982,	July	15	37.4,	20.3	30	—	6
1072		July	18	39.2,	25.3	0	—	5 1/2
1073		July	22	39.0	25.1	11	—	5 1/2
1074		July	23	39.0,	25.2	22	—	5 3/4
1075		Aug.	4	39.7,	20.5	22	VI - VII	5 3/4
1076		Aug.	8	39.3,	22.9	36	—	5 1/2
1077		Aug.	17	33.7,	22.9	1	—	6 3/4
1078		Sept.	10	38.1,	22.8	22	—	5 1/2
1079		Sept.	20	34.3,	26.0	39	—	6
1080		Sept.	21	34.3,	26.0	42	—	6 1/2
1081		Sept.	28	37.5,	20.4	35	—	6 1/4
1082		Oct.	11	35.4,	27.8	69	—	5 3/4
1083		Oct.	25	40.5,	21.6	21	—	5 1/2
1084		Nov.	16	40.8,	19.6	20	VIII	6 1/2
1085		Nov.	17	40.8,	19.5	30	—	6
1086		Nov.	20	36.8,	21.5	37	—	5 3/4
1087		Nov.	28	36.4,	26.2	140	—	5 1/2
1088		Dec.	14	38.7,	24.8	9	—	5 3/4