寄 書

第3回地球物理理論と
計算機のシンポジウム

東京大学地震研究所

佐藤 泰夫

(昭和41年7月18日受理)

Third International Symposium on
Geophysical Theory and Computers

Yasuo SATO

Earthquake Research Institute,

The University of Tokyo

(Received July 18, 1966)

Upper Mantle Committee の中の一つの作業グループである“理論と計算機”グループは 1966 年の会を下記の通り、イギリスのケンブリッジにおいて持った。参加者は主催国イギリスのほか、アメリカ、ソ連、イスラエル、東西ドイツ、デンマーク、チェコスロバキア、カナダ、ポーランド、トルコ、イタリア、日本等、十余カ国、90名におよび盛会であつた。なお 1968 年の会は日本において行なわれる予定である。

データ処理、理論の両分野とも、地球物理学に対する計算機の利用はますます広かつ大規模になる傾向がみられる。以下にプログラムを示す。(* 印は追加講演)

Sunday 26 June

2.15 p.m. Tour of Cambridge Colleges (leaving from Emmanuel Front Gate).

5.00~7.00 Registration at Emmanuel College.

8.00 Reception given by the Master of Emmanuel, Sir Gordon Sutherland, F.R.S.

Monday 27 June 9.15~12.30 Chairman-Dr. E. R. LAPWOOD

1)-L. KNOPOFF: Equations of state; an introduction of composition as a parameter in inversion problems.

2)-M. N. TOKSOZ: Inhomogeneities in the Earth's mantle.

3)-M. LANDISMAN, S. MUELLER and K. FUCHS: Further evidence for the Sialic velocity zone.

4)-A. DOUGLAS: The P-wave amplitude-distance function.

2.30~4.00 Chairman-Prof. C. L. PEKERIS

5)-H. JEFFREYS and R. O. VICENTE: The elastic equations for the Earth.

6)-J. KANE and A. MAL: A computational approach to the inverse strain problem.

7)-G. E. BACKUS: Application of tensor potentials to tensor field calculations in spheres.

Tuesday 28 June 9.15~12.30 Chairman-Dr. R. STONELEY, F.R.S.

8)-C. L. PEKERIS: Wave theory intrinsic to seismology.

9)-V. CERVENY: The amplitude curves of waves reflected at a plane interface for different frequencies.

10)-C. B. ARCHAMBEAU, E. A. FLINN and D. G. LAMBERT: Detection, analysis and interpretation of teleseismic signals, and: Compressional phases from the Bilby, Shoal and Fallon events.

11)-Y. SATO and T. Usami: Theoretical seismograms of spheroidal type on the surface of a homogeneous gravitating spherical Earth.

Tuesday 28 June 2.30~4.00 Chairman-Dr. R. BURRIDGE

12)-I. LONGMAN: The numerical solution of theoretical seismic problems.

13)-M. G. WURTELE: The propagation of atmospheric gravity waves in a shearing current.

14)-E. Strick: The determination of a

transient creep curve from wave propagation measurements.

8.00 (In Emmanuel College) Lecture by Professor Sir Edward Bullard, F.R.S. The Analysis of Observations.

Wednesday 29 June 9.15~12.30 Chairman-Prof. L. KNOPOFF

15)-D.L. ANDERSON: Seismology and solid state physics.

16)-F. PRESS: How to measure Q in the presence of aftershocks.

17)-M. CAPUTO: Linear models of dissipation whose Q is almost frequency independent.

18)-R. KOVACH: Relative attenuation of compressional wave energy in the mantle.

In the afternoon a visit to Ely Cathedral.

Thursday 30 June 9.15~12.30 Chairman-Prof. Sir EDWARD BULLARD, F.R.S.

19)-V. I. KEILIS-BOROK: Inverse problems of seismology.

20)-R. A. PHINNEY: Diffraction by the Earth's core.

21)-G. E. BACKUS and F. GILBERT: Numerical exploration of the inverse normal mode problem.

22)-Z. ALTERMAN and F. ABRAMOVICI: The motion of a sphere caused by an impulsive force and by an explosive point-source.

2.30~4.00 Chairman-Prof. J. E. NAFE

23)-F. PRESS: An explanation of the Krakatoa air-pulse and its coupled sea wave.

24)-A. BEN-MENACHEM: Green's dyadic and its role in elastostatics and elastodynamics.

25)-R. STONELEY: Love waves of high frequency along an interface.

*)-LAVRENTIEU: Two dimensional and three dimensional inverse problem in

geophysics.

*)-B. M. NAYMARK: Inversion of travel time curve.

5.30 Drinks at Peterhouse College.

Friday 1 July 9.15~12.30 Chairman-Prof. V. I. KEILIS-BOROK

26)-Prof M. V. WILKES, F.R.S. (Director of Mathematical Laboratory, Cambridge): The digital computers and their use in scientific research.

27)-D. H. WEICHERT and E. B. MANCHEE and K. WITHAM: Digital processing at twice real time speed of the seismic signals from the Yellowknife medium aperture seismic array.

28)-E. P. ARNOLD: A progress report on the International Seismological Research Centre.

*)-B. M. NAYMARK: On the problem of stress concentration.

2.15~2.50 or 3.00~3.55 Visit to TITAN at the Mathematical Laboratory.

Saturday 2 July 9.15~12.30 Chairman-Prof. C. L. DRAKE

30)-A. H. COOK: The Earth's gravity field from satellite observations.

31)-M. H. P. BOTT: Solution of the linear inverse problem in magnetic interpretation with application to oceanic magnetic anomalies.

32)-G. GUDMUNDSSON: Spectral analysis of magnetic surveys.

33)-J. TANNER: An automated method of gravity interpretation.

Sunday 3 July

2.00 Tour of Essex and Suffolk Villages.

8.00 An informal musical evening in Emmanuel College.

Monday 4 July 9.15~12.30 Chairman-Prof. F. GILBERT

34)-E. J. KELLY: Experiments with LASA.

35)-J. A. HUDSON: Signal generated noise

at the Eskdalemuir array.

36)-J. KANE: Teleseismic response of a non-uniform crust.

2.00 Visit to the Department of Geophysics, preceded by a brief description of items of interest to be seen there.

8.15 Lecture by Dr. Max Perutz, F.R.S. Nobel Laureate (Director of Medical Research Council Laboratory for Molecular Biology, Cambridge): X-ray analysis of crystalline proteins.

Tuesday 5 July 9.15~12.30 Chairman-Prof. F. PRESS

37)-N. O. WEISS: Numerical experiments and the Earth's magnetic field.

38)-D. H. MATTHEWS: Formation of magnetic anomaly pattern of mid-Atlantic ridge.

39)-M. TAKIN and M. TALWANI: Rapid computation of the gravitational attraction of topography on a spherical Earth.

40)-B. R. LEATON and S. R. MALIN: Geomagnetic research at the Royal Greenwich Observatory.

2.30~4.00 Chairman-Dr. J. A. HUDSON

41)-G. W. LENNON: Some numerical methods of tidal prediction.

42)-W. ULLMANN: A quantitative interpretation of seismicity and seismic activity.

43)-C. LOMNITZ: On estimating earthquake risks.

8.00 Reception at Emmanuel College by Prof. G. K. Batchelor, F.R.S., Head of Applied Mathematics and Theoretical Physics.

地震 第2輯
第19巻(1966) 280-282頁

実体波および表面波から 求めた小地震のマグニ チュードの関係について

気象庁地震課

市 川 政 治

(昭和41年8月5日受理)

Relationship between Local Earthquake
Magnitudes determined by Body and
Surface Waves

Masaji ICHIKAWA

(Received August 5, 1966)

1963年以降 U.S.C.G.S. はその傘下の観測所の短周期上下動地震計に記録された P 波初動群中の最大振幅とその周期から、震源の決定された大部分の地震に対し、Gutenberg-Richter の方法に基づきそれらのマグニチュードを計算し、発表している。

このマグニチュード m と気象庁, Pasadena, その他多くの機関で使用しているマグニチュード M との間には、 $M > 6\frac{1}{2}$ の地震に対し、

$$m = 0.63 M + 2.5 \quad (1)$$

なる関係があるとされている (Gutenberg-Richter (1956)). しかし、この式を導くために使用した資料から、小地震に対しこの式が適用できるかどうか検討の余地がある。

そこで、筆者ら (1963) がカナダの地震観測所の長・短周期地震計から計算した M や m , U.S.C.G.S. や Pasadena などの機関から発表されている M や m を用いて、これらの値の間の関係を調べたところ、Fig. 1 から明らかのように $m < 6\frac{1}{2}$ の地震に対しては (1) 式はあてはまらないことがわかった (市川・Basham (1963)).

また、米国でも同じ頃にこの問題が議論されており、例えば R. Fisher (1964) は BCIS 所載の同一地震に対し、多くの機関から発表されている M の平均値と、Resolute, Brisbane, Rome, Baguio の