European Geophysical Society Meeting Program

General Information

The Third Meeting of the European Geophysical Society will be held in Amsterdam, Tuesday through Friday, September 7–10, 1976, at the Vrije Universiteit, De Boelelaan 1105, Amsterdam.

The preliminary program for this meeting appears here. The final program, incorporating last-minute changes and postdeadline abstracts, will be distributed at the meeting. The present EGS issue will be distributed free of charge to those who attend the meeting (with the exception of guests).

Registration. Everyone attending the meeting is required to register, and all attendees must wear their badges to meeting events. Registration fees at the meeting are Dfl. 105 for nonmembers, Dfl. 85 for EGS members, Dfl. 55 for student members, and Dfl. 10 for guests. One can become an EGS member at the meeting for Dfl. 15.

The registration desk will be open from 1600 to 2000 on Monday September 6, from 0800 to 1700 on Tuesday September 7, and from 0830 to 1700 Wednesday through Friday, September 8–10. Preregistrants should collect their registration material at the preregistration desk.

Information and messages. A registration and message desk will be located in the registration area in the Vrije Universiteit (telephone 20-5482670). Travel agency Wagon-Lits/Cook will have a representative in the registration area. Tourist information on Amsterdam can also be obtained. (Please note that sleeping in Vondelpark is no longer permitted by the police.) A book exhibition will also be found in the registration area.

Vrije Universiteit. The Vrije Universiteit (Free University) was founded in 1880 as a very small and wholly private university. It still has its original guiding principle of a Christian world view, but it has with some 11,000 students grown to full size, and it is at present fully government subsidized.

The building is located at De Boelelaan 1105, 3 km from the Rijksmuseum. Public transportation is available from the airport terminal and the railway stations. Participants in the meeting can eat lunch and dinner at the university restaurant for Dfl. 3 to Dfl. 5.

Society Sessions

Two society lectures will be presented: Geodynamic Processes and Geodynamic Models on Wednesday September 8 and Role of the Oceans in the Budget of the Chlorofluoromethanes on Thursday September 9; both sessions begin at 0900. The society's plenary (business) session is planned for Thursday September 9 at 1715.

Social Events

On Monday September 6 from 1900 to 2100 there will be a welcoming party in the building of the Vrije Universiteit. On Wednesday September 8, the Burgomaster and Alderman of Amsterdam will receive the attendees of the meeting in the Vincent van Gogh Museum (near the Rijksmuseum) at a cocktail party.

Organization of This Program

The 230 papers of the program are organized in eight symposia and seven open sessions: 136 papers are in the field of solid earth geophysics and 94 are in external geophysics.

This program consists of the session and symposia summary, the abstracts, and the author index.

The following abbreviations are used throughout the program:

EGS	European Geophysical Society
G	Geodesy
GP	Geomagnetism and Paleomagnetism
ID	Interdisciplinary
S	Seismology
SP	Solar-Planetary Relationships: General
SM	Solar-Planetary Relationships: Magnetospheric Physics
SS	Solar-Planetary Relationships: Solar and Interplanetary Physics
T	Tectonophysics
V	Volcanology, Geochemistry, and Petrology

Program Committee

The Program Committee for the Third EGS Meeting consists of M. Ackerman, L. Lliboutry, S. Mueller, S. A. Thorpe, and B. J. Collette (ex officio).

Precipitating low energy electrons in the lower ionosphere lose energy by various processes. Considering the precipitating flux to be mono-energetic and having a certain energy spectrum we have studied the scattering mechanism and energy loss processes. Using Monte Carlo method we have considered a realist flux of low energy electrons to be incident at a height of 300 km. These particles are followed up and changes in their direction, flux and energy are computed at every slab height. The polar distribution of these parameters at various slab heights have been shown. The spectrum of bremsstrahlung radiation generated in the lower ionosphere has been computed and its height profile has been shown. The computed bremsstrahlung flux has been compared with available measurements. The comparison shows a good agreement in view of various limitations of theory and the measurements.

ID 3

A NEW TECHNIQUE FOR THE PRESENTATION OF THE SPECTRAL AND POLARIZATION CHARACTERISTICS OF NON-STATIONARY SIGNALS

K. Kodera
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C. de Villedary
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We describe a new method for visualizing the frequency versus time behaviour of non-stationary signals. This method is based upon the use of the first moment of the energy distribution of a filtered signal in the frequency time domain and it is related to the properties of the analytical signal and to the concept of instantaneous frequency. It is shown that, for a wide variety of signals (as expressed in terms of their BT value), the bandwidth of the analyzing filter has almost no influence on the results, contrary to other methods of representation. The concept of analytical signal may also be extended to the complex signal associated with a polarized wave. The presentation of the results does not depend upon the direction of the antennas and is not affected by their rotation with respect to a "fixed" frame. A polarization vector is defined, which satisfies the usual relationships with the imaginary part of the coherency matrix. Algorithms for both kinds of analysis are given as well as practical applications to artificial or natural signals.

ID 4

SPATIAL COHERENCE OF THE ACOUSTIC FIELD BACKSCATTERED BY TURBULENCE

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An acoustic sounding system (SODAR) has been used to collect the data presented. The system consists of a transmitting-receiving antenna (3 m diameter), illuminated by a 1000 w(electric) acoustic feeder, and by two other smaller paraboloids. The main antenna is housed in a roofless room with absorbing walls, in order to lower the noise in the receiver. The distance between the two smaller paraboloids has been changed in the course of the experiment from 3 m up to 30 m. The transmitted signal usually consisted of a 1000 Hz - 50 ms burst. The signal, backscattered by the atmospheric irregularities, and received by the three antennas, has been recorded on a magnetic tape to be analyzed later on with a small computer. Autocorrelations and crosscorrelations, both of the amplitude and of the phase, of the received signals have been computed and are presented as a function of the delay time for some specified atmospheric heights. The behaviour of such functions is analyzed in terms of atmospheric turbulence spectra and mean wind, in different meteorological situations.

ID 5

MODEL CALCULATIONS ABOUT THE GROWTH OF SALT DOME FAMILIES

U. Hunsche (Institut für Geophysik und Meteorologie, Mendelssohnstrasse 1A, 3300 Braunschweig, West-Germany)

The known hydrodynamic model calculations (e.g. Ramberg, 1963; Saalfrank, 1973) use two-dimensional harmonic initial disturbances. The computations yield the approximate distances between the salt domes and their approximate velocities of growth.

For higher accuracy it is necessary to use more realistic disturbances of which a spatial harmonic analysis has to be made. Each term of the sum develops in a different way and afterwards they must be superimposed.

With these model calculations it is possible to compute the development of two-dimensional salt dome families, especially the distances between the salt domes, the times of origin and the growth velocities of the generations of salt domes and other interesting details. This is shown with the example of the salt-dome family of Schleswig-Holstein (Western-Germany). Extensive model experiments with two-fluid models confirm the accuracy of the computations.

ID 6

NON-LINEAR INTEGRAL OF ALGEBRAIC SYSTEMS FOR SOLVING UNKNOWN CONTOURS OF BODIES BY HELP OF THEIR ANOMALIES

V. D. Uzunov (Boul, Patriarch Evtimi 53 Entr B SOFIA 63 Bulgaria)

ID 7

UNIQUENESS PROBLEMS IN THE SPHERICAL HARMONIC ANALYSIS OF THE GEOMAGNETIC FIELD DIRECTION DATA -

M. Kono * (Sub-department of Geophysics, University of Liverpool, Liverpool L69 3BX, England)

Several attempts have already been reported to represent the ancient geomagnetic field before the time of Gauss by spherical harmonic components calculated from field direction data. The meaning of such a representation, however, is not clear. It can be shown that if the field directions (inclination and declination, or any other combinations of two independent angles) are completely known on the surface of the Earth, the geomagnetic potential can be determined uniquely except an arbitrary multiplicative constant. On the other hand, when declinations only are specified on the surface, there are infinitely many potentials which satisfy exactly the same boundary conditions. Such non-uniqueness seems also to be associated with other incomplete data set composed of one angle only. The uniqueness theorem serves as the basis for spherical harmonic analyses of the palaeomagnetic field.

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ID 8

COMPARED RELATIVE VARIATION OF THE MAGNETOTELLURIC VARIANCE.

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The MT variance has been studied with regard to coherence, oscillations periods, density of values for each period, homogeneity and isotropy conditions of the locations under study. The locations analysed are Nozay en Dunois on isotropic and homogeneous sedimentary layers and Planchez du Morvan, in the middle of a very polarized granitic horst. The range of the studied periods was 1s to 24h for Nozay and 15s to 24h for Planchez. The density of values of MT analysis is defined per one-fifth of logarithmic 10-intervals of the period T. Three levels of minimum coherence where used: .53, .73, .85. First, the average coherence increases more rapidly with regard to the decreases of the average variance between the coherence yields of .53-.73 than it does in the .73-.85. On the other hand, the variation of these two parameters when they become better is more marked in the .73-.85 interval rather than in the .53-.73. However, the quality of the average MT curve is worse for .85 than for .73 due to the loss of a large proportion of the analyse values in the computation of the averaged values of the apparent resistivity (blanks in the curve). The average curve is of a much better quality for the .73 coherence yield compared to the .53. Finally, it seems that the best coherence yield is .73 in this study. Truly, toward one hand, low coherence cut brings the large variance, toward the other hand high cut decreases very much the number of values to be averaged. In the particular case of the Pc3 band, the quality is good from the start and increases slowly when the coherence threshold is raised. Results described here are similar for both locations.

ID 9

STOCHASTIC BEHAVIOUR OF DAILY MINIMUM, MEAN AND MAXIMUM TEMPERATURES IN MODENA, ITALY.

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Istituto di Fisica e Osservatorio Geofisico, Università di Modena, Via Università, 4 - 41100 Modena, Italy)

A stochastic model, mostly non-parametric, has been developed for the analysis of the daily temperatures in view of their forecasting and of studies of climatic changes. As an example the minimum, mean and maximum daily temperatures in Modena, Italy, since 1892, have been analyzed. The temperatures are assumed as due to the contribution of two terms: T(t) = E(t) + R(t), where E(t) comes from the average energy balance and has a fundamental period of 365 days, and R(t) comes from short range effects of the random changes of the atmosphere. E(t) has been determined by a moving harmonic analysis of a string of 365 consecutive temperatures centered around t. The behaviour of the phases of the harmonic waves shows that the first 3 harmonics reproduce the annual repetitive behaviour of the temperatures. R(t) obtained as a difference, turns out to be a normal noise of markovian type as shown by its autocorrelation following a decreasing exponential: $A.e^{-x/t}$. The time behaviour of the stochastic Fourier parameters and autocorrelation will also be presented. In particular the trends of the constant, the amplitude and the phase of the first harmonic (corresponding respectively to the annual average, the annual maximum excursion and to the day in which the maximum of the temperatures is reached) will be discussed.

A more sophisticated model, which assumes as constant and not as random variables the 1st, 2nd and 3rd harmonic and leaves any stochastic variation to the constant and to R(t) will be also discussed. In this model R(t) results as a sum of two nearly normal stochastic processes with an overall autocorrelation given by the sum of two decreasing exponentials.

ID 10

RELATIVISTIC GRAVITATION AND GEOPHYSICS

F. Machado (Inst. Univ. dos Açores, Ponta Delgada, San Miguel, Azores)

With an adequate metric for the Universe, General Relativity leads to the possibility of changes in the rest mass of material bodies and, therefore, in gravitational attraction. The law of attraction (or repulsion) for very distant objects is slightly complicated, but for near objects, within a single galaxy, the usual Newton equation can be used if we accept that the gravitational "constant" is subject to small changes. That "constant" is likely to pulsate along the galactic orbit of the solar system and this has very important geophysical consequences. Variation of pressure in the Earth's interior, derived from changes of gravitational attraction, will produce expansion or contraction of the crust, thus providing a mechanism for plate tectonics and for sea level changes. On the other hand, changes of mass lead to changes in the Sun's radiation (with all their implications for the Earth's climate) and also to changes in the rotation of the Earth.