opposite opinion is expressed by M.A. Leontovich (Vvedeniye v termodinamiku, 1951) and by T.A. Erenfest-Afanas'yev (Zurn. prikl. fiz., 5, 3, 1928). It is shown that [illegible] Erenfest-Afanas'yev that the [illegible] principle [illegible] of thermodynamics are inadequate for the case of thermally inhomogeneous systems. It is also shown that the inapplicability of the [illegible] principle to thermally inhomogeneous systems on the basis of the argu-

L 57500-65
ACCESSION NR: AP5013751

[illegible] by P. S. Epshteyn becomes evident only when the artificial thermodynamics are [illegible] of the statistical thermodynamics. "The [illegible] for his constructive criticism of the results [illegible]

ASSOCIATION: [illegible]

SUBMITTED: [illegible] ENCL: 00 SUB CODE: NP

NO REF SOV: 003 OTHER: 003

IMSHENNIK, V.S.; NADEZHIN, D.K.

Thermodynamic properties of matter at high densities and temperatures. Astron. zhur. 42 no.6:1154-1167 N-D '65.
(MIRA 19:1)

1. Submitted April 8, 1965.

D'YACHENKO, V.F. (Moskva); ISHENNIK, V.S. (Moskva)

Conversion of a cylindrical symmetric shock wave in the presence of dissipative effects. Prikl. mat. i mekh. 29 no.6:993-996 N-D '65. (MIRA 19:2)

1. Submitted June 26, 1965.

L 21732-66 EWT(1)/EWP(m)/ETC(f)/EPF(n)-2/EWG(m)/T-2 IJP(c) AT

ACC NR: AT6006749 SOURCE CODE: UR/3136/65/000/960/0001/0066

AUTHOR: Imshennik, V. S.; D'yachenko, V. F.

ORG: Institute of Atomic Energy im. I. V. Kurchatov (Institut atomnoy energii)

TITLE: On the magnetohydrodynamic theory of pinch effect in a dense high temperature plasma

SOURCE: Moscow. Institut atomnoy energii. Doklady, IAE-960, 1965. K magnitogidrodinamicheskoy teorii pinch-effekta v vysokotemperaturnoy plotnoy plazme, 1-66

TOPIC TAGS: high temperature plasma, plasma pinch, plasma discharge, magnetohydrodynamics

ABSTRACT: Detailed behavior of a deuterium plasma during a linear pinch is studied by solving one-dimensional cylindrically symmetric magnetohydrodynamic equations. The role of dissipative processes (electron and ion thermal conductivity and viscosity, electrical conductivity and electron-ion collision dissipation) occurring in fully ionized plasma and the formation of shock waves are discussed. The connection between the region near the axis and the converging shock wave is determined, and thermonuclear neutron and soft x-ray output is computed. The computation also

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L 21732-66

ACC NR: AT6006749

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determines the plasma temperature and ejection of the mass from the pinch region as a function of the current sheet velocity near the pinch axis. (Typically, 1 kev temperatures occurring at $2.5 \cdot 10^7$ cm/sec sheet velocity and 90% mass ejection are discussed.) The results are compared with the experimental data and the range of agreement between the two is established. The main difficulty arises from presence of non-uniformities which do not occur in the one-dimensional problem. Data from this experiment agrees with data from experimental pinches which are cylindrically symmetric in the entire space between the anode and the cathode of the discharge apparatus. The authors are grateful to N. V. Filippov, T. I. Filippova, V. P. Vinogradov, G. V. Golub, L. G. Golubchikov, and Yu. A. Kolesnikov for their many valuable comments and for their joint analysis of the results of the computations and experiments. The authors express their sincere thanks to V. V. Paleychik who did all the work in providing numerical solutions to the problem on a computer. The authors thank L. A. Artsimovich, M. A. Leontovich, S. N. Braginskiy, V. I. Kogan, B. B. Kadomtsev, and R. P. Fedorenko for their valuable discussion of the formulation of the problem and for their interest in the work. Orig. art. has: 14 figures, 56 formulas, 3 tables.

SUB CODE: 20/ SUBM DATE: 00/ ORIG REF: 024/ OTH REF: 008

Card 2/2

IMSIROVIC, M.

IMSIROVIC, M. Stability of bituminous emulsions. p. 422.

Vol. 3, no. 11, 1955
CESTI I MOSTOVI
Zagreb, Yugoslavia

So: Eastern European Accession Vol. 5 No. 4 April 1956

IMSIROVIC, Magdalena, ing.

New building materials produced by the "Katran" Factory.
Kem ind 10 no.11:457-459 N '61.

1. "Katran", Zagreb.

IMSIROVIC, Magdalena, inz.

News in the field of bitumen products. Kem ind 12 no.3:191-193 Mr '63.

IMYANITOV, I. M.

PA 25/49T57

USSR/Geophysics Nov/Dec 48
Atmosphere -- Measurements
Light -- Dispersion

"Study of the Atmosphere With the Aid of Light Impulses," I. M. Imyanitov, Main Geophys Obs, Leningrad, 6 pp

"Iz Ak Nauk SSSR, Ser Geog i Geofiz" Vol XII, No 6 p. 531-536

Discusses possibility of optical study of the atmosphere by study of forms of light impulses after their dispersion. Discusses possibility of practical realization of proposed principles.

25/49T57

INYANITOV, I.M.

USSR/Geophysics — Jul/Aug 49
Geomagnetism
Electric Field

"Measuring the Horizontal Component of an Electric Field in the Atmosphere," I. M. Inyanitov, Main Geophys Obs, Leningrad, 11 pp

"Iz Ak Nauk SSSR, Ser Geog i Geofiz" Vol XIII, No 4

Discusses recently discovered presence of a horizontal component of an electric field in the atmosphere near the earth's surface. It gives a method of separating the components of such fields and the results of measurements showing the unexpectedly great magnitude of the field's horizontal

[redacted] 60/49T49

USSR/Geophysics (Contd) — Jul/Aug 49

component, which amounts to several volts per centimeter and sometimes exceeds the value of the vertical component. Submitted by Acad V. V. Shuleykin 6 Jan 49.

Translation D151394, 1949

[redacted] 60/49T49

IMYANITOV, I. M.

PA 149T90

USSR/Physics - Instruments Sep 49
Geophysics

"Instruments for Measuring the Intensity of an Electric Field and Their Application," I. M. Imyanitov, Main Geophys Obs, Leningrad, 11 pp

"Zhur Tekh Fiz" Vol XIX, No 9 p. 1020 - 1031

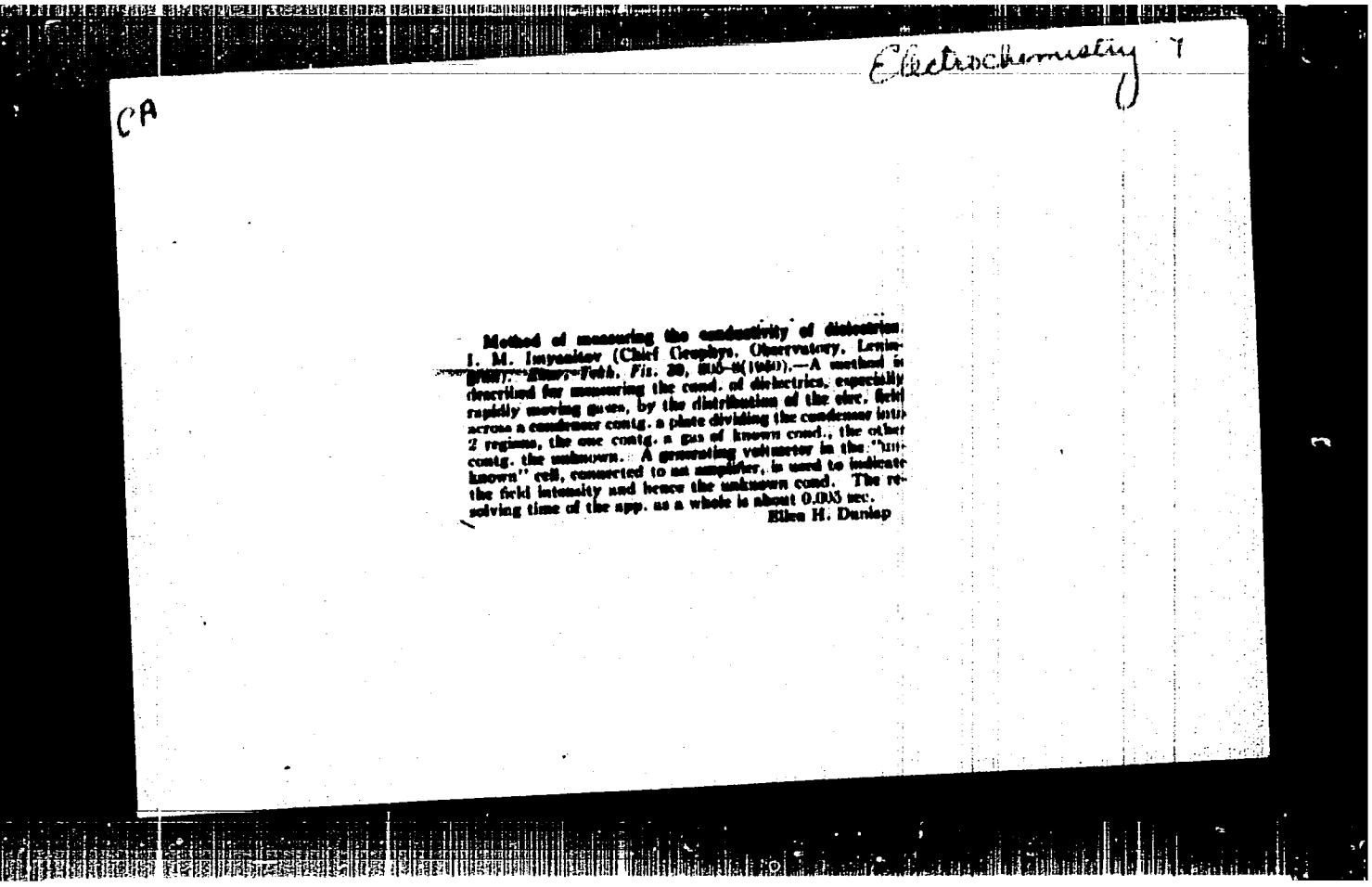
General discussion of theory underlying instruments used to measure field intensity, such as "capacitance commutators," "dynamic electrometers," "rotary voltmeters," etc, all of which are lumped herein under "electrostatic generators." Author designed an instrument to make test measurements

149T90

USSR/Physics - Instruments (Contd) Sep 49

having maximum sensitivity of 0.01 v/cm per division, an area of the measuring plates of 225 sq cm, and a minimum input resistance of 15 megohms. Submitted 25 Nov 48.

149T90



Electrochemistry 7

CA

Method of measuring the conductivity of dielectrics. I. M. Imyanitov (Chief Geophys. Observatory, Leningrad). *Zhur. Tekh. Fiz.* 20, 835–8(1950).—A method is described for measuring the cond. of dielectrics, especially rapidly moving gases, by the distribution of the elec. field across a condenser contg. a plate dividing the condenser into 2 regions, the one contg. a gas of known cond., the other contg. the unknown. A generating voltmeter in the "unknown" cell, connected to an amplifier, is used to indicate the field intensity and hence the unknown cond. The resolving time of the app. as a whole is about 0.005 sec.

Ellen H. Dunlap

IMYANITOV, I.M.

Electric fields in the free atmosphere. Trudy GGO no.35:9-11 '52.
(MIRA 12:1)

(Atmospheric electricity)

IMYANITOV, I.M.

Dynamic methods of measuring weak currents. Trudy GGO no.35:42-57 '52. (MIRA 12:1)

(Electrometer) (Atmospheric electricity)

IMYANITOV, I. M.

"The Inertia of Apparatus Employed in the Study of Convective Cloudiness Meteorol. i gidrologiya, No 4, pp 47-48, 1954.

Numerous investigations of convective cloudiness have revealed the existence of nonhomogeneities in the magnitude distribution of drops, their concentration, the structure of wind currents and the temperature having magnitudes of the order of 100 meters, and micrononhomogeneities of the same elements with magnitudes of about 10 meters. In order that these nonhomogeneities be recorded during observations from an airplane flying with a velocity of 70 m/sec, the inertia of the measuring apparatus must not exceed 0.1 second, and instudies of micropulsations the inertia must be still smaller. Episodic measurements must be conducted not fewer than 5-10 times per second, and complex measurements of cloud characteristics must be sufficiently synchronized. (RZhGeol, No 8, 1955)

SO: Sum No 884, 9 Apr 1956

IMYANITOV, I.M.

AID P - 2604

Subject : USSR/Meteorology

Card 1/2 Pub. 71-a - 7/26

Authors : Imyanitov, I. M. and Chuvayev, A. P.

Title : Basic process of electric charge in thunderclouds

Periodical : Met i gidr, 4, 34-36, Jl/Ag 1955

Abstract : Results of studies of highly convective thunderclouds are reported in this article. Research on the electric charge tension in cumulo-nimbus clouds before and after glaciation is presented. A table listing vertical measurements, time, and tension of the electric field in the cloud is given. The authors maintain that it is possible to determine the criterion of lightning danger for areas with radar echo by establishing the connection between the potential lightning capacity of various cloud formations and the thickness of the clouds (particularly in saturated part) and the location of the zero isotherm. One Russian reference, 1952, 2 American, 1952 and 1953.

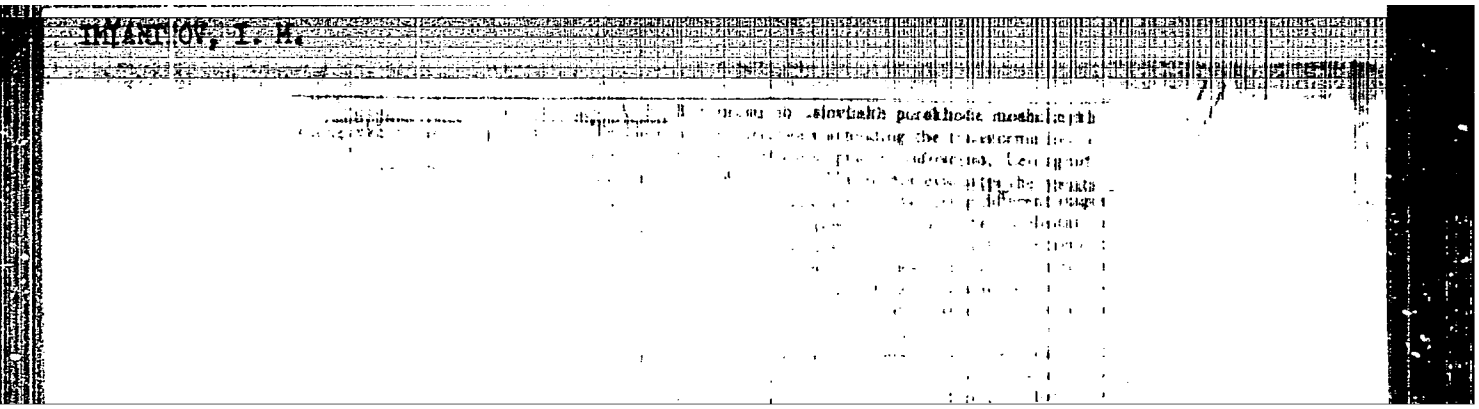
AID P - 2604

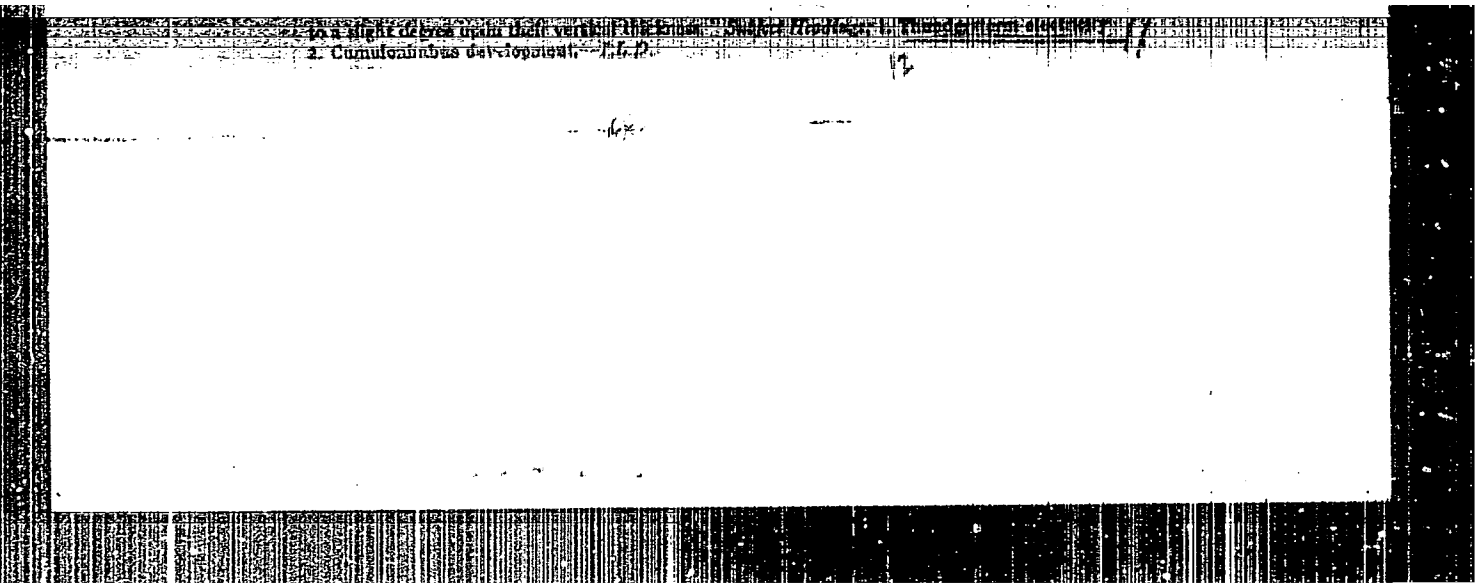
Met i gidr, 4, 34-36, Jl/Ag 1955

Card 2/2 Pub. 71-a - 7/26

Institution : None

Submitted : No date





IMYANITOV, I.M.; MIKHAYLOVSKAYA, V.V.; ZIGANOV, N.P.; STREL'TSOVA, M.B.

Instrument for prolonged measurement of the intensity of an atmospheric electrical field in complex meteorological conditions. Izv.AN SSSR. Ser.geofiz. no.9:1121-1127 S '56. (MLRA 9:12)

1. Glavnaya geofizicheskaya observatoriya imeni A.I. Voeykova.
(Atmospheric electricity)

36-58-1/12

AUTHOR: Imyanitov, I. M.

TITLE: Methods of Measuring Conductivity and Ion Concentration Gradients in the Atmosphere (Metody izmereniya gradiyentov provodimosti i ionnoy kontsentratsii v atmosfere)

PERIODICAL: Trudy Glavnoy geofizicheskoy observatorii, 1956, Nr 58, pp 3-7 (USSR)

ABSTRACT: In order to increase the accuracy of gradient measurements the author recommends measuring values at different levels with instruments of greater precision. He also offers a new theory for utilizing differences in values for given altitudes. There are 2 references, both Soviet.

AVAILABLE: Library of Congress

Card 1/1

36-58-2/12

AUTHOR: Imyanitov, I. M. and Kolokolov, V. P.

TITLE: Investigating the Distribution of Induced and Free Electrical Charges on Aircraft Surfaces (Issledovaniye raspredeleniya indutsirovannogo i sobstvennogo elektricheskogo zaryada na poverkhnosti samoleta)

PERIODICAL: Trudy Glavnoy geofizicheskoy observatorii, 1956, Nr 58, pp 8-16 (USSR)

ABSTRACT: A study of induced and free electrical charges on aircraft surfaces has two purposes: 1) to determine the position and distribution of instruments and antennas in investigating electrical fields in the free atmosphere with the aid of aircraft and a study the latter's electrical charge, and 2) to determine the conditions surrounding coroning at different points on the surface of an aircraft in order to decrease parasitic effects in radio communications by selecting the right type of receiving antennas and dischargers and choosing the correct location for them. The coroning is caused by external electrical fields and the aircraft's own charging. The investigation is carried out for aircraft the surface conductivity of which is sufficiently large. Tests have shown that coroning conditions on a plane are wholly determined by the latter's design and construction. Even if antennas and other projecting parts are removed the aircraft would still corone while flying through clouds, in landing, and flying close to storm clouds. The usual dischargers may not be effective, since the discharger

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Investigating the Distribution (Cont.)

instrumental in discharging the aircraft's own charge does not prevent coroning due to the effect of an external field. Electrostatic interferences on a plane may be eliminated only through a thorough analysis of the effect of the aircraft's form on coroning conditions. There are 6 figures, 1 table, and 3 references of which 2 are Soviet, and 1 is English.

AVAILABLE: Library of Congress

Card 2/2

IMJANTOV, I.M.

SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1421
AUTHOR IMJANTOV,I.M.
TITLE On the Problem of the Electrification and Conductivity of Cumulo-Nimbus Clouds.
PERIODICAL Dokl.Akad.Nauk, 109, fasc. 1, 77-79 (1956)
Issued: 9 / 1956 reviewed: 10 / 1956

Measuring of the electric fields of cumulo-nimbus clouds carried out by the author in an aircraft showed that in altitudes of more than 200 m the electric fields, and consequently also the charge distribution in the clouds,may remain nearly constant for several minutes. The condition of charge invariance in a cumulo-nimbus cloud is: $i_g = i_d$. (i_g - the current generating the charges, i_d - the dissipation current reducing the charges). In the case of a considerable modification of a component it is possible, from measuring field strength, to draw conclusions with respect tp the amount of the other component. This is best done immediately after lightning discharges. Field strength was measured by means of an electrostatic fluxmeter.
Two kinds of charges were observed. Electric field strength increases or diminishes after discharges of the first (type A) or second kind (type B) respectively.

If a cumulo-nimbus cloud is considered to be an immense electric dipole (positive charge above, negative charge below), the discharge type A may be explained by a modification of the electrical structure of the cloud. After a lightning discharge the cloud receives an "excess charge", but the field of this charge is not reduced as rapidly as the field of the dipole, and consequently the field in-

creases at a certain distance of the cloud after the lightning discharge. The decrease of the field after the discharge is thus to be ascribed to the dissipation of this excess charge.
Discharges of the type B are due to a reduction and following restoration of the magnetic moment (or of the charge) of the clouds. The velocity of restoration here depends on the amperage on the occasion of the generation of charges and on the velocity of their spatial distribution. In both cases the restoration curves have a marked exponential character. The average time of relaxation amounted to ~ 4,9 and 7,2 sec respectively on the occasion of discharges of the types A and B in the case of thunderstorms in the Caucasus and on a plain respectively.
More than 50% result in a relative modification $\Delta E/E$ of field strength by more than 0,4. Here ΔE denotes the modification of field strength and E the field strength before the lightning discharge. Modifications of field strength depend essentially on the modification ΔQ of the dipole charges.
The data obtained here show that conductivity in cumulo-nimbus clouds plays an important part on the occasion of the delivery of the necessary charge to the channel of the lightning discharge. The generation of charges in the cloud is probably due to the elementary processes of electrification which depend on field strength, because the charge diminishes exponentially in the cloud.

INSTITUTION: Principal Geophysical Laboratory "A.V.VOEJKOV"

IMYANITOV, I.M.

Call Nr: AF 1154942

AUTHOR: Imyanitov, I.M.

TITLE: Instruments and Methods for Investigating Atmospheric Electricity (Pribory i metody dlya izucheniya elektrichestva atmosfery)

PUB.DATA: Gosudarstvennoye izdatel'stvo tekhniko-teoreticheskoy literatury, Moscow, 1957, 483 pp., 3,000 copies.

ORIG.AGENCY: None

EDITOR: Starokadomskaya, Ye.L., Tech.Ed.: Akhlamov, S.N.

PURPOSE: This monograph is intended both for persons directly concerned with atmospheric electricity measurements, and for researchers in scientific and technical fields involving electrostatic measurements, measurements of low currents, and related topics.

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Instruments and Methods for Investigating Atmospheric (Cont.) Call Nr: AF1154942

COVERAGE: Description is given of various aspects of atmospheric electricity which were subjected to measurements, special stress being given to measurements which up to now had been rarely described, such as those of field strength, of vertical currents, of atmospheric conduction, and so forth. Makhotkin, L.G., is mentioned as author of Chapter 12 of the volume. The book deals with some Russian contributions. These are referred to in the list of references. There are 613 references, 124 of which are USSR.

TABLE OF CONTENTS

Card 2/23

SOV/112-59-1-606

Translation from: Referativnyy zhurnal. Elektrotekhnika, 1959, Nr 1, p 80 (USSR)

AUTHOR: Imyanitov, I. M., and Chuvayev, A. P.

TITLE: Results of an Investigation of Electric Phenomena in Thunderclouds

PERIODICAL: V sb.: Issled. oblakov, osadkov i grozovogo elektrichestva. L., Gidrometeoizdat, 1957, pp 13-16

ABSTRACT: Investigations of meteorological conditions that accompany the accumulation of charges in clouds carried out with specially equipped aircraft have shown that neither the vertical thickness of the cloud, nor its water content, nor the velocity of vertical streams in it can bring about charges and fields high enough to cause lightning. It has been noted that the electric field strength in the convective clouds grows after the appearance of the ice phase in them. Introducing ice crystals into the cloud has resulted in a rapid field build-up in 5-20 min and lightnings in 20-45 min. The time of field recovery after a lightning stroke has been about 5 sec which can be explained only by the phenomena associated with water-ice phase transitions.

Card 1/1 S.V.S.

69822

SOV/169-59-2-1699

Translation from: Referativnyy zhurnal, Geofizika, 1959, Nr 2, pp 107 - 108 (USSR)

3.5000

AUTHOR: Imyanitov, I.M.

TITLE: Methods and Devices for Investigating the Electricity of Clouds and Precipitations

PERIODICAL: V sb.: Issled. oblakov, osadkov i grozovogo elektrichestva. Leningrad, Gidrometeoizdat, 1957, pp 159 - 163

ABSTRACT: The measuring of the elements of the atmospheric electricity near the earth's surface does not yield the true values of the quantities when investigating the electricity of clouds and precipitations. The measurements show that the droplets can change not only the magnitude but also the sign of their charge, when falling from the cloud to the earth. Charged fields of less than 20 v/cm do not occur under thunderous clouds in altitudes of 200 m, while the intensity of the field under thunderous clouds at the earth's level does not exceed 100 v/cm. Therefore, a volume charge of an average density not less than 3 electrostatic units/m^3 is generated during thunderstorms in the layer from 0 to 200 m. An electrostatic aircraft fluxmeter and an aircraft device for measuring the charges of the precipitation particles are developed for measurements undistorted by the effect of

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SOV/169-59-2-1699

Methods and Devices for Investigating the Electricity of Clouds and Precipitations

the earth's surface. The measurements of the electric atmospheric field and the charge of the aircraft proper can be carried out by means of the fluxmeter. The maximum sensitivity amounts to $\pm$ 5 v/cm over the entire scale. The inertness is 25 msec. Precipitation charges from $5 \cdot 10^{-4}$ to $1.5 \cdot 10^{-1}$ electrostatic units can be measured by the induction device in cases when the concentration of particles amounts to $10^4 m^{-3}$.

Yu. Ivanov

Card 2/2

53-1t-18/18

AUTHOR IMYANITOV, I.M.

TITLE Measuring of the Electrostatic Field Strengths in the Upper Strata of the Terrestrial Atmosphere. (Izmereniye elektrostaticheskikh poley v verkhnikh sloyakh zemnoy atmosfery.- Russian)

PERIODICAL Uspekhi Fiz. Nauk 1957, Vol 63, Nr 1b, pp 267-282 (USSR)

ABSTRACT By means of artifical earth satellites the distribution of the electric field strength around the entire earth as well as the height distribution and the modification with respect to time of these field strengths can be determined. It is essential to measure the field strengths and the space charges formed by the particles which have penetrated into the earth atmosphere at heights of from 80 to 500 and even at heights of ~ 1000 km. The higher the satellite flies the more valuable are its measuring results. The use of artificial satellites for these measurements makes it necessary to work out a special method and apparatus. The present paper discusses the peculiarities of the measurements of the electrostatic field in the upper strata of the atmosphere and the method used for the construction of an apparatus suited for such measurements.

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Measuring of the Electrostatic Field Strengths in the Upper Strata of the Terrestrial Atmosphere. 53-1b-18/18

Measuring of the electrostatic field in space by means of an insulated body. The basic conceptions necessary for these measurements have already been discussed in a previous paper by the author. The following main difficulties arise: The apparatus itself can have a certain electrostatic potential which is superimposed to the field to be measured. The occurrence of a conducting body in the field causes local distortions of the field to be measured. The influence exercised by these disturbing factors on measuring results must be eliminated. By measuring the field strength at two points of the body the field strength in the atmosphere and the charge Q of the body can be measured; the corresponding formulae are written down. Similar deliberations apply also to the determination of the charge of the body. For the determination of the vector of the electrostatic field in space the field strength at four points of the body must be known. Such measurements, however, are not very exact, but when taking into account the electrostatic neutral lines, the fieldstrength need be measured only at two points of the body. Only one of the components of the

fieldstrength vector has then to be measured. In the case of an orientated satellite the desired component of the fieldstrength can be selected, e.g. the vertical one. In the case of a not orientated satellite the component of the fieldstrength is measured in the system of coordinates closely connected with the system of coordinates.

The peculiarities of the measurements for the case in which the body is located in a plasma: The measuring method hitherto described is applicable only if the effect exercised by the body on the distribution of the charges in the surrounding medium may be neglected. These conditions, however, prevail only in the lower atmospheric strata but never in that case in which the body is located in the ionosphere. For a rapidly flying satellite charges can be induced by a magnetic field. The author here investigates the charge of a body located in a plasma by the application of the usual conceptions of LANGMUIR'S probe theory and determines

formulae for the potential of the satellite. The potential of the satellite and the fieldstrength on its walls is influenced relatively only slightly by its motion. Also the thickness of the perturbed stratum can be determined by means of a formula by LANGMUIR ("3/2-law"). The results obtained here can even be given with much greater precision if together with these measurements, also the spectrum of the ion mass is measured.

The next chapter deals with the mode of operation of the device measuring the fieldstrength and the peculiarities of its performance in a conducting medium. Because of the very difficult conditions during the flight of the satellite a special device has to be constructed. The author here describes the operation of these devices which are destined for measurements carried out in the ionosphere. The most important part of these devices is "receiving electrode" which has to be located in the field to be measured. The following problems are discussed in detail: the influence exercised by the creeping current on the current flowing on the satellite casing, the densite distribution of the space charge over the operation of the device. In con-

Measuring of the Electrostatic Field Strengths in the Upper Strata of the Terrestrial Atmosphere. _ _

53-1b-18/18

clusion the fundamental scheme of this apparatus is described. The donor and the amplifier are discussed in detail.
(With 6 Illustrations and 4 Tables)

ASSOCIATION: not given.
PRESENTED BY: -
SUBMITTED: -
AVAILABLE: Library of Congress.

CARD 5/5

IMYANITOV, I.M.; KULIK, M.M.; CHUVAYEV, A.P.

Investigation of thunderstorm zones in the southern regions of European Russia and Transcaucasia. Trudy GGO no.67:3-32 '57.
(Thunderstorms) (MIRA 11:4)

DMYANITOV, I.M.; KULIK, M.M.; CHUVAYEV, A.P.

Preliminary data on experiments designed for the control of development and change of the electric state of massive convection clouds in the southern regions of European Russia and Transcaucasia. Trudy GGO no.67:33-58 '57. (MIRA 11:4)

(Clouds) (Weather control)

VOSKANOV, A.I.; DMITRIYEV, I.M.; KULIK, M.M.; CHUVAYEV, A.P.

Feasibility of safe passage of airplanes through thunderstorm zones.
Trudy GGO no.67:114-120 '57. (MIRA 11:4)
(Thunderstorms) (Radar in aeronautics)

IMYANITOV, I.M.; CHUVAYEV, A.P.

On basic processes leading to electric charge generation in thunderclouds. Trudy GGO no.67:121-128 '57. (MIRA 11:4)
(Atmospheric electricity) (Clouds)

SOV/120-58-2-21/37

AUTHORS: Inyanitov, I. M. and Mikhaylovskaya, V. V.

TITLE: An Aeroplane Instrument for Measuring the Charges on Precipitation Particles (Samoletnyy pribor dlya izmereniya zaryadov chastits osadkov)

PERIODICAL: Pribory i Tekhnika Eksperimenta, 1958, Nr 2, pp 86-91 (USSR)

ABSTRACT: In order to explain the mechanism of electrification of clouds and the production of electrostatic fields in the atmosphere it is necessary to know the charges on precipitation particles. Measurements of such charges near the Earth's surface do not yield the true values which obtain in clouds since these charges change as the particles fall towards the Earth's surface. It is therefore necessary to measure these charges in the clouds, or under the clouds. In the present paper an induction device is described. The instrument consists essentially of two rings (Fig.2). They are placed at such a distance that drops which come into contact with the first ring either do not pass through the second one or induce a pulse in the second ring which is different in form from that induced in the first ring. This arrangement separates out all the drops which have

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An Aeroplane Instrument for Measuring the Charges on Precipitation Particles.

not been affected by the apparatus. In order to screen the two rings from the effects of external fields the rings are placed inside a grounded metallic conical screen. The circuit which detects and amplifies the signal induced by the charged drops in the ring system is shown in Fig.3. The electronic circuit consists of a preamplifier and a four-tube main amplifier. The latter is a three-stage circuit with a transformer output. With a maximum signal at the input, the circuit delivers 100 mamp through a load of 2.4 ohms at the output. The instrument measures charges in the range $\pm 5 \times 10^{-4}$ to ± 1.0 CGSE. It may be used from an aeroplane in cases where particle concentration is less than $10^{-3} cm^{-3}$. It can work in the temperature range -30° to +25° and in 100% humidity without changes in

An Aeroplane Instrument for Measuring the Charges on Precipitation Particles.

its parameters. There are 6 figures, no tables and 5 references, 2 of which are English and the rest Soviet.

ASSOCIATION: Glavnaya geofizicheskaya observatoriya (Main Geophysical Observatory)

SUBMITTED: January 21, 1957.

Card 3/3

1. Clouds--Electrical properties 2. Particles--Properties
3. Electric fields--Measurement 4. Electrometers--Applications

AUTHOR: Imyanitov, I. M. SOV/20-121-1-25/55

TITLE: On the Mechanism of Electrostatic Charging (K voprosu o mekhanizme elektrostaticheskogo zaryazheniya)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol. 121, Nr 1, pp. 93-96 (USSR)

ABSTRACT: The electrification in a flow in general depends on the concentration of the pushing particles, on their kinetic energy, the material of the two colliding particles, and on the conditions prevailing in the separation of the particles from the charging body. Until now no theory existed to explain the observed effects. The present paper gives a simple qualitative explanation of these phenomena. A flow consisting of small uncharged particles is assumed to approach a body. The contact of any particle P with the body T in the moment when the particle strips from the body is assumed to take place on a plane surface with the area S; the body is supposed to be uncharged. The work function of an electron issuing from the body is assumed to be V_1 eV, that of an electron issuing from the particle is V_2 eV. A sphere with the radius R can in this process be

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charged up to the potential $V = V_k R/d$. On this occasion holds $V_k = V_2 - V_1 - u_1 - u_2$; where u_1 and/or u_2 denote the potential drop inside the body and/or the particle in the place of contact. u_1 and u_2 are determined by the depth of penetration of the fields into the body; they depend on the concentration of the carriers in the corresponding bodies. d denotes a certain mean distance between the particle and the body in the moment of stripping. In the case of poor conductors d varies within the limits of 10^{-6} and 10^{-7} cm. If a certain potential difference occurs between body and particle because of a contact, the body can be charged up to considerable potentials (e.g. a sphere of 1 m diameter unto 10^8-10^9 V, a sphere of 1 cm diameter unto 10^6-10^7 V). In an analogous way an insulated body can be charged up if during melting drops of the material, which transforms into the liquid phase, separate from the body. Another deduction of the equation given above is outlined. The highest attainable potential depends on the active distance d during the stripping of the particles, and d depends on the velocity of stripping. The described process can also occur in

On the Mechanism of Electrostatic Charging SOV/20-121-1-25/55

some industrial methods, which are connected with spraying of substances, and in the electrification of particles in thunderstorm clouds. There are 6 references, 3 of which are Soviet.

PRESENTED: January 25, 1958, by A. F. Ioffe, Member, Academy of Sciences, USSR

SUBMITTED: January 16, 1958

1. Electrostatic generation--Theory 2. Work functions

Card 3/3

Imyanitov, I.M.

29(0) PHASE I BOOK EXPLOITATION SOV/3065

Iskusstvennyye sputniki zemli, vyp. 3 (Artificial Earth Satellites, No. 3) Moscow, Izd-vo Akademii nauk SSSR, 1959. 125 p. 5,500 copies printed.

Sponsoring Agency: Akademiya nauk SSSR.

Resp. Ed.: L.V. Kurnosova; Ed. of Publishing House: L.V. Samsonenko; Tech. Ed.: Yu. Rylina.

PURPOSE: This collection of articles is the third in a series intended to disseminate data collected from artificial earth satellite investigations to scientists.

COVERAGE: The collection of articles deals with various problems arising in the operation of artificial satellites. The papers also cover the use of artificial satellites as scientific instruments for various types of geophysical investigations.

AVAILABLE: Library of Congress

Card 3/3

AC/fn
12-30-59

IMYANITOV, I.M.; SHVARTS, Ya.M.

Abatement of interference currents occurring at the input of an electrostatic fluxmeter operated in a conducting medium. Isk. sput. zem. no.3:77-83 '59. (MIRA 12:12)
(Artificial satellites) (Electric measurements)

PHASE I BOOK EXPLOITATION SOV/4316
SOV/2-5-97

Leningrad. Glavnaya geofizicheskaya observatoriya

Voprosy atmosfernogo elektrichestva (Problems in Atmospheric Electricity)
Leningrad, Gidrometeoizdat, 1960. 115 p. (Series: Its: Trudy, vyp. 97)
Errata slip inserted. 1,000 copies printed.

Sponsoring Agency: USSR. Glavnoye upravleniye gidrometeorologicheskoy sluzhby.

Ed. (Title page): I.M. Imyanitov, Candidate of Physics and Mathematics;
Ed. (Inside book): T.V. Ushakova; Tech. Ed.: N.V. Volkov.

PURPOSE: This publication is intended for meteorologists and scientists concerned with the problem of atmospheric electricity. The book can also be used by graduate students at hydrometeorological institutes and by university students studying physics of the atmosphere.

COVERAGE: This issue of the Transactions of the Main Geophysical Observatory im. A.I. Voyeykov contains works on problems in atmospheric electricity written from 1954 to 1958. Individual articles deal with the electrical phenomena associated with thunderstorms, clouds, rains, and fogs. Observational techniques

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Problems in Atmospheric Electricity SOV/4316

and instruments used are described. No personalities are mentioned. References accompany individual articles.

TABLE OF CONTENTS:

Problems in Atmospheric Electricity SOV/4316

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Problems in Atmospheric Electricity SOV/4316

AVAILABLE: Library of Congress

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JA/dvm/mas
10-14-60

IMYANITOV, I.M., kand.fiziko-matematicheskikh nauk

Notes on the observation of the length of a lightning flash.
Priroda 49 no.7:110 Jl '60. (MIRA 13:7)

1. Glavnaya geofizicheskaya observatoriya, Leningrad.
(Lightning)

80054

S/020/60/132/01/27/064
B014/B014

3.9000
24.2400

AUTHORS: Imyanitov, I.M., Chubarina, Ye.V.

TITLE: The Structure of the Electrostatic Field in the Free Atmosphere According to Data Obtained by Investigations During the International Geophysical Year

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 132, No. 1, pp. 104-107

TEXT: By way of introduction, the authors refer to the model of a "spherical condenser" which is used to describe the electrostatic field of the atmosphere. The hypotheses of this theory are discussed, and it is noted that the reasonableness of these hypotheses must be verified by studying the course of the field with rising altitude. The electric field of the atmosphere was probed by means of an LI-2 airplane over Leningrad, Kiyev, and Tashkent. The potential of several points was calculated by integrating the experimentally determined curve E = f(H) (E denotes the potential of the electrostatic field, and H is the altitude). It is shown that about 66 per cent of the total resistance is contained in the layers between 0 and 6 km. Evaluation of the results of measurement indicates that the monotone course of field strength is partly disturbed

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The Structure of the Electrostatic Field in the Free Atmosphere According to Data Obtained by Investigations During the International Geophysical Year

S/020/60/132/01/27/064
B014/B014

(even in fair weather), and that the most frequent value of the potential was unexpectedly low at an altitude of 6 km. The variations at the three above-mentioned points were not uniform. Besides, the potential maximum was shifted relative to the altitude. These results did not confirm the applicability of the model of a "spherical condenser". These results can be interpreted only by means of the model of a charged sphere which is enveloped by a space charge. Next, the motions of the space charge are discussed, and the globe is divided into three regions, in the first of which the space charge is generated and the profile of the electric field is completely disturbed. In the second region, the monotone variation in the electric field strength relative to the altitude is disturbed by introducing charge from the first region. In the third region, there is only a small space charge which has no considerable effect on the field at the surface of the Earth. There, unitary variations in the electric field occur which are also observable at certain altitudes in regions where the monotone variation in the electric field strength is disturbed by introducing charge. The behavior of the atmospheric space charge, its development, propagation, and distribution should be further studied. There are 4 figures, 1 table, and 9

4

80054

The Structure of the Electrostatic Field in the Free Atmosphere According to Data Obtained by Investigations During the International Geophysical Year

S/020/60/132/01/27/064
B014/B014

references, 5 of which are Soviet.

ASSOCIATION: Glavnaya geofizicheskaya observatoriya im. A. I. Voyeykova (Main Geophysical Observatory imeni A. I. Voyeykov)

PRESENTED: January 3, 1960, by A. F. Ioffe, Academician

SUBMITTED: December 29, 1959

Card 3/3

S/057/62/032/006/018/022
B108/B102

24.2400

AUTHORS: Imyanitov, I. M., and Starovoytov, A. T.

TITLE: Some problems in the theory of electrostatic charging of bodies exposed to currents

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 6, 1962, 759 - 765

TEXT: The charging of a sphere in a uniform current of particles is examined. Conductivity of the medium and corona currents are taken into account. It is shown that the contact potential mechanism of charging in a particle stream is suitable for explaining the observed high values of potential. Estimates of the parameters that occur in field conditions, when an airplane flies through a cloud, made it possible to estimate the equilibrium charge on a sphere of 1 m radius: 10^4 - 10^5 ESU. This value agrees in order of magnitude with that measured on an airplane. This is because the cross sections of both are of the same order of magnitude. There are 3 figures.

Main Geophysical Observatory im. A. I. Voyeykov

S/053/62/076/004/001/004
B102/B104

AUTHORS: Imyanitov, I. M., Shifrin, K. S.

TITLE: Contemporary state of research in atmospheric electricity

PERIODICAL: Uspekhi fizicheskikh nauk, v. 76, no. 4, 1962, 593 - 642

TEXT: The main problems of atmospheric electricity are reviewed. In particular, the paper discusses the work of Ya. I. Frenkel' on fundamental problems in geophysics, including atmospheric electricity. The literature of the last ten years is reviewed; reference is made also to earlier papers of importance. There are 33 figures and 7 tables.

Card 1/1

45106
S/531/62/000/136/001/007
A052/A101

AUTHORS: Imyanitov, I. M., Lobodin, T. V.

TITLE: Investigation of the electric structure of shower- and thunder-clouds

SOURCE: Leningrad. Glavnaya geofizicheskaya observatoriya. Trudy. no. 136, 1962. Atmosfernoye elektrichestvo, 3 - 20

TEXT: The results of more than a hundred measurements of electric field distribution near peaks of and underneath shower- and thunderclouds are discussed. The investigation aimed on the one hand at collecting data about the electric structure of shower- and thunderclouds and, on the other hand, at obtaining material necessary for refining the methods of these measurements. It was carried out by means of aircraft in the far-eastern regions during August-September 1959 by the State Scientific-Research Institute of Civil Aviation in cooperation with the Main Geophysical Observatory im. A. I. Voyeykov, Central Aerological Observatory and Central Institute of Weather Forecasts. Compared with the other principal

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Investigation of the electric structure .....

methods of studying the electric macrostructure of shower- and thunder-clouds, the aircraft method, while maintaining their positive features, eliminates many of their shortcomings. An aircraft flying at a high speed enables to make measurements in a time much shorter than that necessary for the development of a cloud. Consecutive measurements near the same cloud enable one to determine the transformation of its electric structure. A special equipment can be installed on board aircraft, permitting the full allowance for the distortions of measured fields caused by the aircraft. By making several flights at different distances from a cloud or by making measurements by means of several planes at a time, the difficulties faced at ground measurements in determining the magnitude and distribution of main charges of a cloud can be overcome. By measuring from an aircraft the changes of the field connected with lightning strikes and following at the same time the cloud, the transformation of its electric structure can be studied in detail. The application of planes enables one to eliminate distortions introduced by the surface free charges, and also a considerable number of clouds can be investigated in a relatively short period of time. Another important advantage of the air-

craft method is the possibility of obtaining synchronous data relating both to the topography of clouds and to the aerological characteristics of atmosphere by means of radar, airborne meteorographs and other devices. The application of high-altitude high-speed planes like TY -104 (TU-104) widens the potentialities of the aircraft method and gives better results than those obtained by using transport planes like ЛИ-2 (LI-2) and ИЛ -14 (IL-14). On the other hand the aircraft measurements do not provide reliable information on the mesostructure of electric charges, and probably only a combination of aircraft and sounding methods will enable one to study both macro- and mesostructure of thunderclouds. The airborne equipment for measuring the field intensity is described; the field intensity pickup is adjusted so that the field produced by the plane's own charge will not affect the indications of the device. The investigation has shown that clouds in 50% cases carry a considerable excess charge of about 2 coulomb. This charge is located 6 - 7 km above the earth surface and the "mirror" effect (the opposite charges of raindrops and the surface field) may be ascribed to the action of this charge. The polarized clouds observed are charged to 60% positively and to 40% negatively. There are 9 figures and 4 tables.

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45107

S/531/62/000/136/002/007
A052/A101

AUTHORS: Imyanitov, I. M., Chubarina, Ye. V.

TITLE: Electric structure of lower unrainy stratified clouds

SOURCE: Leningrad. Glavnaya geofizicheskaya observatoriya. Trudy. no. 136, 1962. Atmosfernoye elektrichestvo, 21 - 34

TEXT: The electric structure of stratified clouds and cumuli is investigated. It is pointed out that this problem, in spite of its importance, has found no adequate treatment in the literature. The knowledge of the electric structure of stratified clouds is important because in these clouds the electrification processes connected with the precipitation of air ions on water drops and the processes of the charge separation in clouds under action of the gravity force appear in the purest form. It is also important for determining the ways of the charge accumulation in the first stage of the development of thunderclouds. The study of the transformation of the electric structure may also play an essential part in evaluating the effectiveness of the cloud control. And at last it is

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Electric structure of lower .....

necessary for working out better methods to prevent the electrostatic hazard for the aircraft. First of all it is essential to determine the electric macrocharacteristics of clouds, that is the distribution of free charges and electric field intensity and their values. In 1958 - 1959 during the International Geophysical Year and International Geophysical Cooperation systematic vertical sounding of the electric field intensity from an aircraft were carried out in USSR. Especially in the course of this investigation data relating to the electric structure of lower unrainy stratified clouds were obtained. The investigation has revealed a relative constancy of the field in the horizontal plane, so electrically the clouds can be considered as infinite charged layers in which all changes of fields and charges depend on the vertical coordinate. This fact makes the vertical sounding from an aircraft superior to other methods of vertical sounding. Altogether 54 stratified and 192 stratified-cumulus clouds were investigated which, from the viewpoint of electric structure, can be reduced to four principal types: 1) Positively polarized with an excess positive charge, 2) negatively polarized with an excess positive charge, 3) unipolar positively charged, 4) unipolar negatively charged. In a

general form the field intensity in the middle part of a cloud can be described by the equation: $E = a + b(z - h) + c(z - h)^2$, where a, b and c are coefficients, z is the coordinate measured from the base of the cloud and h is the height in the cloud at which the maximum field intensity is recorded. With an increase of the thickness of clouds the average field intensity practically does not change, but its maximum value increases. The free charge density is almost independent of the thickness of clouds and in general has a tendency to decrease as the thickness decreases. The authors suggest a theoretical explanation of a number of peculiarities observed in the structure of stratified clouds. However, this theory cannot provide an explanation for such facts that in 10% cases a positive polarization appears at a negative field or that in 10% cases the field above the cloud is a positive one and under the cloud a negative one. Peculiar is also the fact that the potential difference between the upper and the lower boundary of a cloud is in a number of cases comparable with the potential at a height of 6,000 m in clear weather, sometimes exceeds it and in many cases has a comparable absolute value but an opposite sign. This may be explained by assuming that in certain cases

S/531/62/000/136/002/007
A052/A101

Electric structure of lower .....

stratified clouds begin to act not as a passive resistance but as generators producing considerable free charges which can many times exceed those present in the atmosphere during "fine" weather. The nature of these charges is entirely obscure at present and requires further study. There are 10 figures and 5 tables.

Card 4/4

W589

S/169/62/000/012/046/095
D228/D307

3.5132

AUTHORS: Imyanitov, I.M. and Chubarina, Ye.V.

TITLE: Structure and origin of the atmospheric electric field

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 12, 1962, 31, abstract 12B226 (In collection: Issled. oblakov, osadkov i grozovogo elektrichestva, M., AN SSSR, 1961, 239-248)

TEXT: The systematic aerial measurements of the atmospheric electric field, carried out during the IGY at Leningrad, Kiev, and Tashkent by means of aircraft fitted with electrostatic fluxmeters, allowed information to be obtained on the distribution of the field strength, space charges, and the electric field potential to heights of 6-7 km. On clear days the appearance of field maxima (usually in the inversion zone) and the change in the field sign at a height of 3.5 - 4 km frequently disturb the monotonic decrease of the field strength with altitude. The variation of potential with

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Structure and origin ...

height often departs from the monotonicity and the potential begins to decrease from an altitude of 3.5 - 4 km. The estimated potential difference between the ground and ionosphere is 200-220 kv. Even at a height of 6 km the daily potential oscillations do not repeat the daily unitary variation of the field strength and are not synchronous at different observation points. The potentials themselves may differ by more than a factor of 2 with respect to the mean values. The relative potential variations tend to decrease with increasing height, but above 3.5 - 4 km they are larger than at this height. At heights of several hundred meters the diurnal field strength variation repeats the unitary variation, though this similarity is not noted above and below this layer. The results obtained contradict the currently accepted 'spherical capacitor' theory and may be explained by another scheme, in which the ground and the atmosphere exchange charges and create the observed phenomena. In this model, the troposphere, and particularly its lower layer, is the outer plate of the capacitor. The display of unitary variation only at a certain height stems from the fact that at this height fields from local atmospheric space charges, situated above and below it, com-

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Structure and origin ... S/169/62/000/012/046/095
D228/D307

pensate each other and permit the appearance of a field from the ground charge, whose change also induces unitary variation. Zones where charges flow groundwards and zones in which outflow of charge occurs, exchange charges in the atmosphere.. The level, at which the flow begins to change, should lie at a height of 3-4 km.
[Abstracter's note: Complete translation]

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44590

S/169/62/000/012/047/095
D228/D307

3.5130

AUTHOR: Imyanitov, I.M.

TITLE: Electric structure of thick convective clouds (Cu Cong) and its relation to air motions in clouds

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 12, 1962, 31-32, abstract 12B227 (In collection: Issled. oblakov, osadkov i grozovogo elektrichestva, M., AN SSSR, 1961, 225-233)

TEXT: Composite measurements of the electric field strength and the meteorological properties of thick cumuli were carried out in aircraft, fitted with electrostatic fluxmeters, over the Union's European territory during 1956-1959. They allowed the main macro-electric properties of such clouds to be obtained from research data for ~ 140 clouds. In 50% of cases the mean field strength in these clouds does not exceed 5 v/cm, and in 90% of cases it does not exceed 10 v/cm. In addition, any change in the thickness of clouds is little reflected in the size of their average

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Electric structure ...

field strength. The average fields in cumuli and thick cumuli are about the same. In thick cumuli the extreme values of the field strength exceed 10 v/cm in 50% of the cases and 30 v/cm in 15% of the cases; individual cases with a strength of 100 v/cm are mentioned. Electric fields are much more irregular in thick cumuli than in cumuli. The average density of space charges in clouds was estimated from data on the cloud distribution of the electric field. In 30% of cases it does not exceed 1 esu/m^3; its most likely values range from 10^{-2} to 10^{-1} esu/m^3. The extremes of the space charge density exceed $2 \cdot 10^{-1}$ esu/m^3 in 75% of cases and 1 esu/m^3 in 40% of cases. From the data of an accelerograph and a temperature pulsation meter curves were plotted for the frequency of the sizes of zones, in which the values of the field and the electric charging of the aircraft were extreme, and also of the dimensions of the cloud current. They proved to be largely coincident. This fact lets conclusions be drawn about the substantial role of air motions in clouds, their electrification, and the presence in convective clouds of zones where the drop spectrum and the water content vary greatly. A schematic model of cumulus was constructed on the

Electric structure ...

grounds of the data cited. The cloud can be depicted as being polarized in such a way that a positive charge is located at its top, and a negative charge at its base. Zones of positive and negative space charges are imposed on this distribution. They are chaotically disposed through the cloud, the appearance of these zones and their location being closely related to the effect of the current in clouds. The mean rate at which the main space charges accumulate in such clouds comprises 10^{-5} - 10^{-3} esu/m^3·sec, which is 2-5 orders less than the rate of accumulation of charges in subsequent stages. In this stage of cloud development there accumulate so few charges, which then appear in a storm cloud, that in an electric respect the studied stage of development does not prepare for the next. The accumulation of charges in cloud particles at this stage may be presumed to proceed under the influence of both the conduction current and the removal by convective motions of charges accumulated inside the cloud, as well as under the influence of the charging of drops as they evaporate. Meso-heterogeneities play a vital part in the development of convective clouds and electric processes.

[Abstracter's note: Complete translation]

Card 3/3

IMYANITOV, I.M.; LOBODIN, T.V.

Study of the electric structure of shower and thunderstorm clouds.
Trudy GGO no.136:3-20 '62. (MIRA 15:12)
(Atmospheric electricity)

IMYANITOV, I.M., kand. fiz.-mat. nauk, red.; KAPITANETS, Ye.P., red.; ALEKSEYEV, A.G., tekhn. red.

[Materials from observations of the intensity of the electric field of the atmosphere at various altitudes based on data from airborne sounding during the International Geophysical Year and the International Geophysical Cooperation, 1958-1959] Materialy nabliudenii napriazhennosti elektricheskogo polia atmosfery na razlichnykh vysotakh po dannym samoletnogo zondirovaniia v period Mezhdunarodnogo geofizicheskogo goda i Mezhdunarodnogo geofizicheskogo sotrudnichestva, 1958-1959 gg. Pod red. I.M.Imianitova. Leningrad, Gidrometeoizdat, 1963. 226 p. (MIRA 16:7)

1. Russia (1923- U.S.S.R.) Glavnoye upravleniye gidrometeorologicheskoy sluzhby.

(Atmospheric electricity)

IMYANITOV, I. M.

"The Significance of Atmospheric Electricity."

Report to be submitted for the Int. Conference on Atmospheric and Space Electricity, Montreux, Switzerland, 6-10 May 1963.

IVYANITOV, I. M.

(2)

IVYANITOV, I. M., Main Geophysical Observatory imeni A. I. Voyeykov, Moscow - "The significance of atmospheric electricity measurement" (Session II)
SHISHKIN, N. S., Leningrad University, Main Geophysical Laboratory - "Thunderstorm theory" (Session IV)
"Atmospheric electricity research in the USSR" (Session I) - USSR speaker not yet selected.
"Electricity in clouds and fogs" (Session III) - USSR speaker not yet selected.

report to be submitted for the 3rd Intl. Conf. on Atmospheric and Space Electricity Montreux, Switzerland, 6-10 May 1963

L 19445-63 EWT(1)/FCC(w)/BDS/FS(v)-2/EEC-2/ES(v)/ES(w)-2 AFFTC/ASD/
AFMDC/ESD-3/APGC/IJP(C)/SSD Pi-4/Po-4/Pe-4/Pab-4/Pq-4 TT/GW/K

ACCESSION NR: AT3007030 S/2560/63/000/017/0059/0065

96
92

AUTHOR: Imyanitov, I. M.; Shvarts, Ya. M.

TITLE: Measurement of electrostatic field intensity on the third artificial earth satellite 21

SOURCE: AN SSSR. Iskusst. sputniki Zemli, no. 17, 1963, 59-65

TOPIC TAGS: third Soviet earth satellite, Soviet earth satellite, satellite, artificial earth satellite, earth satellite, electrostatic fluxmeter, fluxmeter, electrostatic field measurement

ABSTRACT: Measurements of electrostatic field intensity 12 at the surface of the third Soviet artificial satellite 17 made by an electrostatic fluxmeter attached to the satellite, are discussed. The measurements covered a range of ± 2 v·cm^{-1}. Linearity of the dependence of output signal on measured field intensity was ensured by the use of synchronous detectors. Equipment error did not exceed $\pm 15\%$; to keep it to a minimum, the constancy of gain and zero was checked every four minutes. The excess of the duration-

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ACCESSION NR: AT3007030

4

of a positive over that of a negative field at the satellite surface testifies to the presence of a negative charge on the satellite surface during those sectors of the trajectory in which the electrostatic field was measured. Variations of the intensity of the electrostatic field at the satellite surface which do not correlate with the position of the pickup in relation to the direction of motion, the sun, and the magnetic field are due to the intense charging of the satellite. "S. I. Zachek, N. P. Ziganov, V. V. Mikhaylovskaya, and V. G. Borodulina participated in the development of the equipment." Orig. art. has: 9 figures.

ASSOCIATION: none

SUBMITTED: 07Aug62 DATE ACQ: 11Oct63 ENCL: 00

SUB CODE: AS, GE NO REF SOV: 005 OTHER: 002

Card 2/2

L 20255-63 EWT(l)/BDS/ES(v) AFFTC/ASD/AFMDC/ESD-3/APGC Pe-4/Po-4 GW

ACCESSION NR: AT3007031 S/2560/63/000/017/0066/0081

AUTHOR: Imyanitov, I. M.; Gdalevich, G. D.; Shvarts, Ya. M.

TITLE: Measurement of electrostatic field intensity at the surface of geophysical rockets moving in upper atmospheric layers

SOURCE: AN SSSR. Iskusst. sputniki Zemli, no. 17, 1963, 66-81

TOPIC TAGS: electrostatic field intensity, field intensity, electrostatic field, geophysical rocket, rocket, ionospheric electrostatic field, ionospheric current

ABSTRACT: A discussion is presented of methods used to measure electrostatic field intensity at the rocket surface during flights of nonstabilized geophysical rockets on 14 July 1959, 15 June 1960, and 24 June 1960 and during flight of a stabilized geophysical rocket on 15 November 1961. The basic measuring circuit is shown in Fig. 1 of the Enclosure, diagrams of the sensing elements, in Figs. 2 and 3. Disk-shaped measuring plate 1 (Fig. 2) was situated at the rocket surface and responded to the local space

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ACCESSION NR: AT3007031

charge in the vicinity of the rocket. Rotating and fixed slotted disks 2 and 3 were located above the sensing disk; the rotating disk was spun at 900 cps to give a chopped output signal in load resistor R proportional to the field intensity. (A cross section of the entire pickup assembly is included, showing mounting details of the disks and the drive motor; fabrication details are also given.) The distance between the measuring and rotating disks was 1.5 mm and between the measuring and fixed disks 5 mm. The effective area of the sensing disk was about 24 cm^2. The drive motor also drove a generator whose output served as the reference voltage for synchronous detection; during calibration, the rotating disk could be adjusted with respect to the rotor to give optimum signal-to-noise operation in the synchronous detector. The most interesting results were those obtained on 15 November 1961 with the stabilized rocket, which attained the highest altitude (430 km) and had the smallest measurement errors. The full scale of its field sensing equipment was ± 6 v x cm^{-1}, and the sensitivity threshold was 0.06 v x cm^{-1}. Preliminary tests had shown that the error of the device did not exceed 5% or 0.3 v x cm^{-1}.

L 20255-63

ACCESSION NR: AT3007031

In addition to the field sensors, a current pickup was installed to register charges not intercepted by the sensors. The current sensitivity threshold was 10^{-9} amp x cm^{-2}, which was not actually reached during the 15 November flight. The pickups were placed at diametrically opposed pofnts on the cylindrical part of the rocket, pickup 1 facing north and pickup 2 facing south at approximately one-third the distance from the rocket nose. Solar rays fell on pickup 2 at an angle of 4°, while pickup 1 remained in the shade. Measurements showed that the rocket was negatively charged throughout the recorded period. At all altitudes, except for a small sector between 100 and 120 km, field intensity at the rocket surface remained almost constant at 1.5 to 1.6 v x cm^{-1}; within the same altitude range, the depth of the space charge varied within 1.2—5 cm at a temperature of 1000K, and within 1.7—7 cm at a temperature of 2000K. Results of measurements made for the nonstabilized rockets confirm those obtained for the stabilized rocket and suggest the existence of a significant electrostatic field in the regions studied. "The authors thank K. I. Gringaus for discussing the results of the investigation

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L 20255-63

ACCESSION NR: AT3007031

3

and V. G. Borodulina, V. I. Zhdanov, and V. A. Kraynev for their assistance in developing the equipment." Orig. art. has: 8 figures, 1 table, and 12 formulas.

ASSOCIATION: none

SUBMITTED: 24Aug62 DATE ACQ: 110ct63 ENCL: 02

SUB CODE: GE, AS NO REF SOV: 010 OTHER: 000

Card 4/6

AID Nr. 967-9 15 May

ELECTROSTATIC FIELD INTENSITY OF THE SURFACE OF A GEOPHYSICAL ROCKET (USSR)

Imyanitov, I. M., G. D. Gdalevich, and Ya. M. Shvarts. IN: Akademiya nauk SSSR. Doklady, v. 148, no. 6, 1963, 1306-1308. S/020/63/148/006/013/023

The electrostatic field intensity near the surface of a geophysical rocket launched 15 November 1961 was measured by means of an electrostatic fluxmeter. The equipment measurement range was ± 6 v/cm. The readings of two symmetrically placed fluxmeter pickups, although differing from each other, showed that field intensity undergoes relatively slight variations with altitude. The intensity value measured by one of the pickups varied within the range of 0.5 to 1 v/cm, and that of the other from 1.8 to 2.5 v/cm. The second pickup was illuminated by the sun at an angle of 4° throughout the flight, while the first remained in the shade. The electric field intensity corresponding to the charge on the rocket itself had an average value of 1.5 v/cm. After taking into account measurement errors and inaccuracies in the determination of the real value of

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AID Nr. 967-9 15 May

ELECTROSTATIC FIELD INTENSITY [Cont'd] S/020/63/148/006/013/023

intensity, the average value of the electrostatic field produced by the charge of the rocket was found to be < 2 but > 1 v/cm, i.e., the rocket had a negative charge. Measurements of electron concentration, together with data on field intensity, made it possible to determine that the potential produced by the rocket's own charge amounted to several volts. At an altitude of 200 to 300 km, it was determined that the electric field was < 3.6 but > 1.6 v/cm according to the second pickup and < 1.2 but > 0.1 v/cm according to the first pickup. It was concluded that during the experiment an electric field intensity of the order of 10^{-5} v/cm existed in the ionosphere. [DW]

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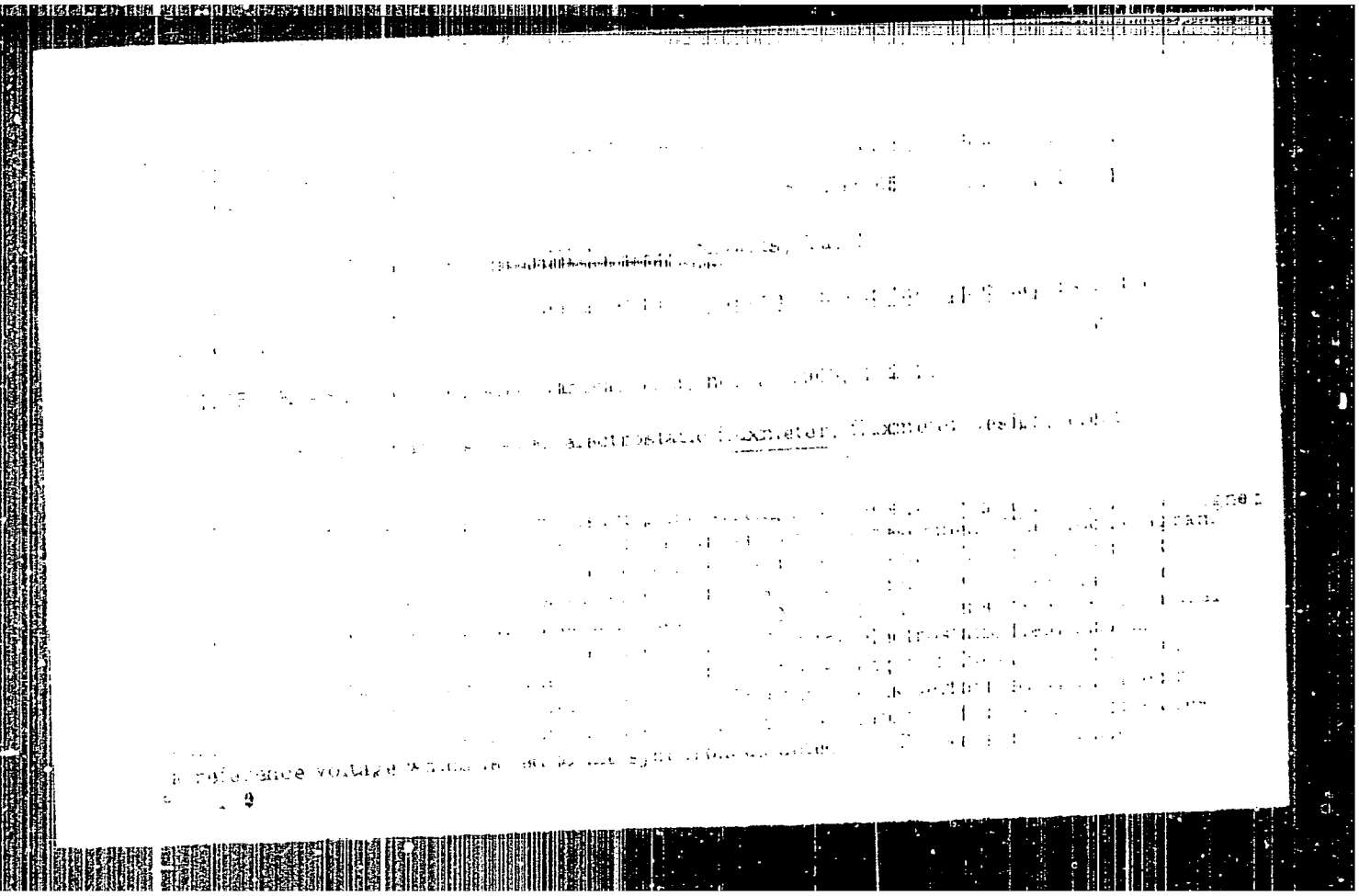
IMYANITOV, I.M.; LOBODIN, T.V.

Inhomogeneity zones in thunderclouds. Trudy GGO no.157:3-8 '64 (MIRA 17:8)

IMYANITOV, I.M.; CHUBARINA, Ye.V.

Annual variation of the atmospheric electric potential at 6000 meters and the charge of an air column in a 0 to 6000 m. layer. Trudy GGO no.157:9-21 '64 (MIRA 17:8)



L 41878-65

ACCESSION NR: AP5006439

[illegible] section, [illegible] for measurement of the electrical [illegible] by [illegible] of plasma. The [illegible] is welded [illegible] grid. The grid is of a molybdenum-nickel alloy with grid [illegible] apart. The wire diameter is approximately 0.08 mm. The [illegible] which is solution [illegible] The authors thank [illegible] and V. A. Krayner who participated in the development of the instrument." Orig. art. has: 2 formulas and 7 figures.

Card 2/5

GAGRINA, S.G.; IVANITOV, I.M.; KAMALOVA, I.I.; [illegible]

Relation of radar characteristics of clouds to their turbulent and electric state. Trudy GGO no.173:58-62 '65.

(MIRA 18:3)

IMYANITOV, I.M.; CHUBARINA, Ye.V.

Electric structure of nimbostratus clouds. Trudy GGO no.177:113-128 '65. (MIRA 18:8)

IMYANITOV, Il'ya Moiseyevich; CHUBARINA, Yevgeniya Vladimirovna; KOTIKOVSKAYA, A.B., red.

[Electricity of the free atmosphere; results of measurements during the IGY and IGC] Elektrichestvo svobodnoi atmosfery; rezul'taty izmerenii vo vremia MGG i MGS. Leningrad, Gidrometeoizdat, 1965. 239 p. (MIRA 18:9)

L 3451-66 EWT(d)/EWP(v)/T/EWP(k)/EWP(h)/EWP(l)/ETC(m) WW/GS

ACCESSION NR: AT5023597 UR/0000/65/000/000/0271/0274

AUTHORS: Gdalevich, G. L.; Imyanitov, I. M.

TITLE: Electrical fields in the ionosphere according to data from direct measurements taken by geophysical rockets

SOURCE: Vsesoyuznaya konferentsiya po fizika kosmicheskogo prostranstva. Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 271-274

TOPIC TAGS: ionosphere, electric field, sounding rocket, geophysic instrument, fluxmeter

ABSTRACT: Experiments have been carried out on geophysical rockets to measure directly the electric fields occurring in the lower layers of the earth's atmosphere. Many prominent effects in these regions depend strongly on the magnitude of the stationary electric fields there, but previous estimates of their intensities have been available only on the basis of indirect data to which must be applied theories as yet not fully worked out. The measurements were made with two fluxmeters (G. L. Gdalevich, I. M. Imyanitov, and Ya. M. Shvarts, Kosmicheskiye issledovaniya, 3, No. 1, 102, 1965) located opposite one another

Card 1/4

L 3431-66

ACCESSION NR: AT5023597

on the cylindrical part of the rocket surface. The electric field intensity is proportional to the potential drop between the two detectors, the constant of proportionality being dependent on their orientation with respect to the local fields, the electric charge on the rocket, and the characteristics of the medium. Typical data for E are shown in Figs. 1 and 2 on the Enclosure. The measurements are analyzed as functions of altitude, and diurnal variations are noted. Reasons for the absence of intensive ionospheric heating due to the large fields observed and the origin of the fields are suggested. It is concluded that the present method may be applied to interplanetary measurements and to the determination of charge neutrality of the earth and moon. Orig. art. has: 2 figures and 1 table.

ASSOCIATION: none

SUBMITTED: 02Sep65 ENCL: 02 SUB CODE: ES

NO REF SOV: 007 OTHER: 007

Card 2/4

L 3431-66

ACCESSION NR: AT5023597 ENCLOSURE: 01

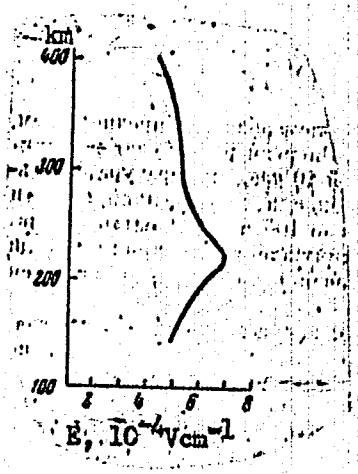


Fig. 1
Measurements of electric field intensity, made Nov. 15, 1961

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L 3431-66

ACCESSION NR: AT5023597 ENCLOSURE: 02

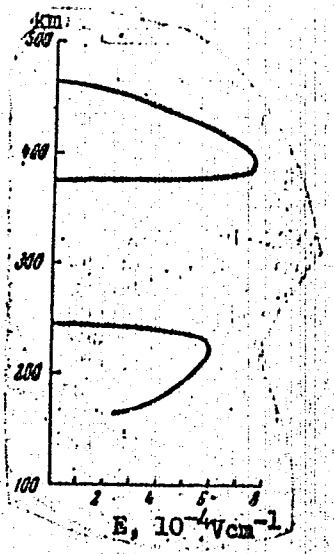

Fig. 2.
Measurements of electric field intensity, made June 6, 1963

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L 27295-66 EWT(1)/FCC GW

ACC NR: AM6000592 Monograph UR/

Imyanitov, Il'ya Moiseyevich; Chubarina, Yevgeniya Vladimirovich

Electricity of the free atmosphere; results of measurements during the IGY and IGC (Elektrichestvo svobodnoy atmosfery; rezul'tatu izmereniy vo vremya MGG i MGS) Leningrad, Gidrometeoroizdat, 1965. 239 p. illus., biblio., tables. (At head of title: Glavnoye upravleniye gidrometeorologicheskoy sluzhby pri Sovete Ministrov SSSR. Glavnaya geofizicheskaya observatoriya im. A. I. Voyeykova) 1250 copies printed.

TOPIC TAGS: atmospheric physics, atmospheric structure, atmospheric thermodynamics, lightening electricity, electromagnetic effect

PURPOSE AND COVERAGE: This book is based on data obtained during the IGY by systematic aircraft soundings of the earth's electric field. More than 2000 soundings were made, and the results of data processing are analyzed in the book. In addition to the detailed information on the initial data presented in tabular form, the book gives, for the first time, pertinent information on the structure of the electric field in "good" weather, on the distribution of volumetric electric charges and potentials under these conditions. Also included are data on the electric structure of stratified clouds. Thus, the book presents a general picture of the electric structure of the atmosphere on cloudy and clear days. It is intended for specialists in the field of atmospheric, as well as the specialists in all those fields which are concerned with the phenomena of atmospheric electricity.

Card 1/2 UDC: 551.594

L 27296-66
ACC NR: AM6000592

TABLE OF CONTENTS [abridged]:

SUB CODE: 04, 08/ SUBM DATE: 17Jul65/ ORIG REF: 065/ OTH REF: 052/

Card 2/2

IMYANITOV, M.G.

The LR93 copy milling machine with electric contour-follower system. Biul.tekh.-ekon.inform. no.10:28-30 '58. (MIRA 11:12)

(Milling machines) (Electronic control)

[redacted], N.G.

Special LR 16K-type copy-milling machine. Biul.tekh.-ekon.inform. no.4:23-25 '59. (MIRA 12:7)

(Milling machines)

S/193/60/000/009/005/013
A004/A001

AUTHOR: Imyanitov, M.G.

TITLE: The Heavy LP (LR)-163 Copying Milling Machine

PERIODICAL: Byulleten' tekhniko-ekonomicheskoi informatsii, 1960, No. 9, pp. 25 - 28

TEXT: In 1960 the Leningradskiy stankostroitel'nyy zavod (Leningrad Machine Tool Plant) started to manufacture multi-purpose copying milling machines for the machining of complex spatial surfaces, like metal models, dies and press-molds. In contrast to other machines of this kind, the new LR-163 copying milling machine possesses another layout of master template and copying device, the former being located on a horizontal plate on the other side of the machine bed, while the axis of the copying device is placed vertically; the copying device itself is placed on a separate carriage which is movable along the guides of a light welded sleeve fastened to the machine stand. The free end of the sleeve is propped by supporting rollers which are rolling on rails if the stand is displaced along the machine bed. The absence of the usual upper rests simplifies the adjustment of master template and copying device and reduces the

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The Heavy ЛР (LR)-163 Copying Milling Machine

height of the milling machine. The main control panel is located on the spindle stock, while an auxiliary panel is placed next to the copying device. The LR-163 milling machine is equipped for the first time with a universal copying device which replaces a set of interchangeable devices and ensures all the necessary working conditions for automatic machining, among others also profile copying with depth check, i.e. tracing in three dimensions. The following technical data are given: dimensions of surface to be machined, width (vertical cross-arm travel) = 1,800 mm, length (horizontal stand travel) = 4,000 mm; longitudinal travel of spindle stock = 800 mm, power of spindle drive electromotor = 14 kw, range of spindle speeds (18 steps) = 13.5 - 1,600 rpm; effective area of the component table = 2,290 x 5,190 mm; overall dimensions (length x width x height) = 9,517 x 8,775 x 5,155 mm; weight = 60 tons. There is 1 figure.