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Body:

~ 3c!-,tt--~riar 1 Ja n 53 I "So-le ProT:ia!-ties- of Atmosrheric I-Idicatz-1-c-2z of Lirrhtu Sca I Ye.v. ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ Name: PYASKOVSKAYA-FESENKOVA, Y ↑ 307 PHASE I BOOK MWITATION Pyaskovskaya-Fesenkova, Ye. V. Issledovaniye rasseyaniya avets v zesnoy stmosfere (Investigation of Light Scatter- ing In the Earth's Atmosphere) Moscav, Izd-vo AN SSSR, 1957. 21T p. 2,500, copies printed. Sponsoring Agency: Akademlya nauk'SOM. Resp. Ed.: Fesenkov, V. G.; Ed. of Publishing House- Yefigemovs Yu. I.- Tech. Ed.: Klseleva, A. A., PURPOSE- The book presents advances made In the study of light scattering In terrestrial atmosphere and is directed to.the specialist in the field. COVERAGE: This book in a theoretical study of the optics of terrestrial atmosphere and is supplemented vith observations of the brightness of the daylight sky conditioned by molecular and sex4mol scattering of light. A now method is proposed for the derivation of the scattering Indicatrix from the calculation of multiple light scattering in the atmosphere. Card 1/4 ↑ Investigation of Light Scattering in the Earth's Atmosphere 307 V. G. Fesenkov's criterion of stability of the optical rties of atmosphere is refined and expanded. The author discusses his proposed methods for determining the atmospheric transparency coefficient and the brightness of the daylight sky. Observations of sky brightness vere performed by: N. N. Kalitin, G. A. Tikhov, V. G. Fesenkov (Astrophysical Observatory at XUchino "Astrofizicheskaya. observatoriya v Kuehino pod Moskyoy"); V. A. Krat (Tashkent); V. V. Sobolev and Ye. H. Yustova (Yelabuga); V. N. Yamalayto" (Tashicent); G. Sh. Livehits (Alm-AU); Ye. V. Pyukovikaya-Yesenkova; L. V. Fesenkava; A. P. 1(utyreva; T. P. Toropova; V. M. Kazachevskiy; P. N. Boyko; and N. I. Oychlinnikova. The author made visual-photometry observations at different places varying in elevation (h): Gudauta, Caucasian shore of the Black Sea (h = 3m.); a state faru near Pugachersk (h = 100m.); Orlinaya gors at Vla(Uvostok (h = 144m.); sanatorium "Tzkor" near Moscow (hw 150A.); village of Bogorodsoye near Ivanovo (h = 150A.); Saq-Ishik-Ortau Desert, Southern Pribalkhash (h = Won.); 51khote-Alin' (b 6oon.); Almia-Ata Observatory (h = 1450m.); shore of Iasyk-Null Lake (h 1600m.); Kislovodsk Astronomical Station of the GM AN SSSR (h = 2130m.), and Kumbell Mountain near Almis,-Ata (h = 3140m.). Other personalities mentioned: G. Sh. Lifshits, K. N. Shistovskiy, Kh. A. Abishev, X. P. Pervertyn, V. B. Nikonar, V. G. K"trov, Ye. S. Kuznetsov, and V. V. Ovehinakiy. There are 106 figures, 65 tables, and 104 references, 77 of vhich are Soviet, 9 USA, 2 British, and 1 Polish. C ar& 2/4 ↑ Investigation of Light Scattering in the Earth's Atmosphere 307 TABU OF CONEM: Introduction 3 Ch. 1. Fundamental Concepts and Definitions 7 1. Weakening of light Intbe GtmO~Pb8rO 7 2. Scattering of.ligbt in the atmospbere 32 Ch. 2. Apparatus and Methodology of Observations 16 1. Daylight-sky photometer 16 2. Aureole photometer 19 3- Determination of effective Va. length$ 24 4. Accuracy of measurements 28 Ch. 3. Brlghtness.of the Blue Daylight Sky 33 1. Formula for.the brightness of the blue sky with consideration of first order scattering =A certain deductions fran this formils. 33 Card 3/4 ↑ Investigation of Light Scattering in the Earth's Atmosphere 307 2. Observed brightness of the blue dayllght sky 41 3. Formula for sky brightness vith consideration of multiple light scattering and collation of the formila with observational data 91 "Ch. 4. Indiestrix of Light Scattering in the Atmosphere Ch. 5. calculation of Multiple Ll&t Scattering 166 ch. 6. criterion for the Stability of Optical Properties of the Atmosphere 185 Ch. 7- Methods for Deter-in' the AtuDsoeric Cleamss Coefflelent from the Blue-sky Brightness 200 conclusion 215 Bibliogm]phy 217 AVAnABW: Library,of Congms Card 4/4 ↑ AUTHOR: Kirillov, F.A. 49-12-15/16 TITLE: Dissertations Defended in the Scientific Council of the Institute of Physics of the Earth, Institute of Physics of the AtmosDhere and Institute of Applied Geophysics Ac Sc USSR during t9e First Semester of 195T (Dissertatsii, zashchiZch;nn~e v uchenom sovete iastituta fiziki zemli, instituta fiziki atmosfery i instituta prikladnoy geofiziki AN SSSR za pervoye polugodiye 1957) PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Geofizicheska a, 195?, No.12t PP. 1532 - 1536 (USSR~ ABSTRACT: 'Ye.S. Borisevich - Magneto-electric Oscillogra erimen-t-a-l-G-e-o-pffy--sl-c-a=nvestigations (Magnitoelektricheskiye ostsillografy dlya.eksperimentallnykh geofizicheskikh i.2-,sledovaniy) Doctor dissertation. Opponents: Corresponding Memberof the Ac.Sc. USSRI.M.A..Sadovskiy, Doctor of Physico-Mathematical Sciences, D.P,Kirnos, Doctor of Technical Sciences, G.L. Shnirman.May 10,195?. In the dissertation, the design was briefly reviewed of 16 various models of oscillographs for experimental, geophysical investigations which were developed by the author or under his direction. Some of these are series-manufactures and apply also in other branches of science and engineering. Particular attention is devoted to the design of the individual assemblies of the oscillographs. Standard assemblies include typer 6 galvanometers, mounted into blocks Card V21 with permanent magnets, galvanometer illumination time markers, ↑ 49-12-15/16 Dissertations Defended in the Scientific Council of the Institute of of the Earth, Institute of Physics of the Atmosphere and Institute of Applied Geophysics.Ac.Se. USSR during the First Sek#Wt~~r-of 1957. compact gear boxes with swivel-mounted sectors, spring-powered engines, speed regulators. All the oscillographs developed by the Institute of Physics of the Earth, which is pioneering in this field in the Soviet Union, can.be sub-divided into the following three groups: oscillographs for recording short-duration processes with high speeds of the film; oscillographs for recording long- duration of occasional processes at relatively low speeds of the filih~ strip; universal oscillographs for recording various proces- ses within a wide range of speeds of the film strip. Oscillographs intended for recording long-duration and occasional phenomena (earthquakes) and designed for recording with a speed of 0.1 to 2 cm/sec for moving the film; spring-operated mechanisms proved advantageous in this case and therefore it was necessary to develop special speed-regulators. The presence of spring-operated mechanisms and galvanometers grouped into a block with a common Card permanent magnet enabled reducing parasitic influences on the 2/21 metering circuit and also reducing to a ↑ 49-12-15/16 Dissertations Defended in the Scientific Council of the Institute of Physics of the 'Earth, Institute of Physics of the Atmosphere and Instituteof Applied Geop hysicsAc.Sc. USSR during the First Semesterof 1957. minimum the power consumption of the oscillographwhich is particularly important in regions with difficult access. Universal, portable oscillographs represent the widest group amongst oscillographs produced in the Institute;: they are small and light and therefore convenient for expeditions; they are suitable not only for recording geophysical, but any other phenomena which can be.transformed into an electric current or, voltage. The oscillographs rkO&-14 M, MG-12 M and iIC05-9 are among the best produced in the Soviet Union as well as in other countries. The developed, fundamental, typical assemblies and unification of the main circuits enabled rationalising the designof the oscillographs and also simplifying and covering the cost of the development and manufacture of new mo*ls adapted for given conditions. First, the author tonsiders the method of calculation of the basic elements of the oscillographs which he has developed; all the calculations were tested by practical experience and are effe4c~tdd by formulae which are convenient or practical use. ror simplifying the calculations, nomograms, Card3/2f ↑ 49-12-15/16 Dissertations Defended in the Scientific uouncil of the Institute of Physics.of the Earth, Institute of Physics of the Atmosphere and Institute of j[pplied Geophysics..Ac.Sc. USSR during the First Seme.ster of 1957. data tables and examples are included. A fundamentally-new metering system was created; a high-frequency, frame galvan- ometer with a ",continuous extension (pull)" and a method of calculation is presentedfcr the type of galvanometer, giving results of experimental investigations which indicate the possi- bility of achieving a sensitivity,exceeding that of loops. The conditions of optimum electro-magnetic and liquid damping of frame galvanometers were investigated. The calculation is presented of the kinematics of oscillographs and of film adaptors and the phenomenon of shock was considered when switching on film adaptors designed for high speeds. Formulae are derived which permit calculation of the impact force and of the time necessary for reaching a given speed. A new type of simple, compact and reliable gear box was developed and the method of its calculation evolved. Other mechanisms were also considered, ,intended for stepped and stepless speed changes and used for oscillographs. A method of calculation is proposed of spring- Gard4/21operated mechanisms for 0scillographs aiming at achieving maximuv ↑ 49-12-15/16 Dissertations Defended in the Scientific Council of the 1nstitute of Physics of the Earth, Institute of Physics of the Atmosphere and Institute of Applied Geophysics..Ac.Sc. USSR during the First Semester of 1957. useful work from the energy stored in the springs. The problem is considered of ensuring uniform movement of the film strip and various designs were developed of speed regulators with low-rated r.p.m. which are capable of.taking up a considerable excess moment generated by the springs. A method of calcul- ation is presented of a radial-action, centrifugal regulator. All the.described oscillographs were used in geophysical investigations, i.e. in studying the physics of earthquakes by systematic,recording of weak, local tremors, development of a new method of deep seismic-sounding of the Earth's crust, study of the vibrations of soils and of.buildings caused by explosions and earthquakes, development of new, progressive methods of seismic and electro-magnetic prospectingof minerals study of atmospheric phenomena, etc. The oscillographs developed by the author are widely used, not only for geo- physical investigations, but also in scientific establishments and undertakings of various ministries and the manufacture of ,.rd0ke5e instruments does not satisfy requirements. ↑ 49-12-15/16 Dissertations Defended in the Scientific Council of the Institute of Physics of the Earth, Institute of Physics of the Atmosphere and Institute of Applied GeophysicsAc.Sc. USSR during the First Semester of 1957. Ye.V. Pyaskovskaya-Fesenkova - Investigation of the Scatterina re (Issiedovanlye rasseyan-lya sveta v zemnoy atmosfere) - Doctor dissertation. Opponents: Doctor of Physico-Mathematical Sciences Ye.S. Kuznetsov, Doctor of Physico-Mathematical Sciences S.M. Polozkov, Doctor of Physico-Mathematical Sciences G.B. Rozenberg, Doctor of Physico-Mathematical Sciences I.S. Shklovskiy. March 23, 1957. The dissertation represents the result of many years of study of the clear, daytime sky.- The observations were carried out in twelve locations at various altitudes above the sea, various climatic, meteorological and synoptic conditions. The observations were carried out mainly during high-transparency of the atmosphere in the visual raiEp of the spectrum in the absence of asnow cover. In the investigations 'two instru- ments,designed by V.G. Fesenkov were used; one of these was a visual photometer of the daytime sky intended for measuring the brightness of the firmament; the other was a photo- Uard6/21 electric halo photometer for determining the brightness from ↑ 49-12-15/16 Dissertations Defended in the Scientific Council of the Institute of Physics of the Earth, Institute of Physics of the Atmosphere and Institute of Applied GeophysicsAc-Sc. USSR during the First Semester of 1957. near-sun halo and also from the sun on a surface perpendiciilar to these rays. The dissertation contains a certain formula of the brightness of the sky,taking into consideration only the brightness of the first order and derived on the assumption of a,"flat" Earth ahd giving some conclusions derived on the basis of this formula. For a certain coefficient, of trans- parency of the atmosphere, the brightness of the sky at any point is represented by derivation of two functions of which one is the function of the diffubian of light and the other is a function of the zenith distances of.the.sun and of the observed point of the sky. Og changing of the zenith distances of the sun z from 90 to 0 , the brightness of the sky on the almucantar of the sun increases firstj reaching a maximum for a certain value of z and then decreases. A method is also proposed of determining the brightness of the clear daylight sky at any point based on measuring the brightness along the almucantar of the sun and of 5-6 points of the firmament located at various zenith'.distances. This method permits determination Card7/21 ↑ 49-12-15/16 Dissertations Defended in The Scientific Council of the Institute of Physics of the Earth, Institute of Physics of the Atmosphere and Institute of Applied Geophysics,Ac.Sc. USSR during the First Semester of 1957, of the brightness at any other point from the observed bright- ness of the sky. The'method consists essentially af excluding from -the observed brightnesses local indicatrices of ft (WTus]Dn and introducing another one which relates to the-spot where it is desired to determine the brightness of the sky; for this purpose, it is necessary to measure.at that point the brightness of the sky along the almutantar of the sun. A necessary condition thereby is 'that the transparency coeffic- ients of the atmosphere be equ. 1 in both points. The theoret- a i ical brightness was also considered, taking into.consideration the multiple scattering of light in the case of a spherical indicatrix of scattering and a comparison is made of this brightness with the one observed at an angular distance of the sun of 57 - 60 For solving the integral equation of the theory of the diffusion of light, the approximate method of Ye-S. Kuznetsov was used which proved sufficiently accurate. Diffusi'on indicatrices are given in the dissertation which Oard8/23wer-e obtained from observations of the brightness of the sky. ↑ 49-12-15/16 Dissertations Defended in the Scientific (;ouncil of the Institute of Physics of the Earth, Institute of Physics of the Atmosphere and Institute of Applied Geophysics.,Ac.Sc. USSR during the First Semester of 1957. calculated for the entire height of the atmosphere. Itis .shown that there is no w4ll-deflned relation between the coeff- icient of scattering iL for small scattering angles j& and the coefficient of transparency or, respectively,-the optical thickness of the atmosphere. Such a well-deCined dependence does exist for diffusion angles oapproaching 60u. Thus, the diffusion of light near -4 = 60 does not-depend on the prop- erties of the d if fus ion particles. It is shown that the diffusion of light ih the Earth's atmosphere cannot be attrib- uted to a medium particle with some definite effective radius. The effective radius of the diffusion particle changes with the difftLsion angle. The dependence of the diffusion of light in the gar~hls atmosphere on the wavelength for the visual part of the spectrum can be expressed by the relation A = c%-n I representing a generalisation of the known&Vldgh formula where .n), 0 and independent of the wavelength for all angular distances of the,,sun, provided the.dust content of the atmosphere, is not high. If that is not the case, this relation is dis- (;ard9/21 turbed and becomes somewhat complicated for small angular ↑ 49-12-15/16 Dissertations Defended in the Scientific Council of the Institute of Physics of the.Earth, Institute of Physics of the Atmosphere and Institute of Applied GeophysicsjAc.Sc. USSR during the First Semester of 1957. distances to the sun (the halo surrounding the sun); the number n, is dependent on the wavelength and in some parts of the spectrum may become negative. This explains thevarious colour shadings of the halo surrounding the sun. A method is proposed of determining the indicatrix of the atmosphere which is not affected by the influence of the multiple diffusion of light. This method permits obtaining the indicatrix solely from the observed data andconsists in determining by two differing methods the optical thickness of the atmosphere. One method gives optical thickness 1-1 on the basi's of measurement of the direct solar radiation and is therefore not dependent on the multiple diffu sion of light. In the other method, the optical thickness is determined by measuring the brightness of the sky and, consequently, is influenced by the multiple diffusion.. The difference between these gives an increase in the optical thickness of the atmosphere which depends on the multiple d4f f usio n of light, i. e. of the d iff u s ion in all directions (;ardIO/21:)f,the light flux caused by diffusion of higher orders relative ↑ 49-12-15/16 Dissertations Defended in the Scientific Council of the Institute of ~Physics of the Earth, Institute of Physics of the Atmosphere and Institute of Applied Geophysics,Ac-Sc. USSR during the Pirst Semester of 1957. to the incident light flux. The author gives the formula of the brightness of the sky, taking into consideration the multiple diffusion and also the light reflected from the underlying surface. The problem of stability of optical properties of the atmosphere was -considered and existing stability criteria were supplemented and improved by the author. It is shown, too, that the ratio of the brightness of the sky at any point of the almucantar of the sun to the illumination from the sun.also gives a linear dependence on the atmosphere mass and consequently can serve as a criterion of stability of the optical properties of the atmosphere. rinally, methods are.described of determin- ation of coefficients of transparency of the atmosphere from the brightness of a clear sky, namely: a method based on the instant of maximum brightness of the halo surrounding the sun; a method based on the indicatrix of d if f us ion of light in the atmosphere; a method of determining the coefficient of trans- parency on the basis of empirical formulae. uard 11/21 ↑ 49-12-15/16 Dissertations Defended in the Scientific Council of the Institute of Physics of the Earth, Institute of Physics of the Atmosphere and Institute of Applied Geophysics, Ac. Sc. USSR during the First Semester of 1957. V.A.~Romanyuk Determination of the Gravity Forces on the Sea by the Pendulum Method (Opredelenlye tyazhesti na more may-a=tn k- ovym sposobom) Can ate dissertation. Opponents: Doctor of Physico-Mathematical Sciences I.D. Zhongolovich, Doctor of Physico-Mathematical Sciences V.V. Fedynskiy, Candidate of Physico-Mathematical Sciences N.N. Pariyskiy. May 31, 1957. The author attempted to make a more exact analysis of the move- ment.of a pendulum on a mobile support with the aim of deriving more accurate formulae and developing methods for the calculation of the action of acceleration and inclination of the base of the pendulum. The calculation of this action Is precisely the most important and least clear problem in the theory of the measure- ment of gravity forces on sea. The author obtained a formula for the correctiQn of the inclina- tion and acceleration of the support in the observed value of, gravity force which is valid for accelerations below 50 91. Card The main terms of this re2ation correspond to the corrections 12/21 of Brown, but there is some divergence in the terms ↑ 49-12-1-5/16 Dissertations Defended in the Scientific Council of the Institute of -Physics of the Earth, Institute of Physics of the Atmosphere and Institute of Applied GeophysicsAc.Sc. USSR during the First Semester of 1957. which depend on the periods of oscillations of the pendulum and the accelerations.. In many cases, these terms can be dis- regarded. The problem was formulated and solved of determining the accelerations and the inclinations of the mounting by means of inclination-meters and accelero-meters. Attention is drawn to theerroneous nature of the view relating to the compensation of the term '2 during the observation time (!9 - vertical 0 0 acceleration component of the mounting in an absolute system of co-ordinates). Under certain unfavourable ponditions, partic- ularly during observations in submarines, z 0 can be consider- ably larger than the value of other correction factors of the second order. For reducing the influence of the term YO the author proposed to' Inc r e as e the number of measurements at various sections of the film.during determination of the average period of the pendulum; for this purpose, it is necessary tocarry out recordings at the beginning and at the end of Cardl3/2 :P bservations at high-speed of movement of thefilm for durations ↑ 49-12-15/16 Dissertations Defended in the Scientific Council of the Institute of .Physics of the Earth, Institute of Physics of the Atmosphere and Institute of Applied GeoPhYsics,Ac-Sc. during the First Semester of 1957. of 4 6 minutes. The advantage was emphasised of constructing pendulum instruments in a cardan suspension with a minimum natural frequency. It is not advisable to apply a damping device of the cardan suspension,.which is linked with the ship. Methods were developed and investigated of evaluating the recordings of inclination-meters and accelero-mters for obtain- ing correction for the inclination and the acceleration and appropriate calculations were made based on materials collected by marine gravimetric expeditions. It is concluded that it is in principle possible to effect pendulum measurements on surface ships provided that the acceleration of the ship is below 20 gl; at larger accelerations, considerable difficulties occur associated with the determination of the accelerationsand inclinations. Oard 14/21 ↑ 49-12-15/16 Dissertations Defended in -the Scientific Council of the Institute of Physics of the Earth),InsLitute of Physics of the Atmosphere and Institute of Applied Geophysics, Ac.Sc. USSR during the First Semester of 1957. I.I. Rokityanskiy Induced Polarisation in Ion-conductinv, Rocks (Vyzvannaya po-lyarizatsiya,icnoprovodyashchikh porod) --Ua-- Opponents: Doctor of Geol.-Min. ndidate dissertation. Sciences V.N. Dakhov, Doctor of Phys.-Math. Sciences A.G.Tarkhov, Candidate of Phys.-Math. Sciences D.A. Fridrikhsberg. May 17, 1957. The author investigated under induced polarisation the Dhysico- chemical phenomena taking place in rocks and other non-uniformly, conducting bodies under the effect of an electric current. These phenomena lead to the generation of secondary e.m.f. which exist for some time, even after the primary current is switched off. Study of the nature of the induced polarisation of ion- conducting rocks is of great importance in elucidating the prospecting possibilities of this method, both in field prv- ecting, particularly coring d1also for stud the properties of transient regions betviee,~'Tleiquid (water) L so id dielectric, i.e. inelucidating one of the difficult problems of the physics (;ardl5/ZLcf surfaces. The author has studied the influence on induced ↑ 49-12-15/16 Dissertations Defended in the Scientific Council of the Institute of Physics of the Earth, Institute of Physics of the Atmosphere and Institute of Applied Geophysics,Ac-Sc. USSR during the First Semester of.~1957- polarisation of a number of factors: the chemical composition of the pore moisture, the 4-potential, the structure of the specimen and its uniformity. The experiments were effected in~ quartz sand which was boiled several times in hydrochloric and nitric acids and then washed in distilled water until the resistance of the pore solution did not reach the resistance of the distilled water (2 500 Qm)- It was found that the chemical composition.of the pore moisture influenced the induced polaris- ation only through the specific resistance and the Z -potential. For an equal specific resistance of the specimens, the induced polarisation will be the larger, the larger the negative otential. In the case of a constant ;-potential, the n uced polarisation is proportional to the specific resistance of the specimen, but the speed of the drop does not depend on the specific resistance. In moisture-saturated sands with a re-charged, twin electric layer, the induced polarisation approaches zero and does not depend on the 4-potentilal. However, cardl6/21in specimens which were not moisture-saturated, but did have a ↑ 49-12-15/16 Dissertations Defended in the Scientific Council of the Institute of Physics of the Earth, Institute of Physics of the Atmosphere and Institute of Applied GeophysicsAc.Sc. USSR during the.First %mester of 1957. re-charged, twin,.electric layer, the induced polarisation increases sharply with increasing 4-potential. On reducing the humidity, the induced polarisation increases proportionally with the.sDecific resistance of the specimen, but for low humidity contents, this increase slows down, the induced polarisation passes through a maximun and then decreases, although the specific resistance of the specimen continues to increase. The author has proved the existence of a certain dependence of the induced polarisation on the degree of dis- persion and thereby he indicated the possibility of applying the method of.induced polarisation for.coring oil deposits for the purpose of determining the permeabilityand the speci- fic conductivity of rocks. He also obtained the relation between the speed of fall of,the induced polarisation and the degree of dispersion. leor sands, the speed of fall is the higher the finer the sand. This result seems to favour the view that when passing anelectric current through the specimen, uardl?/21 each sand grain is similar to an electric dipole and the drop ↑ 49-12-15/16 Dissertations Defended in the Scientific Council of the InscUtute of Physics of the Earth, Institute of Physics of the Atmosphere and Institute of Applied Geophysics, Ac.Sc. USSR during the leirst Semester of 1957. in the induced polarisation represents the total field of the discharge of these dipoles. The fundamental relations of induced polarisation of ion-conducting rocks were clari- fied, starting off by taking into consideration the forces acting on the charges of the difffidm part of the twin, electric layer. In the equilibrium state (in the absence of current flow), the only force maintaining the charges of the diffusion layer around the surface is the electro-static attraction from the charges of the fixed layer; therefore, the surface density of,the charges of the diffusion layer at each point of the surface equals the density of the charges of the fixed layer. It can be assumed that on applying an external electric field, the surface density of the charges does not change in the fixed layer (or changes much less than in the diffusion layer). uard 18/21 ↑ 49-12-15/16 Dissertations Defended in the Scientific Council of the Institute of Physics of the Earth, Institute of Physics of the Atmosphere and Institute of Applied Geophysica,Ac.Sc. USSR during the First Semester in 1957. N.I. Parkhomenko Piezo7electric Effect of Rocks (Plezoelek- tricheskiy effekt gornykh porod) Candidate dissertatLon. Opponents: Doctor of Physico-Mathematical Sciences V.F. Bonchkovskiy, Candidate of Physico-Mathematical Sciences I.S. Zholudev, Candidate of Technical Sciences B.A. Bazhenov. July 21, 195?. For many centuries, the descriptions of earthquakes mentioned the light effects~but the-phys'ical-nature of.-the latter was no t kn o w n.~ With the &ivelbpment of investigations in electricity and improved instrumentation, the electrical character of these phenomena was estabiished. Only individual statements of hypothetic character exist on the sources of the changes of the electrical field of the Earth. In view of the importance of this problem of a possible relation between the electro-magnetic and the seismic fields, the author studied the electrical effects in rocks subjected to mechanical forces. By means of a dynamic method, a piezo-electric effect was observed in rocks (granite, gneiss, ciuartzites, etc.) containing uardlq/;~yartz grains which are orientated in a specific way. In the ↑ 49-12-15/16 Dissertations Defended in the Scientific Council of the Institute of Physics of the Earth, Institute of Physics of the Atmosphere and Institute of Applied Geophysics,Ac.Se. USSR during the First Semester of 1957. absence of orientation of the quartz grains, no piezo-electric effect was observed. Under laboratory conditions, the exis- . ~ tence of the E effect discovered by A.G. Ivanovwas confirmed and '.also its relation to the presence of a liquid phase in rocks., On the basis of investigation of ideal piezo- electric textures of quartz in accordance with the theory of A.V. Shubnikov, it was found that from a single modification of quartz, it is possible to form piezo-electric textures of the first kind, type W and oo-.2 and of two shapes of quartz, it is possible to form a texture of the type DO.M. The possibility was elucidated of ordinating quartz-containing rocks to piezo-electric textures of the type Do.m and also to the symmetry class 3:2.A 'technique was developed of the qualitative measurement of the piezo-electric moduli of rocks in the case of longitudinal and transverse effeclB,by the static method applying an electrometer. It ism5hown that in rock specimens of volumes of the order of 10 c , the piezo- (;ard20/2l electric effect can be observed owing to the non-compensated --:7- 7 7 7 7~ I TI TT ↑ 49-12-15/16 Dissertations Defended in the Scientific Council of the Institute of Phjsics of the Earth, Institute of Physics of the Atmosphere and Institute of Applied GeophysicsAc.Sc. USSR during the First 'S emester of 1957. effect of the individual quartz grains. On the basis of experimental data, the coefficient of orientation of the quartz grains was calculated with some degree of approximation in various rocks by means of the formula of Zheludev. Model tests on granite blocks enabled establishment (in addition to an elastic wave) of two types of electro-magnetic oscillations. Oscillations of one type precede the arrival of the elastic wave and coincide with the incident of emission, oscillations of the other type a:be r-ecorded at about the same time as the elastic,wave. The os Icillations of the first type-are caused by the piezo effect of the granite block near the emmitter of the ultra-sound., whilst oscillations of the second type are caused by the piezo-electric effect of the,%me granite near to the receiver. The results of these experiments can be applied in studying the physics of earthquakes and also for developing new methods of electric prospecting. AVAILABLE: Library of Congress. Card 21/21 ↑ 5(7),24(4) AUTHOR: Pyaskovskaya-Fesenkova, Ye. V. SOV/20-123-2-161/50 TITLE- On Some Optical Pr-ope-rr ~s ~tmo sphere of the Lybian - Desert (0 nekotorykh opticheskikh svoys4.vakh atmosfery pustyni) PERIODICAL% Doklady Akademii nauk SSSRp '1958, Vol 123, Nr,2, pp 269-271 (USSR) ABSTRACT; The authoress And her collaborat6rs carried out investigations in Egypt (October-November 1957) in connection with the prog- ram of the International Geophysical Year. The exgedition work- ed in the Libyan desert south of Assuan ((f = 23 59', , X = 320521) in-a distance of I km from the river Nile and about 200 km west of' the Red S%E;. The following was found: The optical properties of the atmosphere are very constant in the forenoon and afternoon hours. Nevertheless, this constancy was disturbed for several hours at about noon, after which the atmosphere becamemore transparent than in the forenoon, a phenomenon that is only very rarely observed in the USSR. The aureole of,the sun was weaker in the afternoon than in the forenoon. The atmosphere at the place where observations were ' Card 1/5 carried out was very homogeneous in optical respect on cloud- ↑ 0n Some Optical Properies of the Altmosphere of the SOV/20-123-2-16,150 Lybian Desert less days. A schematical drawing shows 2 scattering indicat- rices which were determined on October 25 on the basis of observations of.the brightness of the sky along the entire almucantar of the sun with a zenith distance of z = 740. These two indicatrices hardly differ at all from ench other. There was no fine atmospheric dust, there was little moisture, and it was probably for this reason that a green shine became noticeable nearly every evening before sunset. The increase of transparency in the afternoon influenced the polarization properties of the atmosphere. The degree of polarization of the sky by day is always less high in the afternoon than in the forenoon. The authoress determined the direction and the amount of polarization by Aeans of a visual photometer des- L cribed in one of her earlier papers (Ref 2). The degree of polarization.attains very high values; it is higher in the afternoon than in the forenoon, and immediately after sunset it roseto 60 %.A diagram shows the course of the degree of polarization in the almucantar of the sun at an angular dis- tance of 900 to the sun, as a function of the atmosDheric Card 2/3 mass m in the direction towards the sun. This curve describes ↑ On Some ODtical Properties of the Atmosphere of the SOV/20-123-2-16/50 Lybian Desert the observations made on November 16 from z 6702t in the morning to 87034' in the evening. When the light is scattered in the first order, the direction of the oscillation plane must be vertical to the plane of vision. In tho forenoon of November 16, the transpark~ncy couff tcient amounted to p - 0.85, and the difference between the measured and the theoretical plane of oscillation remained constant (-20). In the after- noon (p = 0.69) these two planes were in agreement. There are 4 figu-i-t~~s and 4 referen,--es, 3 of whii-,h are Soviet. PRESENTED. July 121, 1958, by,V. G. Fesenkov, Academician SUBMITTED: July 12, 1958 Card 3/3 ↑ 3(7) AUTHOR: Pyaskovskaya-Fesenkova, Ye. V& SOV/20-123-6-14/50 TITLE: On the Scattering and Polarization of Light in the Atmosphere Under the Conditions of the Libian Desert (0 rasseyanii i - polyarizatsii sveta,v atmoefere v usloviyakh W1viyskoy pustyni) PERIODICAL: Doklady Akademii nauk SSSR, 195811,1'91.12,3j~.'Alr 6, pp 1006-1009 (USSR) ABSTRACT: The authoress investigated the luminosity and the polarization of the daylight sky in October-November 1557 in the Lybian Desert 20 km south of Assouan 230591 32052, h - 200m) by means of a visual photometer provided with a yellow Schott (Shot) filter and with a Polaroid. The degree and the angle of polarization were determir,,_~d according to the method of V. 0. Posenkov, according to which the luminosity of the investigated point of the sky is measured through a Polaroid at 3 positions B1, B 2 9 B3 at various angular'distances 4 from the sun in the solar almucantarat. (These points on the sky and the sun have the same distance from the zenith). The angular distances between the positions B,, B 21 and B3 amount to 600 Card 1/3 Moreover, the authoress measured the luminosity of a plane ↑ On the Scattering and Polarization of Light SOV/20-123-6-14/50 in the Atmosphere Under the Conditions of the Lybian Desert perpendicular to the sunbeam. From these.data, the degree of polarization, the orientation of the plane of the light vibrations, the tolal luminosity Be and the scattering indicatrix could be determined. Moreover, the scattering .indicatrix could be divided into 2 components. One of them is ,the indicatrix of the scattering in natural beams, the other one$ in polarized beams. Moreover, the total scattering indicatrix was subdivided into.2 other components: one of them corresponds to molecular scattering, the other to aerosol scattering. Finally, the authoress tried to separate out the degree of polarization caused by aerosols and to subdivide the aerosol indicatrix into 2 indicatrices which correspond to natural and to polarized beams. A diagram shows the distribution of the polarization degree P along the almucIntarat of the sun. The ,maximum polarization degree was at - - 900 and was equal to 74%. The second diagram gives the orientation of the plane of the light-vibrations with respect to the corresponding vertical. as a function of the angular distance 4(from the sun. The third diagram'shows the total indicatrix in polar coord-4nates.--- A formula is then given for the intensity of the polarized light. Card 2/3 ↑ On the Scattering and Polarization of Light SOV/20-123-6-14/50 ↑ 23933 'S/U35/61/000/006/015/044 AGOI/AIOI AIJ'. Pyaskovskaya-Fesenkova, Ye.V. T11ME: Some data on.sky polarization in southern Egypt PERIODICAL. Referativnyy zhurnal. Astronomiya I Geodeziya, no. 6, 1961, 26-27, abstract 6A231 ("TZV. Astrofiz. In-ta AN KazSSq', 1959, v. 8, 82- 97, Engl. summary) MT- The author 6scribes the results of observations on atmospheric op- ,ties In southern Egypt, c-onducted by an expedition of the Academy of Sciences, USSR, in the fall 1957. A visual photometer of daily sky (for measuring the brW_ ness and polarization of -.he sky) and a photoelectric photometer (for observations of circ-umsolar aureole and ccnllrol of stability of the atmosphere optical proper- ties) were used. It was found out --.hat in the region investigated a good stabill- ty was obi~erved before and after noon, which was disturbed only about ncon (fol- lowed by aureole decreaea). In the USSR usually the aureole grows after noon. Almost every evening a green ray was ot.served. Polariza-lion degree after noon in- creased. The V.G, Fesenkcv metticid (Astron. zh., 1935, v. 12, no. 4), which con- =ls~. - L 's In measuring the brigh*.ness of a given sky point at three polaroid positions, Card 1/2 ↑ 2-VA5/,,~: 1/000/006,/015/044 Some data on Zky pclariza-_l3n in so~~-hern Egyp-I .4001./AlO'L was employed for determinin ,gdegree and angle of polarization. These measurements werle pF-rf'criPed in almucan-.ar of the Sun and in zenith. ITe observed pciarizat-ion, angle tLne of light, oscillations) was oom- 6 ob.- (between the vertical and the pl pared wl th that caicalated theoretically (~ th) fz~r f I rst-order ecattering. At high transparency the d_'fferenc-e -_-e-~ween them amounted t_o 1--20. 'Ln four Zaae ut o of 5, polarization fraximum in _almucan~ar of the. Sun was at scattering angle =60, i.e., the plane of light oscillations in -Zhe real atmc-sphere ccinl,ides with the similar plane at firs!--order s:!at-tering (if transparency is sufficiently high) in proximity of this angle. The author presents components of the summary s0attering indica-lrix in na-,.urai light t'and in polarized light #', determined from ob-serva.- tions in almucantar of the S-LL-. Cc-mponent /11 varies frcm day to day mcre thanlu An' attempt is made --- ZIngle out polarization depe-1:4-ent on aerosol componen-~ from -the observed (ZLI V immar-j) polarization. G, Livshits [Abstracter's notlet Complete translation] Card 2/2 ↑ "'~335/61/000/006/0 14/044 A001/AIOI AUM Pyaskov~kaya_Fesenkova, Ye.V. "TITLE: Certaln relations in the phenomenon of sky polarization PERIODICAL: Referativnyy zhurnal. Astr.onomiya i Geodeziya, no. 6, 1961, 26, ab- stract 6A230 ("Izv. Astrofiz. in-ta AN Ka7..9.c;R" 196o, v. io, 64-7o, Engl. summary) TEXT:- The author describes the results of observations of brightness a-id polarJzation of -uhe,ciear sky along the almucantar of the Sun at its different heights in the region of the Mount-ainnus Observatory of the AstrophysicbL1 Insti- tue, AS KazSSR. The photometer was described by the author earlier (RZhAstr, 1960, no. 5, 4036). Polarization was determined by the V.G. Fesenkov method (measuring sky brightness at -..hree pcsitions of 'the polaroid (see RZhAstr, 1959, no. 5, 3556). Observations, which were conducted on sky points over mountains and lowlands, have shown that polarization degree was almost the same at equal angular distances to the Sun. Polarization degree P at different scattering angles turned out often to be proportional to "RayleigirP polarization degree- P = kPR- This relation holds sometimes also at poor transparency. On the other hand, deviations from the Ray- Card 112 ↑ 23?/19-35/61/000/006/014/044 Certain relations AGOI/A101 letgh law may often happen to be very significant. Observations permitted the singling out of summary, indicatrix indicatrix in natural rays IA'(?) and in polarized rays ~1" (,?j;) (j.~ is scattering angle). A comparison of observational data in different aces clarified the problem of relation between 1A)and ~L9at different atmospheric transparency p. It has been found out that /~1(900) and Ik (900) var-y linearly with p and, consequently, the change of a scattered flux in natural light is greater than in a polarized one. This is connected with a lesser light polarization on aerosols (in comparison with molecular polarization). G. Livshits [Abstracter',s note. Complete translation] ↑ J. 4000 68983 AUTHOR: pyaskov#~~' ak'A S/020/40/131/02/022/071 B013/BO11 . Data the Polarization of Light ~v on by the Atmosphere TITLE: Some PERIODICAL: Doklady Akademii nauk SSSR9 1960y Vol 131v Mr 2, pp 297-299 (USSR), ABSTRACT: 1/3 The author reports on observations made concerning the brightness and polarization of the olearsky along the alnuosatar of the am on the mountain observatory of the Astrofixicheekly institut AN Kax It (institute of Astrophysics of th AS of the lasekbakaya SSR) in the surroundings of Alas, At& 00450 M) in August, 19549 in the Aksengerskiy sovkhoz in the surroundings of Alas, At& h-500 in June - July, 1957# and in the Lybian Desert (ant) ~h-,200 :~ in October - Novenber, 1957- Observations more &ad* by means of a visual photometer with a yellow Schott filter. Polariza- tion was determined according to Y.G. Fesonkov's procedure. The brightness of the celestial point under investigation was seasur*d by a polaroid with three different positions. Polarization degree and direction of the polarization plans can be deterain9d in a similar w4X. The d9gres of polarization was determined by the forauls. 2 -B2)+B2(B2-B)+B (B _D 01 (B1 Bj + B2 + B 3 3 3 17- . where Dj,B2PB3 denote the brightness.of the celestial point observed with the three above- ↑ 68983 Some Data on the Folarization of Light by the S/020/60/131/02/022/071 Atmosphere B013/9011 mentioned positions. On certain days, the influence exerted by aerosols in a real atmosphere manifesto itself only by a certain decrease of the polarization degr n 2 PR ("'C) + 0082Ah namely, in the same ratio for all scattering angles2p.. gone*, P(-I,&) kPR(i4 holds for these days, with k denoting the maximum pol&rix&- tion degree in the almucanter of the sun (for~A - 900). Such a proportionality does not depend on the ataospheric transparency. the last-mentioned equation is satisfied well with bad t=ansparency, and poorly in the case of good transparency. Examples are offered. On the basis of observations.of the sky brightness along the almucantar of the sun with the three above-mentioned positions of the polarold it was possible to determine the scattered light flux #(%,I,) for, different scattering anglea -LA and to subdivide it into two parts, namely, into natural rays 41(vFs) and into polarized rays A4 of (iA) The ratio between these two scattered fluxes changes with a change in the atmospheric visibility. IAI(900) risen more quickly with increasing atmospheric dullness than P"(900 Aorosole.perhaps polarize the light to a lesser degree than molecules. 7or this reason, Card 2/3 the scattered flux in the case of an increased quantity of aerosols ↑ 68983 Some Data on the Polarization of Light by~the 8/020/60/131/02/022/071 Atmosphere B013/Boll Is likely to grow more slowly in polarized rays than in natural rays. and #"(i)k) are likely to depend linearly on the M1 - - - - - - -A 04 4 4-U1- --A X ↑ 84686 S/020/60/134/004/010/023 VI., 01P 3~v M69) BOI19/BO67 AUTHOR: Fygskovska a-Fesenkova. V. U TITLE: Determination of the Transmission Coefficient of the Atmosphere From the Polarization of the Sky light \0V PERIODICAL: -Doklady Akademii nauk SSSR, 1960, Vol...134,,No. 4, pp. 812 - 815 TEXT: From 1956 to 1957 the author studied the sky brightness by means of a polaroid and aphotometer on a mountain observatory '(1450 m above sea level)) in the Aksengerskiy sovkhoz (kksengir (?) sovkhoz) near Alma-Ata and also in the Liviyskaya pustina Yegipetskogo rayon. They also measured solar radiation and the brightness of thelv8alix-corona. These measurements were made at the~mountain observatory by N. I. Ovchinnikova, in the Aksengerskiy sovnarkhoz by PZ. _~Jio~koq and in the Liviyskaya pustina by V. M. Kazachevski and P. N. Boyko. The observations were made by means of photometers with yellow Schott glass filter. The effective wavelength in the system glass yellow screen was calculated from formula Card 1/4 ↑ Determination of the Transmission Coefficient S/020/60/134/004/010/023 of the Atmosphere From the Polarization of B019/BO67 the Sky Light E;~p d% 0 OD EXpj&~L d% ,,E denotes the energy,distribution in the spectrum of the light source, p' the transparency of the filter, F. the spectral sensitivity of the 0 0 glass-Absolutely black bodies with temperatures of T = 20,000 K, 4,000 K and the sun (t - 6,0OOOK) were studied. Results: Ao . 560 m~Lat 20,0OOOK, Ao - 565 m/L at 6,0OOOK, and ;Lo - 56a T at 4,0OOOK. For a light source of E const, X0 was found to be 567. The effective wavelength in Ithe system selenium photocell yellow screen was calculated from formula Card 2/ 4 ↑ 84686 Determination of the Transmission Coefficient S/020/60/134/004/010/023 of the Atmosphere From the Polarization of the B019/BO67 Sky Light 00 m E p d?, (2) 0 CD pie M E d% 0 Here, E is the energy distribution in the solar spectrum at the atmosphere boundary, t thespectral sensitivity,of the photocell, p. the spectral transmission coefficient, and m the atmospheric mass in the direction of the sun. For m 1, %0 was found to be 577, and for M = 5.6, 10' was found to be 582. The degree of polarization was calculated from formula P = 2YB 1 'B 1-B 2) + B2(B2B 3) + B3(B3-B /(B 1+B 2+B 3) (3). B i are the three brightnesses of the sky measured by V. G. Fesenkov's method by means of the polaroid. The transparency coefficients were.measured by three different methodsi 1) from solar radiation according to Buger, 2) from measurements of the sky brightness at an angular distance of 600 Card 3/4 jj ↑ Determination of the Transmission Coefficient 5/020/60/134/004/010/023 of the Atmosphere From the Polarization of the B019/BO67 Sky Light from the sun, and by a method suggested by the author with the aid of formula p = 0.973 - 9,80B(~SOOVE m (4); 3) from measurements of the solar m corona at the moment of its maximum brightness, by the aid of formula: logp - -M/m max (5), In Fig 1 F f(p) is graphically r lepresented according to measuremews at the three localities mentioned initially with 0 1 0 0 s ,attering angles of 40 j 60 , and.90 i e, The author points to the nonl near character of this dependence which is not locally dependent within the maas-arement error. Furthermore, P = f(T) is graphically represented (Fig.2) where x denotes the optical path of the atmosphere. The relation InT = 0.035 - %344P (6) is given for this case, For T = O~05 the author cal,3ulated a polarization at 900 of 100%, at 600 of 60%, and at 40' of 26% with a transparency coefficient of 0.954 By taking account of an effective wavelength in the system glass - screen of 564 ~v4 the author obtains a 83% polarization at a scattering angle Of 90 0 at sea level, and anF37% polarization at the mountain observatory, There are 2 figures and Soviet reference, PRESENTED: May 3, !960; by V, G. Fesenkov, Academician SUBMITTED: 27, 1960 April Card 4/4 ↑ PYASKOVSKAYA-FESENKOVA, V. (Alma-ata) "Some results of investigation about atmospheris scattering and polarization of the day skylight." Report submitted in connection with the Symposium on Radiation, Vienna, Austria 14-19 Aug 1961. ↑ S/169/62/000/003/047/098 AUTI-10R: ~Pyaskovskaya-Fesenkova, Ye. V. TITLE: Day-time sky polarization (Theses) PERIODICAL: Re_-~'erativnyy zhurnal, Geofizika, no. 37 1962, 2061 ab- stract 3B212,.(V sb.,Akt-inometriya i atmoofern. optika, L., Gidormeteoizdatu, 1961, 103-104) TEXT: The results of sky brightness observations, carried ou, in the Libyan desert, in southern Egypt, and atla mountain observato- ry.near Alma-Ata, are analysed.N. G. Fesenkov's method was used in determining Ithe degree of sky-dispersed light polarization 'and the orientation. oli" the plane.of the electrical vector's variations. An attempt was made to distinguish from 'the summary radiation, ob- served alon- the sun's almacantar, the radiation that depends on. the presence of aerosols in the azmosphere. The mazeimum of the aero- sol component of the polarization ban be observed-at an angular distance of 110 - 1200 from the sun and amounts to 40%. /-Abstrac- ter's note: 03mplete translation.7 Card 1/1 ↑ 9/169/62/000/003/061/098 D228/D301 AUTHOR: Pyaskovskaya-Fesenkova Y e TITLE: Methods of determining the coefficient of atmospheric transparency from the sky brightness (Theses) PERIODICAL: 'Referativnyy zhurnal, Geofizika, no. 3, 1962, 28, ab- stract 3B232 (V sb. Aktinometriya i atmosfern. optika, L., Gidrometeoizdat, 1961, 144) TEXT: Three methods of determining thecoefficient of transparen-, cy are suggested: 1) From the moment of onset of the brig4tness maximum of the circumsolar halo, since in this case there is 4 very simDle relationship; 2) from the indicatrix of dispersion wh6n true absorption is absent; and 3) from empirical formulas, derived on the basis of much observational material,*/-Abstracter'.9 note: Com-r plete translation.-7 Card ↑ S/035/61/000/012/008?u4 I A0OI/AIOI ALWORS~ Pjaskovskaya-Fesenkova-Ye.V., Boyko, P.N., Belyak, G,M, Boykc. T i Some data on attenuation and dispersion of light at varlous alti- tudes above sea level FERIODICAL: Referativnyy zhurnal, Astronomiya i Geodezlya, no, 12Y 19161, A3, abstract 12A285 ("*Lzv. Astrofiz, in-ta AN.KazSSIV, 1961, v, 11, 78 88, Engl, summary) TEXT-Brightness of daily sky on the Sun's almucantar was measured simu 'L- ~aneously at two points e = - 57 and'60c at the Mountain - Observatory of the A:~ ohysical InitiWte, AS KazSSR, and on the Kumbel' mountain. A visual photometer and a pho"oelectrical photometer, with selenium photoelement were used. Trans-parency coefftelents P), optical thicknesses of atmosphere (T') and .9cattering IndIcat.nices i),(~) were-determined from the measurement data, it. is noted tha,, tran-sparency coefficients over the lowland and mountains differ only slightly- Linke~s turbidity factor increases in afte~rnoon hours in comparison with mornine, f~ard If~~ ↑ ↑ B/913162/003/000/002/033,.- 1)405/D301 ~AUTHORs .yaskovskaya-Fesenkovas Ye. V., P TITLES Development of atmoopheric optics in Kazakhstan.' SOURCES Akademiyal:nauk Kazakfiskoy SSR. Aotrofizicheskiy. instituta'";Trudy. v. ~'3, 1962,.Rasseyani e i poly- ariiatsiyal.:sveta v. zemnoy atmosfere; 'materialy Sovesfichaniya.po rasseya:idyu i polyarizatsii oveta :v atmosfere. 14.- 25 TEXT: The,study of..atmospherio optics in Kazakhstan was initiated -from- in September I e 90, when eight exp ditions, various parts of the USSR arrived there to study the total- solar:'- ~eclipse. Soon afterwards iVwas~deoided by,the Council of Ministers of the USSR (at the initiative~.of V.G. Fesenkov:) to-create' the Institute.of Astrono and...` Ffi~,sica at the Kazakh Branch of the'4 MY -:~The' ar y Academy of Sciences USSR. e 1 days of the~Institute coincided' with the diffi cult.stage of the-Second-World War, so that great, obstacles were encountered. in instrument construction. blany,instrument Gard 1 ↑ i19131621003160010021033 Development of atmospheric optics,,.. D40VD301. were constructed by the scientists themselves,' in particular V,G, Feserikov; among these were an. instrument for laboratory deter- mination of the scattering~function in turb:~d wedia,and an instru- ment for the determination'bf-,th6 absolute albedo of reflecting stirfaces. In 1950 the Inatituteof Astronomy and Physics was.divided into two: the Astrophy'sical:~.Institute and. the Physicotechnical Institute; in addition an'independent Section for Astrobotany was ,created. The Astrophysical Institute moved.to the Kamensk'Plateau a V rious expeditions were'organized, mainly inside Kazakhat n; among a themt to the Kumbeli.Mountain'-(200 m) and the G eat Alma_ e 3 r Ata Lak the Sary-Ishik-Otrau deseri:1(near the Balkhash~Sea)lleto., Other.' ,expeditions led to the Sikhote-Alin'sk Mountain Range in the Par East,, and to the Black-Sea',(Gudaut).'Durin the-International.Geophysical.' 9 171 Year 1957t an expedition was,sent.to Egypt.where it worked in the desert South of the town of Assuan-The. research'of the Atmospheric- M..i: Optics Section was mainly'.'concerned with,the scattering capacity' 1 of the atmosphere, the extinction of. light by,the.atmosphere, solar' halos, the-energy distribution,in the spectrum of the diurnal sky In recent years, the polarization of light of the: diurnal sky Va Card 2/4 ↑ S/913/62/003/000/002/033 Development of atmospheric optice., D405/D301 investigated, as Weil as-'the scattering of light in'the bottom layer of the atmosphere. 'Por~this purpose three new instruments io were construoteds - aspeot -electropolarlmeter with automatic recording of spectra, a diurnal-sky electropolarimeter using a' photomultiplierf and a' two-channel polarimet6r which'enables to directly determine the irst parameters of Sto .3;f kes (intensityt, difference betweenintensities at two.mutually perpendicular".. directions, and the.*Angle of the polarization plane. The polari- in the lower-atmosphere was studied~by a specially-designed photoelectric photometer.;-Rere,are some of.tfie results,of nearly, 20 years of research in atmospheric optics: The solar. halo attains its highest brightness when the direct solar radiation.i, is attenuated by-a factore (the bass of natural logarithms) in" .-A the direction of.the line,of sight. The sky brightnees-with,respeot"-,l to the solar illumination does not depend, atan angular distance of 570 from the Sun,'on.the form-.of the scattering funotio * "The i n. nature of the latter is the same irrespective of climatic- and meteorologic conditions' Among -thetheoretical studies are V.G. Fesenkov's theory.of vertical visibility, etc., andthe new method-:"-'.'- Card 3/4 Ix, ↑ ↑ ↑ s/gi3/62/003/060/003/033 Some data on sky brightness D405/D301 homogen eous in the hlorizonta 1 direction. The directional scattering coefficients were determine d~by a,well-known formula of sky bright~. ness in which multiple scattering,,is neglected. From figures plotting.i the coefficient ~L as a function of atmospheric mass, the following conclusions were obtaineds 'At constant angular distance from the Sun the.directional scattering coefficient,IA decreases when the. Sun approaches the horizon (the zen .ith distance.of the point under~ consideration remaining fixed); it~remainsconstant for the solar, almacantar; it decreases',,~when the Sun,apprbaches the horizoni for points which are on an,almacantar-that,is higher than the solar almacantar and which move'.together with the latter so that z~-~'const (z denoting the zenith distance of the:Sun, and 5 the zenith distance of the point under consideration); it increases, when the Sun approaches the horizon, for points which are on an almacantar lower than the solar and move--together with latter as above..These results. are discussed in relation to'suoh-factors as'theldecreasing,atmos- pheric density with altitude' multiple',scattering, ground reflection, etc. It is noted that the'dbservations.of light polarization conf the above results. There"are 3 fi res. 9U Card 2/2 0 ↑ 913/62/003/000/013/033.- 9 05/1)301 AUTHOR: Pyaskovskaya-Pesenkova, Ye. V. TITLE%~ On the sky-brightn6so layer 'Akademiya nauk Kazakhskoy SSRi Astrofizicheeki SOURCE: institut. Trudy., v.,3,:1962. Rasssyaniye i polyarizatsiya sveta v zemnoy,"atmoofere; m6terialy Soveshchaniya po rasseyaniyu i poly- arizatsii eveta vatmosfer6. 83 88 TEXTt The'height'h of*the effective-brightness,layer 0 I-, . -integrals,of the brightness hi is defin B ed by a formula involving Thereby it is assumed that.*the atmosphere consiBts,of thin plan46- -: parallel homogeneous layers, that the density. and optical:. thiokn6ss .~""~':.! : I of the atmosphere.decreas*e.exponentially, and that multiple s catter ing and light reflection f.rom.th e ground are absent* After evaluat-*! -I I-.-'; ing the integrals, the'author illustrates the method'of calculation . by a numerical example. On the basis of this:example the following conclusions are obtaineds., 1).For celestial-points of-fixed zenith Card 1/2 ↑ ↑ ↑ S/913/62/903/000/021/033 Atmospheric polarization 405/D30V ~Thereby the effects of.multiple scattering, of ground and those due to th presence of aerosols, are,taken into..account- it is assumed that the multiple-s"cattering intensity is not -depen-.:: dent on azimuth. The method was verified theoretically;,it was shown that, under certain conditions, the method involves a n error of a few percent only..In~order to separate the integral and aerosol,,~-i~%, scattering functions' into polarized and non-polarized light com- ponents, the duthor,neglected,the'polarizati6n,of the multiply~ scattered light. The reasons for such'an assumption are set forth~'. From.the curves representing'the degree of.polarizatlon as a func-w tion of the scattering angleit is evident that, for a trans parency coefficient of 0.88, the effect., of multiple *scattering -is negligibly small; on the other hand,.-for a-.transparency coefficient of 0.80~,- neglect.the multipl scattering. The:a it is no longer possible, to,.: e eroa--- a -~'just as~ the integral. o es. h sol.degree of polar.iz tionj~' ne,'..increas wit a tmo sphe ri c trans parency; 'f or. a - . trans parency oo ef f i ci ent. of . 0. 68 the degree of polarization of,.light'icattered by aerosols.--was found.. to.';~.be -f! 36%, and.for-a transparency.,ooefficient..of 0. 60: it, was 29%.' There s,and 1 table. are 6 figure Card 2/2 ↑ ↑ ↑ ↑ ACC NR: AR6035286 SOURCE CODE: UR/0269/66/000/009/0027/0027 AUTHOR: Pyaskovs kaya- Fes enkova, Ye. V. TITLE: Atmospheric polarization of light with dri and wet aerosols SOURCE: Ref. zh. Astronomiya, Abs. 9.51.245 REF SOURCE: Tr. As.trofiz. in-ta. AN KazSSR. v. 7, 1966, 79-84 TOPIC TAGS: atmospheric optics, optics, light polarization, aerosol, light scattering ABSTRACT: Data are presented on the polarization of light, scattered in the day- time at differenct points in the sky in various localities principally along the solar almucantar. The observations showed, that at the same atmospheric optical thick- ness, the degree of polarization (P) is approximately 10% less when dry aelrosols predominate over moist ones. If multiple scattering is assumed to be nonpolarized and independent of the azimuth, then the computer degree of aerosol component (P.) polarization is independent of atmospheric transparency. The mean value of Pa in a location with predominantly moist aerosols was found to be greater (50.3%) r.,d 1/ 2 UDC: 525.7 ↑ WCC-NG--- AR6035286 than with predominately dry aerosols (28.5%). In computing P a, molecular anisotropy was not taken into account. which reduces the values obtained by 2-3%. It is assumed that the differences observed in the degree of polarization are explained by the difference In the polarization proportion of dry and moist aerosols. [Translation of abstract] (SPI .SUB CODE: 03 ↑ ↑ ↑ ↑ ↑ 0 a 0 0 0 a is 16 IF J7 n J4 AI R_j_j Is is -Y m so is v u 14 is 1. 1: a J. c 41 At &I CEO f 1, 0 p a _J~I~AA_M j_', ~ I, e, 4 6 - _ 't~ _ & , 0 If 'o. C.D(.5 I..~Ctm TM PrOW16 of crww ov Pedolov (U. S. S R-) 36. 116-107(1931).-P. ckm t1w knostion ambi an nwks in the Dnicprr Rivemr. 00 ir Analywo ad saw MMPJM AM SJWM. Mb*Wbq thilit 11111BUY tJ Ok-111 00111,lin 161 it. whkb, spimmustly I the dark mokir. Tlw wminsweve amstitticuls founal in t1w cervatem a AM PJ11(j. JIML111111 WSICC, IN Wkkb OW MIND MIJ Ft SFV in 11W hilng 4 b"fINNIIAM ashesna Vat d6mmy of awls cruou in any tergiist cues. thwer- luce. twl 1w taken as am bodimmum CIO a ebeorii type of chumter. I I Joffe all ~40 0 06 As 5 a - I I, A of TALLVRfK4L LITERSTWE CL41WOCATPCO CV u A .1 N is is, *A ooe 60 o" S" o" 0"o o'0 Go 0 o" 0 1is* 00 0 0 0 0 0 0 0 0 0.0 0 0 0 0 0 0 0 0 0 0 0, 0 00 00 00 0 0 0 c 0 0 0 ↑ rTASKCVSKIY, ~,. V. ↑ PYASKOVSKIY. B. V. ↑ What Is Loess? Materialy po Inzh. geologil, No 3, 1953, 56-68 The aughor analyzes the ideas of L. S. Berg, who explained the origin of loess from the viewpoint of soil-formation processes and refuted the aeolian theory. In theformation of loess two stages are distinguished: accumulation of fine earth (the matrix of loess), and its process of loess form1nF. The author's orinion is that loess is formed under the humus layer of steppe soils and Is P. conT&ent part of their profile and that loess is a Ilime melkozem Z fine earth_/ of dust-like mechanical comrosition possessing a number of characteristic signs. (RZhGeol, 1, 1954) SO: W-31128), 11 Jan 55 ↑ USSR/Goology - Dosert soils Card 1/1 1 Pub. 86 25/35, Authors Pyaskovskiy., B. V. Title Did a desert exist, in southern Ukrainia during the Pliocene 1.e h?' POP Periodical. I Priroda 44/2.- 115 U6,,, Feb.l: 1 .955 Abstract I A studyis made' 'of:the.loese-soll in,the southern part Of the Ukraine, In 1914 this scientis,t,,I* Levinskiy.,Idiscovered . ed'rock covered by: a~ beneath a thick layer of clay rounde'd-off brick-r I black shiny coating., which could be attributed.t6 I'desert,burno This is,found at..Kherson and near Odessa.: Against the desert- theory are the findings of,other scientists attributing the formations described to other causes, thus leaving the question in doubt. Two USSR references (1914 1931). Illustration. Inatitution State Scientific Research Institute of Rock Chemical Materials Submitted ↑ ↑ ↑ ↑ SfMMp A.N.; ~IYASMVSKIYI B.V. [Pliaskovslkyi) B.V.] ↑ ↑ (HDtts V.) ↑ PYASKOVSKIY. B.V. [Piaskovelkyi, B.V.j ↑ (Relativity 0Physic~)) (Slace and time) ↑ ↑ ↑ ↑ ↑ KOROSTELEVAj, 0.1.; PYASKOVSKIY, S.V.; BYCHKOVA, G.I... red. 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