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Lake Elton. N. A. Shlesinger and I. B. Feigelson. *Sci. Mem. Univ. Saratov* 10, No. 2, 35-60(1933).—Lake Elton (Lower Volga) contains 7×10^{8} tons of $MgCl_2$ and 40,000 tons of Br; the latter enters the lake with river Tscher-niavka water, which contains 1-4 mg. % of Br, the yearly increment from this source being approx. 35 tons.

B. C. A.

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8

Boron in the salt lakes of west Kazakstan. I. Feigelson and A. Koshevnikova. *Razvedka Nedr* 15-10, 9(1935); *Neues Jahrb. Mineral., Geol.*, Ref. II, 1936, 113.—B. in amts. varying from 0.005 to 0.110% occurs in several other lakes in this district besides the Inder lake.

C. A. Silberrad

COMMON ELEMENTS

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8

Hydrochemistry of the salt lakes of the Ural Emba district and Mangyshlak peninsula. L. Feigelson and A. Koshevnikova. *Razvedka Nedr*, 3, 30 [illegible]; *Neues Jahrb. Mineral., Geol.*, Ref. II, 1939, 94; cf. C. A. 32, 6588[4]. Boron is widespread in western Kazakistan; it occurs in the brine of the lakes. In lake Aral-sor there is much thenardite, and in most of the lakes potash salts and bromides.

C. A. Silberrad

1ST AND 2ND ORDERS

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—Cyclochronograms of salt lakes. Elton Lake (1932–1936). N. S. Kurnakov, I. B. Feigelson and A. G. Bergman. *Compt. rend. acad. sci. U. R. S. S.* 17, 411–14(1937)(in English).—The complex processes that take place in salt lakes over a period of years can be recorded in diagrams with the aid of the polydimensional geometry methods first proposed in 1902 by P. H. Schoute. The compn. of the salt lakes can be simplified by selecting only the most essential components, such as NaCl, $MgCl_2$ and $MgSO_4$. With H_2O as the fourth component, and temp. and time as addnl. variables, 6 topological components are obtained, which give a five-dimensional figure for the diagram of state. This can be represented as a complex of projections in annual cyclic curves giving time, temp., $MgCl_2$, NaCl, $MgSO_4$ as 6 projection diagrams along 5 axes, viz., 6 points for each compn. The cyclic curves obtained in this way are called cyclochronograms. They may be used as physicochem. characteristics of the climate, and are valuable aids in working salt mines and in designing salt-productive combinations. H. S. v. K.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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18

Boron in the salt lakes of the Mangyshlak Peninsula. N. B. Feigel'son and A. A. Kozhevnikova. *Byull. Inst. Halurgii* 1938, No. 7, 1-7; *Khim. Referat. Zhur.* 2, No. 4, 44 (1939).—The B content in the salt lakes of the Mangyshlak Peninsula varies from 0.202% to 0.045% (calcd. as H_3BO_3). In the Karabogaz Gulf the H_3BO_3 content is 0.25% of the total salt content, and in the Caspian Sea 0.28%; the H_3BO_3 content in sea water is only 0.005% of the total salt. The H_3BO_3 salts dissolve in pure water to a much smaller degree than $MgCl_2$ and $MgSO_4$. Therefore, it would be expected that under the conditions of the salt lakes the H_3BO_3 salts will be deposited before NaCl. This was not the case, except in the lake Krasnoe, where traces of H_3BO_3 were found in layers of NaCl. It is concluded that $MgSO_4$ may increase the soly. of the borates and that H_3BO_3 is concd. in the mother liquor during the evapn. of the solns. W. R. Henn

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Solubility of sodium borates in saturated solutions of sodium chloride in the presence of magnesium sulphate. N. A. Schlesinger, I. B. Fridman, and A. I. Spiridonova (Compt. rend. Acad. Sci. U.R.S.S., 1938, 20, 141—143).—The solubility of $Na_2B_4O_7,10H_2O$ in saturated NaCl solutions at 35° is < in pure H_2O. It increases in the presence of increasing proportions of $MgSO_4$ and eventually exceeds the solubility in pure H_2O. Its solubility in pure dil. $MgSO_4$ at 35° is < in pure H_2O but decreases further with increasing concn. of $MgSO_4$. At 50° $Na_2B_4O_7$ exists in pure H_2O as the pentahydrate but in solutions of NaCl or $MgSO_4$ at 50° passes into the decahydrate again. As before, the solubility in saturated NaCl increases with increasing [$MgSO_4$]. T. H. G.

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1B

Hydrochemistry of the El'ton lak I. B. Feigel'son.
Trudy Vsesoyuz. Inst. Halurgii, Problemy Ozera El'ton,
Pt. 2, 1939, No. 16, 3-40; *Khim. Referat. Zhur.* 1940,
No. 4, 22.—The changes in the compn. of the El'ton lake
brine were investigated during 6 years, including measure-
ments of concn., temp., depth of brine layer and temp.
of the air, climatic factors being observed simultaneously.
Considerable variations in compn. were observed in dry
and wet years; $CaSO_4$ 0.07-0.10, $MgSO_4$ 2.04-4.65, Mg-
Cl_2 5.90-21.80, $MgBr_2$ 0.06-0.20, KCl 0.08-0.27 and
NaCl 5.50-16.90%. The temp. of the brine varied from
−0.1 to 28.3°. The metamorphosis coeff., $MgSO_4$:Mg-
Cl_2, was 0.18-0.42 (av. 0.29). It is supposed that evapn.
of the brine passes through all stages of deposition from
NaCl to $MgSO_4 \cdot 6H_2O$ during April-October. The brine
contains max. amts. of $MgCl_2$ and $MgBr_2$ at the end of the
evapn. period. For $MgCl_2$ the autumn max. is 21.80%
(in September) and the winter max. 9.62% (in January).
The min. $MgCl_2$ content in April is 5.90% and in December
9.18%. For $MgBr_2$, the max. is 0.20% in September
and the min. 0.06% in April and December. The brine
reservoirs should be filled in the autumn. Mirabilite
should be collected in January and February. W. R. H.

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

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18

Evaporation of the El'ton lake brines under natural conditions. I. B. Feigel'son. *Trudy Vsesoyuz. Inst. Halurgii, Problemy Ozera El'ton* Pt. 2, 1930, No. 10, 41-51; *Khim. Referat. Zhur.* 1940, No. 4, 22-3.—The evapn. rate of the El'ton lake brines was investigated; 2.0-2.5 l. of 20, 24, 26, 28, 30, 33 and 36% brine were evapd. under natural conditions from vessels with an area of 250-300 sq. cm. and a brine layer depth of 15 cm. The vessels were weighed daily and distd. water was added to the original wt. Air temp., sediments, cloudiness, velocity and direction of the air, air humidity and temp., concn. and depth of the brine layer were observed. The mean evapn. coeff. for the El'ton lake brines is 0.42. Max. evapn. of the brines occurs in August at 46% relative humidity of the air and min. evapn. occurs in October at a 64% humidity. In May, a second max. of evapn. is observed, as the relative humidity of the air decreases to 48%. All concns. of the brine investigated evap. from April to October. Evapn. ceases from November to March, and atm. moisture is absorbed by the brine.

W. R. Henn

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Preparation of commercially pure, saturated solutions of magnesium chloride (from the El'ton lake brines). I. B. Feigel'son and A. P. Larina. *Byull. Inst. Halurgii* 1939, Nos. 4-5, 42-8.—Lab. tests show that about 90% of sulfates ($MgSO_4$ and Na_2SO_4) and 100% NaCl can be removed from the concd. brines by freezing at from 0° and −20° in the winter (December-February). The residual sulfates can be removed by pptn. with $BaCl_2$. C. B.

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Annual cycle of the Inder Lake. I. B. Feigel'son and A. A. Kozhevnikova. *Byull. Inst. Halurgii* 1939, No. 10-11, 28-37.—The chem. compn. of the brines of Inder Lake throughout the year remains practically const. with 0.041% Br and 0.006% H_3BO_3. Chas. Blanc

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3RD AND 4TH ORDERS

Synthesis of inderite. I. B. Feigel'son, V. E. Grushvitskii and T. V. Korobochkina. *Compt. rend. acad. sci. U. R. S. S.* **22**, 242-3(1939)(in English).—From interaction of borax and $MgSO_4$ in aq. soln. at 35° there was obtained a synthetic inderite corresponding to $2MgO.3B_2O_3.15H_2O$, orthorhombic crystals, optically biaxial with the angle 2V near 60°, straight extinction, optically positive, sp. gr. 1.78, and having n_g = 1.505 ± 0.002 and n_m = 1.480 ± 0.002. George Ayres

Inst. for Salt Research, Leningrad

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Occurrence of boron in salt lakes of Aral-Kaspian region. I. B. Feigel'son, M. G. Valyashko and A. G. Bergman. *Compt. rend. acad. sci. U. R. S. S.* 22, 244-7(1939)(in English).—An examn. of 64 samples of salt lake brines found in Kazakh, Turkmen and Uzbek S. S. Republics showed B_4O_7 contents (g. per 1000 g. mineral residue) ranging from 0.02 to 9.02; 21 samples show values greater than 1.0. George Ayers

Sci. Res. Station for Salts, Saratov

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Physicochemical analysis of the equilibria of the reciprocal system $2NaCl + MgSO_4 \rightleftarrows Na_2SO_4 + MgCl_2$ in the El'ton Lake brine. I. B. Feigel'son and A. G. Bergman. Ann. secteur anal. phys.-chim., Inst. chim. gén. (U. S. S. R.) 12, 157-88 (1940); cf. C. A. 29, 3633[4]; 34, 6417[1].—From the combined results of physicochem. studies of the El'ton Lake brine over a period of 6 yrs. by F. and other workers it was possible to construct a complete polythermic diagram of the equil. system Na, Mg \| Cl, SO_4 at from −20° to 25° at intervals of 5°. The max. $MgCl_2$ concn. in brines during the summer drops to a min. in the winter. Cyclochronograms of salt lakes. El'ton Lake (1932-1936). N. S. Kurnakov, I. B. Feigel'son and A. G. Bergman. *Ibid.* 189-212; cf. C. A. 32, 3090[6].

Chas. Blanc

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[illegible] analysis and the annual [illegible] S. Kurnakov, I. B. [illegible] (Izv. Sekt. Fiz.-Khim. Anal. [illegible]). The results of [illegible] to [illegible] of L. [illegible] of "cyclo-chronograph" (curves connecting concn. of a given salt with temp., date, and [NaCl]). (C. A., 1940, I, 413.)

R. T.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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Ca

Geochemical indications for the presence of borates. I. B. Feigel'son. *Compt. rend. acad. sci. U. R. S. S.* 28, 502-5(1940)(in English).—The ratio H_3BO_3/Br has the value 0.05 for the World ocean. For brines from various districts the values are given: Ural-Emba region, 2.03; sources of Lake Inder, 12.60; subterranean waters of the Inder (R. basin), 65.00; Manguishlak peninsula, 2.50; Karabogas region, 2.00; Tchelkar region, 2.16, Ust-Urt plateau, 0.30; Sarakamysh depression, 2.00; Khiva oasis, 3.01; Solikamsk-Berezniaki region, 0.25. A high value for the ratio should be a good indication of borate deposits in the region. D. W. Pearce

All-Union Inst. of Halurgy. Pushkin

METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

Underground waters of gas-petroleum deposits of the Saratov district. I. B. Feigel'son. *Doklady Akad. Nauk S.S.S.R.* 59, 307-10(1948).—Underground waters were observed in the whole stratigraphic complex from Jurassic to Devonian. They are Na sulfate or carbonate waters, or brines contg. $MgCl_2$ and $CaCl_2$, or NaCl and $CaCl_2$. The salt content increases regularly with the depth of the water-bearing horizons, ranging from 0.4 to 2.1% in the first group, and from 5.3 to 10.4% in the brines. The $CaCl_2$ brines are met only in the productive Carboniferous and Devonian sediments. In the Cenozoic horizons the waters are fresh or slightly salty, derived from sands and sandstones. Br, I, B, and K are present only in subordinate amts.; even if the country rocks are of marine origin, the total sum of the mineral material is not above 0.5%. A second geol. complex comprises the sediments, chiefly limestones, down to the Middle Carboniferous. The waters derived from these horizons are exclusively of the $CaCl_2$ type. In contrast to the first zone, the salts could not have been derived from leaching out the country rock, but by metamorphic processes in the org. material in the rocks. The waters show a type transitional to the brines contg. up to 2.2% salts. Petroleum and hydrocarbon gases are absent, but the limestones contain bituminous material up to 1%. The third zone, contg. $CaCl_2$ brines, exclusively, comprises the Middle Carboniferous sediments of the Moscovian Basin down to the Middle Devonian, the water-bearing horizons alternating with mineral oil and hydrocarbon gases. Some of the brines are nearly satd. with NaCl in the Devonian, with remarkable amts. of I, Br, B. Under the temp.-pressure conditions in these horizons, the waters are in an emulsion-like state of mixt. with mineral oil and hydrocarbon gases; the brines have a high d. and viscosity, they flow sluggishly even in porous country rocks. A detailed table of the chem. compns. of typical underground waters is given.

W. Eitel

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

FEYGEL'SON, I.B.

CH

The saline lakes of the northwestern Aral Sea territory, the Plateau of Ustyurt, and the lower parts of the Amu-Dar'ya basin. A. G. Bergman, M. G. Valyashko, and I. B. Feigel'son. *Trudy Lab. Ozerovedeniya, Akad. Nauk S.S.S.R.* 2, 17-67(1953).—Detailed description of each of the 30 lakes investigated is given, including drawings of the geol. formations and phase diagrams of the substances present, as well as the temp. and d. measurements, and chem. analyses of their water (ions HCO_3^-, SO_4^{--}, Cl^-, Br^-, $B_4O_7^{--}$, Ca^{++}, Mg^{++}, K^+; salts $Ca(HCO_3)_2$, $CaSO_4$, Na_2SO_4, $MgSO_4$, $MgCl_2$, NaCl, KCl, NaBr, $Na_2B_4O_7$) and coeffs. of metamorphisation, K'_n = $Na_2SO_4/MgSO_4$ and K_{MK} = $MgSO_4/MgCl_2$. Coeffs. of K content, K_K = (wt. % K/wt. % Σ salts)·10^3, varying from 1.30 to 16.3, coeffs. of Br content, K_{Br} = wt. % Br/wt. % Σ salts, varying from 0.0 to 30.9, and coeffs. of B content, K_B = (wt. % B_4O_7/wt. % Σ salts)·10^3, varying from 0.07 to 5.18 are also given for all the lakes, as well as the quantity NaCl/Σ salts, which varies from 0.24 to 0.90. The lakes appear to be suitable for the development of salt industry. R. D.

(2)

abstract W-31146, 1 Feb 55

SHORNIKOV, B.Ya.; FEYGEL'SON, I.B..

Methods of developing certain oil fields. Neft.khoz.34 no.11:47-48 N '56. (MIRA 10:1)

(Volga Valley--Oil fields)

FEYGEL'SON, I.B.

LARIONOVA, ,O.R.; FEYGEL'SON, I.B.

Using mineral hydrogen sulfide solution for edge water drive.
Neft. khoz. 35 no.8:46-50 Ag '57. (MIRA 10:11)
(Oil field flooding) (Hydrogen sulfide)

FEYGEL'SON, I.B.

3(5) PHASE I BOOK EXPLOITATION SOV/1827

Vsesoyuznyy nauchno-issledovatel'skiy geologorazvedochnyy neftyanoy institut

Geologiya i neftegazonosnost' yugo-vostochnykh rayonov Russkoy platformy; sbornik statey (Geology and Oil and Gas Bearing Characteristics of the Southeastern Regions of the Russian Platform; Collection of Articles) Leningrad, Gostoptekhizdat, 1958. 242 p. Errata slip inserted. 1,200 copies printed.

Resp. Ed.: Ya.S. Eventov; Eds.: N.S. Burshtar, N.S. Il'ina, and S.A. Sakhnovskiy; Tech. Ed.: A.B. Yashchurzhinskaya; Executive Ed.: N.V. Kulikov.

PURPOSE: This book is intended for petroleum exploration geologists, particularly those interested in the Russian platform area.

COVERAGE: These articles, originally read at a meeting of the Scientific and Technical Council of Ministry of the Petroleum Industry (1953), discuss the geologic structure of the south-

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eastern parts of the Russian platform, the planning of exploratory and prospecting work, and special problems in geochemistry. Studies are aimed at realizing the oil and gas potential of the area. Representatives of VNIGNI, VNIGRI, the Stalingradneftegazrazvedka Trust, Saratovneft', Kazakhstanneft', and Grozneft' contributed to the work. No references are given.

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Geology and Oil and Gas Bearing (Cont.) SOV/1827

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FEYGEL'SON, I.B.; GABRIELYAN, A.G.; SINYAGOVSKIY, I.N.

Distribution of saturation pressure in the B_1 layer of the Zhirnovsk oil field. Neft.khoz. 37 no.3:47-49 Mr '59. (MIRA 12:5)

(Stalingrad Province--Oil reservoir engineering)

FEYGEL'SON, I.B.

Selecting absorptive horizons for sewage disposal; a topic for discussion. Neft.khoz. 38 no.8:29-33 Ag '60. (MIRA 13:8)
(Sewage)

FEYGEL'SON, I.B.

Basic water resources for edge water flooding in Saratov and Stalingrad Provinces. Trudy VNIGNI no.28:194-205 '60. (MIRA 14:4)

1. Nizhne-Volzhskiy filial Vsesoyuznogo nauchno-issledovatel'skogo geologo-razvedochnogo neftyanogo instituta.
(Volga Valley--Oil field flooding)

AGAPOVA, G.D.; FEYGEL'SON, I.B.

Geological characteristics of oil and gas pools of the Jivet stage (layer D$_{2}$4$_{a}$) of the Stepnovskoye field. Geol. nefti i gaza 6 no.6:37-39 Je '62. (MIRA 15:6)

1. Nizhne-Volzhskiy nauchno-issledovatel'skiy institut geologii i geofiziki.

(Saratov Province--Petroleum geology)
(Saratov Province--Gas, Natural--Geology)

FEYGELSON, L.L.

PHASE I BOOK EXPLOITATION SOV/4671

Akademiya nauk SSSR. Institut avtomatiki i telemekhaniki. Seminar po pnevmogidravlicheskoy avtomatike. 2d and 3d session

Voprosy pnevmo- i gidro- avtomatiki (Problems in Pneumatic and Hydraulic Automation) Moscow, 1960. 211 p. Errata slip inserted. 4,300 copies printed.

Resp. Ed.: M.A. Ayzerman, Doctor of Technical Sciences, Professor; Ed. of Publishing House: A.A. Tal'; Tech. Ed.: S.G. Tikhomirova.

PURPOSE: This collection of articles is intended for scientific workers, industrial designers and engineers interested in automation and telemechanics.

COVERAGE: The collection of 23 articles is a continuation of an earlier work of the Academy of Sciences USSR, on pneumatic and hydraulic automation systems, published in 1959. A wide range of problems connected with the design and operation of pneumatic and hydraulic automation equipment is described. In addition to problems based on experiments, the collection also contains discussions of new trends in the field, such as the possibility of using very low pressure for the operation of pneumatic devices. Some articles of this collection were written in the German Democratic Republic and in Czechoslovakia and reflect a somewhat different approach to automation problems. No personalities are mentioned. References accompany most of the articles.

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27

FEYGEL'SON, M.A., inzh., red.; PEVZNER, A.S., red. izd-va; TOKER, A.M., tekhn. red.

[Manual of consolidated indices of the cost of planning and research] Spravochnik ukrupnennykh pokazatelei stoimosti proektnykh i izyskatel'skikh rabot. Vvlditsia v deistvie s 1 ianvaria 1958 g. Pt.8. [Enterprises of the petroleum industry] Predpriiatiia neftianoi promyshlennosti. 1958. 28 p. Moskva, Gos. izd-vo lit-ry po stroit. i arkhit. (MIRA 11:8)

1. Russia (1923- U.S.S.R.) Gosudarstvennyy komitet po delam stroitel'stva.

(Petroleum industry)

FEYGEL'SON, M.A., starshiy nauchnyy sotrudnik

Something new in the very old. Izobr.i rats. no.7: 16-19 Jl '60. (MIRA 13:8)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut zerna i produktov yego pererabotki.
(Grain handling machinery--Technological innovations)
(Cereal products)

Feygelson, S.

FEIGELSON, S.

Obledenenie samoletov i bor'ba s nim. (Grazhdanskaia aviastsiia, 1940, no.1, p.8-10, illus.)
Title tr.: Icing of aircraft and the fight against it.

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955.

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FEYGEL'SON, S. I., Engr. Cand. Tech. Sci.

Dissertation: "Protection of Airplanes Against Icing." Moscow Order of Lenin Aviation Inst imeni Sergo Ordzhonikidze, 9 Jun 47.

SO: Vechernyaya Moskva, Jun, 1947 (Project #17836)

FEYGEL'SON, T.S.

Simple method for establiching the independence of statistios. Vest. LGU 19 no.13:157-158 '64 (MIRA 17:8)

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000412930002-0"

VISTELIUS, A.B.; FEYGEL'SON, T.S.

Stratification theory. Dokl. AN SSSR 164 no.1:158-160 S '65.
(MIRA 18:9)

1. Gruppa matematicheskoy geologii Leningradskogo otdeleniya Matematicheskogo instituta im. V.A. Steklova AN SSSR. Submitted March 13, 1965.

FEYGEL'SON, Yakov L'vovich; PORTER, Mikhail Semenovich; ZAYTSEV, Viktor Ivanovich; VERZHBINSKAYA, I.I., inzh., red.; GVIRTS, V.L., tekhn. red.

[Making sectional hard-alloy dies] Opyt izgotovleniia sostavnykh tverdosplavnykh shtampov. Leningrad, 1961. 20 p. (Leningradskii Dom nauchno-tekhnicheskoi propagandy. Obmen peredovym opytom. Seriia: Mekhanicheskaia obrabotka metallov, no.2) (MIRA 14:7)
(Dies (Metalworking))

PETROVA, L.V.; FEYGEL'SON, Ye.M.

Role of radiation in the buildup of clouds. Izv. AN SSSR Ser. geofiz. no.8:1247-1252 Ag '64 (MIRA 17:8)

1. Institut fiziki atmosfery AN SSSR.

FEYGEL'SON, Ye.M.

Spectral reflection of radiation by clouds. Trudy GGO no.166: 128-143 '64. (MIRA 17:11)

FEYGEL'SON, Ye. M. CAND PHYSICOMATH SCI.

Dissertation: "Distribution of Temperature of the Earth's Atmosphere by altitude during Radiant and Vertical Turbulent Heat Exchange."

18 May 49
Geophysic Inst. Acad Sci USSR.

SO Vecheryaya Moskva
Sum 71

FEYGEL'SON, Ye. M.

PA 164T40

USSR/Geophysics - Lapse Rate Jul/Aug 50
Turbulence

"Vertical Distribution of Temperature of the Earth's Atmosphere in the Presence of Radiation and Vertical Turbulent Heat Exchange," Ye. M. Feygel'son, Geophys Inst, Acad Sci USSR

"Iz Ak Nauk SSSR, Ser Geograf i Geofiz" Vol XIV, No 4, pp 359-382

Solves approximately equations of radiation heat exchange, considering turbulent heat conductivity. Establishes that equations which take diffuse nature of radiation into account yield considerably

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USSR/Geophysics - Lapse Rate (Contd) Jul/Aug 50

higher temperatures at all levels than the solution of the Schwartzschild equation. Evaluates optical thickness of the atmosphere from adsorption spectrum of water vapor and radiation energy. Calculates temperature distribution and flow of radiation energy with height. Gives formula relating effective radiation with temperature and humidity at the earth's surface. Submitted 22 Nov 49 by Acad L. S. Leybenzon.

164T40

[illegible] to evaluate theoretically the [illegible] energy in the atmosphere [illegible] changes in the distribution of [illegible]

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000412930002-0"

ABSTRACT: Experimental data on the passage function of water vapor and carbon dioxide in a wave length from 5-17 μ are processed by the method proposed by E. S. Kuznetsov (1). Results are used for the construction of a coarse model of the absorption spectrum, adapted to problems of the radiation theory. V. G. Kastrov (8) considered the absorption coefficient within the interval of 8-13 μ as a sum of the coefficient of continuous absorption, obtained by Adel and of the coefficient of total absorption in the lines, calculated according to the experimental data of Veber and Rendall. Results are shown in table 5. The model constructed is of course very coarse, especially because of an insufficiency of experimental data. At the same time it gives on the whole a correct idea about the order

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Absorption Properties of Water Vapor and Carbon Dioxide in the Atmosphere

of values of the absorption coefficients, and about the place of each of them in the spectrum and makes it possible to separate with a certain degree of accuracy the intense R, responsible for the radial heat exchange. With the help of that model of the spectrum it is possible to make the following step in the sense of the taking into account the absoprtion selectivity by water vapor and pass from the spectrum with two absorption coefficients (large and medium) to a spectrum with three coefficients: Large, medium and small. Included are 11 tables and five figures.

ASSOCIATION: Geophysical Institute, Academy of Sciences, U.S.S.R.

SUBMITTED: March 20, 1954

AVAILABLE: BMI SL

June 7, 1955
NF/GW:dc
Dc

Card 2/2

FEYGEL'SON, YE. M.

USSR/Geophysics - Heat exchange in the atmosphere

FD-1785

Card 1/1 Pub 45-7/18

Author : Feygel'son, Ye. M.

Title : Taking into account selective absorption in the theory of radiant heat-exchange in the atmosphere

Periodical : Izv. AN SSSR, Ser. geofiz. 3, 249-260, May-Jun 1955

Abstract : The author investigates radiant heat-exchange of long-wavelength radiation in the terrestrial atmosphere under the assumption of the division of the absorption spectrum of water vapor into regions of small, medium and large values of the coefficients. He clarifies separately the role of large coefficients in the upper layers of the atmosphere. He thanks Ye. S. Kuznetsov. Four references: Ye. S. Kuznetsov, "Distribution of the temperature of the atmosphere along the vertical under radiant equilibrium," Trudy Instituta teoretich. geofiziki, 1, 1946; Ye. M. Feygel'son, "Absorptive properties of water vapor and carbon dioxide in the atmosphere," Izv. AN SSSR, Ser. geofiz. No 1, 1955; K. Ya. Kondrat'yev, Perence dlinnovolnovogo izlucheniya v atmosfere (Transfer of long-wave radiation in the atmosphere), GITTL, Moscow-Leningrad, 1950.

Institution: Geophysical Institute, Academy of Sciences USSR

Submitted : March 20, 1954

Feigel'son, E. M.

3

3.10-153 551.521.3:551.593

Feigel'son, E. M. and Pastukhov, V. A. (*Geophys. Inst., Acad. Sci. U.S.S.R.*). Uproshchennyi metod ucheta vytianutykh indikatris v zadachakh atmosfernoi optiki. [A simplified method of calculating the attenuation index in problems of atmospheric optics.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 5:541-548, May 1956. 6 figs., 4 tables, 6 refs., 23 eqs. DLC—A simplified method is presented for solving the problems of the transmission of radiation in a purely diffuse atmosphere with strong attenuation indices of diffusion. *Subject Headings:* 1. Radiation attenuation. 2. Atmospheric optics.—*Authors' abstract.*

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FEYGEL'SON, YE. M.

60-37-3/7

AUTHOR: Feygel'son, Ye. M.

TITLE: The Effect of Clouds on the Thermal Equilibria in the Atmosphere (Vliyaniye oblakov na teplovoy rezhim atmosfery)

PERIODICAL: Trudy Geofizicheskogo instituta Akademii nauk SSSR, 1956, Nr 37(164), pp. 62-88 (USSR)

ABSTRACT: The author examines the transfer of long-wave radiation in an atmosphere containing a homogeneous horizontal layer of clouds of finite thickness and computes the distribution of temperature in such an atmosphere when a state of radiative equilibrium exists outside the cloudy layer. The dispersion and absorption of long-wave radiation in clouds with variants, the characteristics of solar radiation penetration in a cloudy atmosphere, and the selective character of the absorption spectra of vapor outside the clouds are considered. There are 2 tables, 7 figures, and 7 references, all USSR.

AVAILABLE: Library of Congress

Card 1/1

FEYGELSON, E. M., KOGAN, G. Y., MALKEVICH, M. S.

"The Approximate Methods of Evaluating the Scattered Light Intensity in the Earth's Atmosphere. The Results of Calculations for the case of Anisotropic Scattering," paper submitted at International Assoc, of Meteorology Meetings, Toronto, Canada, 3-14 Sep 57

C-3,800,327

Eval. B-3,099,096

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000412930002-0"

FEYGEL'SON, Ye.M.

PHASE I BOOK EXPLOITATION SOV/1685

3(7)

Akademiya nauk SSSR. Komitet po geodezii i geofizike.

Tezisy dokladov na XI General'noy assambleye Mezhdunarodnogo geodezicheskogo i geofizicheskogo soyuza. Mezhdunarodnaya assotsiatsiya meterologii (Abstracts of Reports at the 11th General Assembly of the International Union of Geodesy and Geophysics. The International Association of Meteorology) Moscow, 1957. 38 p. /Parallel texts in Russian and English or French/ 1,500 copies printed. No additional contributors mentioned.

PURPOSE: This booklet is intended for meteorologists.

COVERAGE: These reports cover various subjects in the field of meteorology. Among the specific subdivisions discussed are: the heat balance of the Earth's surface, jet streams, transference of heat radiation, electric coagulation of cloud particles, turbulent diffusion, cloud studies, and others. Abstracts of all the articles are translated into either French or English. There are no references given.

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SOV/1685

Abstracts of Reports (Cont.)

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24(4) PHASE I BOOK EXPLOITATION SOV/2545

Feygel'son Ye. M., M. S. Malkevich, S. Ya. Kogan, T. D. Koronatova, K. S. Glazova, and M. A. Kuznetsova

Raschet yarkosti sveta v atmosfera pri anizotropnom rasseyanii, ch. 1 (Computation of Light Intensity in the Atmosphere in a Case of Anisotropic Scattering, Pt. 1) Moscow, Izd-vo AN SSSR, 1958. 101 p. (Series: Akademiya nauk SSSR. Institut fiziki atmosfery. Trudy, nr 1) Errata slip inserted. 2,000 copies printed.

Ed.: G. V. Rozenberg, Doctor of Physical and Mathematical Sciences; Ed. of Publishing House: V. I. Rydnik.

PURPOSE: This book is intended for physicists and scientists engaged in the study of atmospheric optics.

COVERAGE: This work contains the results of computation on the intensity of light scattered anisotropically in the atmosphere under various physical parameters and functions of scattering. The solution of integro-differential equations of the theory of radiative transfer in an anisotropically scattering medium

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was obtained by the method of successive approximations. The work was carried out by the staff members of the Laboratory of Atmospheric Optics within the Institute of Physics of the Atmosphere, Academy of Sciences, USSR. No personalities are mentioned. There are 23 references: 14 Soviet, 4 English, 4 German, and 1 French.

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Computation (Cont.)

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Computation (Cont.) SOV/2545

AVAILABLE: Library of Congress

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MM/jb
11-2-59

SOV/49 -58-10-7/15

AUTHOR: Feygel'son, Ye. M.

TITLE: On Interpreting Observations of Sky Brightness (Ob interpretatsii nablyudeniy yarkosti neba)

PERIODICAL: Izvestiya Akademii Nauk SSSR, seriya geofizicheskaya, 1958, Nr 10, pp 1222-1233 (USSR)

ABSTRACT: Observations on the brightness of scattered light are used extensively to determine the scattering properties of the atmosphere (Ref.1). The present article tries to explain the following points in interpreting the observational theory: 1) what information on the scattering function can be obtained from brightness measurements based on the theory of single scattering, 2) to what degree multiple scattering can be ignored, 3) how accurate a correction for multiple scattering can be made, using Ye. V. Pyaskovskaya-Fesenkova's method. The propagation of light in the Earth's atmosphere can be described by an equation of the form:

$$\cos\theta \frac{\partial I(\tau;\, r)}{\partial \tau} = \frac{1}{4\pi}\int I(\tau;\, r')\,\gamma\,(\tau; r; r')\, d\omega' - I(\tau;\, r) +$$

$$+ \frac{S}{4}\exp\left[-(\tau^{*} - \tau)\sec\zeta\right]\gamma\,(\tau;\, r_{0}) \qquad (1)$$

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On Interpreting Observations of Sky Brightness

Here τ is the optical thickness of the atmosphere -

$$\tau = \int_0^z \sigma(z)\, dz \qquad (2)$$

where $\sigma(z)$ is the scattering coefficient, $I(t;r)$ is the intensity of radiation at a height z in a direction r (at an angle θ to the vertical and an azimuthal angle ϕ), γ is the relative scattering function and r' is the direction of propagation of scattered light. The scattering function depends on $\cos(r, r') = \cos O\varphi$. The atmospheric boundary conditions are given by Eq.(4), where q is the albedo of the Earth's surface and $F_1(\tau)$, $F_2(\tau)$ are the integral functions of $I(\tau, r)$ shown. Multiple scattering is represented in Eq.(1) by the first term: if this is neglected, Eq.(5) results, which, using the boundary conditions Eq.(4) gives Eq.(6) for a level $\tau = 0$. This can again be re-expressed in the forms Eqs.(7), (8) if $\gamma(t, \varphi)$ does

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not depend on height. As is shown in Ref.2, the scattering function of a real atmosphere changes considerably with height. Hence, the value of γ calculated from Eqs.(7) or (8) is called the relative scattering function averaged over the whole atmosphere. A more realistic average is that defined in Eq.(10); which transforms Eqs.(6) to the form (11), (12). Using the averaged scattering functions Eqs.(9) and (10), some information can be obtained on the change of $\gamma(t, \varphi)$ with height for a given sky brightness at the Earth's surface. The atmosphere is assumed to consist of n layers in each of which γ is constant. Eqs.(9) and (10) are then written in the form Eqs.(13) and (14). If measurements are made of the sky brightness at sufficiently small time intervals for n points (θ_k, ϕ_k) and the resultant values substituted in Eqs.(13) and (14), n equations are obtained to determine the scattering functions for the n layers with $\varphi = \varphi_0$. The system of equations has the form Eq.(17). Localization of the layers requires a knowledge of $\sigma(z)$. The role of multiple scattering is considered in relation to the data given in Ref.3. The results are related to an idealized two-layer model. The calculated brightness is expressed in the form:

$B(\tau; r) = B_I(\tau; r) + B_{II}(\tau; r)$, where B_I is the brightness due to first order scattering and B_{II} due to higher order scatterings. Table 1 gives values for $100B_{II}/B$ when $\tau = 0$, and Fig.1 shows the scattering indices for the two layers. Table 1 shows that the part played by multiple scattering increases with τ^* . The effect of multiple scattering is indicated even better in the case represented by Table 2. This gives the scattering function as defined in Eq.(14) for a two-layered atmosphere (dotted line in Fig.1) together with the relative brightness $\bar{B}(0, r)$. Table 2 does not show the change in $\delta\bar{B}$ due to change in φ or ψ - this is represented in Table 3. This latter table indicates smaller values of δB than Table 2 and shows there is a value of φ_0 for which $\delta B_N(0, \zeta, \psi_0) = 0$. Table 4 gives

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On Interpreting Observations of Sky Brightness

the diminution m multiple scattering with height. The relative brightness $\bar{B}(\tau, r)$ and relative scattering function $\gamma(\varphi)$ are those of the model atmosphere curve 2 in Fig.1. Table 5 gives the change in correction due to multiple scattering more accurately. The method of estimating the effect of multiple scattering worked out by Ye. V. Pyaskovskaya-Fesenkova can be put very simply for $\theta = \zeta$. Writing down Eq.(19) with the notations (20), (21) and (22) it is found that the substitution $B_{II} = a(\tau - \tau^*)$ can be made in Eq.(25) to give Eq.(26) (c.f. Ref.3). Table 6 gives values of B_{II} as a function of ψ and φ for various values of τ^*, ζ and θ. Table 7 is taken from Ref.3 and gives values of the brightness $B(0, \zeta, \psi)$ for the values of Γ given in the first column, corresponding to the lower layer (Γ = 1.3, in the upper layer). Values of $\gamma(\varphi)$ calculated from Eq.(14) and $\gamma(\varphi)$ by Piaskovskaya-Fesenkova's method are also given together with $\bar{\tau}$, which can be considered as the optical thickness corrected for multiple scattering. The following conclusions are drawn: (1) Single scattering formulae can be used for determining the scattering function when $\tau^* \leqslant 0.15$ with an error $\sim$10-15%. (2) Eq.(7) does not

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On Interpreting Observations of Sky Brightness

have a physical interpretation - it cannot be used for defining the scattering function averaged over the whole atmosphere. (3) For $\tau^* \geqslant 0.2$, the brightness curve measured at the Earth's surface differs considerably from the average relative scattering index owing to multiple scattering. In this case, the part played by multiple scattering is considerably larger for directions $\varphi > 90^\circ$ than for $\varphi < 90^\circ$. (4) The effect of multiple scattering diminishes with height. At heights of 7-10 km the single scattering theory can be used for $\tau^* = 0.4$ with greater accuracy than for $\tau^* = 0.2$ in the surface layers. (5) Condition (23) is approximately fulfilled in the angular interval $30^\circ \leqslant \varphi \leqslant 130^\circ$. For

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On Interpreting Observations of Sky Brightness

$\tau^* \leqslant 0.4$ and $\Gamma \leqslant 2.5$, the error in Pyaskovskaya-Fesenkova's method does not exceed 15-20% for $\varphi \leqslant 120^\circ$. There are 7 tables, 1 figure and 4 references; 3 of the references are Soviet and 1 is English.

ASSOCIATION: Akademiya nauk SSSR, institut fiziki atmosfery (Academy of Sciences, USSR, Institute of Atmospheric Physics)

SUBMITTED: October 21, 1957.

Card 7/7

FEIGELSON, Ye. M.

"Radiative Processes in Stratified Clouds."

paper presented at Symposium on Radiation and Atmospheric Ozone, Oxford, UK, 20-26 July 1959

SOV/49-59-6-6/21

AUTHOR: Feygel'son, Ye. M.

TITLE: The Radiation Cooling of Stratus Cloud.

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya geofizicheskaya, 1959, Nr 6, pp 847-857 (USSR)

ABSTRACT: The top layer of the stratus cloud in relation to the atmosphere above is considered. The variations of the temperature in the cloud are obtained from Eq (1) while those above it are obtained from Eq (2), where c_p - specific air temperature at constant pressure, $\rho(z)$ - air density, $T^{(o)}(z,t)$ - cloud temperature, t - time, $\rho_v(z, t)$ - density of cloud water drops, $\rho_w^{(o)}(z, t)$ - density of cloud water vapour (humidity), $\alpha_{v,\lambda}$ - damping coefficient of the wavelength λ in water, $\alpha_{w,\lambda}$ - damping coefficient of water vapour, $\lambda_o = 4\mu$ - lower limit of the range of wavelengths, $\lambda_1 = 40\mu$ -their upper limit, $I_\lambda^{(o)}(z, r, t)$ - intensity of radiation at wavelength λ in the direction r, $d\omega$ - primary angle, $B_\lambda(T)$ - Planck function, L - latent heat

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SOV/49-59-6-6/21

The Radiation Cooling of Stratus Cloud

of condensation. Since the above equations contain the unknown magnitudes $T^{(o)}(z, t)$, $T^{(1)}(z, t)$, $I^{(o)}(z, r, t)$, $I^{(1)}(z, r, t)$, formulae (3) and (4) should be included. The solution of Eqs (1) to (4) is found for the following conditions:

$$T^{(j)}(z, 0), \quad j = 0, 1,$$

$$I^{(o)}(H, r, t) = I^{(1)}(0, r, t),$$

$$I^{(1)}(z, r, t)/z = \infty = 0 \quad \text{at} \quad \theta > \pi/2$$

(H - thickness of cloud, θ - polar angle of direction r). Since the water vapour in the cloud is saturated, the function (5) can be defined, where $\rho_w^{(o)}(z, t)$, $E_o = 6.1_{mb}$ - saturation elasticity of water vapour at 0°C, a = 7.5, b = 237.0°C, R_w = 460 m^2/sec^2 deg - gas constant, t* -

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SOV/49-59-6-6/21

The Radiation Cooling of Stratus Cloud

temperature in degrees C (index 1 = atmosphere, index 0 = cloud). These conditions are applied in Eq (6) for the atmosphere above the cloud. The coefficient of damping for drops of 6.265 μ radius is taken from Ref 4, as illustrated in Fig 1, continuous line (the dotted line - data from Ref 5). This coefficient is calculated from Eq (7) where α_v - mean damping coefficient (Eq 8). The calculation shows that $\alpha_{v,\lambda}$, given in Fig 1, can be substituted by $\alpha_v = 1000 - 1500 \ cm^2/g$. Then the value of A will be obtained with an accuracy of 3%. Thus Eqs (1) and (2) can be adjusted as Eq (9). Also, taking into account the thickness of the cloud, (Eq (10)), and the mass of a vertical column of water vapour in the atmosphere above the cloud, (Eq (11)), the final form of Eqs (1) and (2) can be written as Eqs (13) to (17). Fig 2 gives the values of $\overline{B}_i(T)$ and $\overline{B}(T)$. As an example, the following are given: $T_o = 273^o$, $B_o = 0.146 \ cal/cm^2 min$, $\rho_{w,o} = 4.9 \times 10^{-6} g/cm^3$, $\rho = 1.3 \times 10^{-3} \ g/cm^3$, $c_p = 0.24$ cal/g deg, $t_o = 24$ hours, $\alpha_v = 1100 \ cm^2/g$, $\alpha_w = 1 \ cm^2/g$,

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$\rho_{v,o} = 0.5 \times 10^{-6}$ g/cm^3, then the values $a^{(o)} = 0.117$, $a^{(1)} = 13.1$, $b = 0.398 \times 10^{-2}$ are calculated from Eq (17) for $L = 590$ cal/g. The formulae (13) and (14) can be obtained as the dimensionless equations (18) to (24), where $R(\tau, t)$ is the function of temperature (Fig 3). Table 1 illustrates the values of

$$T^{(o)}(\tau, t_1), \quad \rho_w^{(o)}(\tau, t_1) \quad \text{and} \quad \rho_v(\tau, t_1)$$

at different points of the cloud. Table 2 gives the above values for the top boundary of the cloud for $\Delta t = 0.5$ h. Table 3 gives the density of the drops (second column) and its upward rate of fluctuation (third column) for three types of cloud (first column): rain-cloud, cumulus-stratus, The Radiation Cooling of Stratus Cloud

and stratus (Ref 9). Fig 4 illustrates the increase of temperature due to the latent heat of condensation at four consecutive moments ($\Delta t = 0.5$ h). There are 3 figures, 4 tables and 9 references, of which 8 are Soviet and 1 is English.

ASSOCIATION: Akademiya nauk SSSR, Institut fiziki atmosfery (Academy of Sciences of the USSR, Institute of Physics of the Atmosphere)

SUBMITTED: September 10, 1958.

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000412930002-0"

FEYGEL'SON, Ye.M.; MALKEVICH, M.S.

Calculation of light intensity and haziness coefficients in anisotropic scattering. Trudy Lab.aeromet. 7:37-44 '59.
(MIRA 13:1)

1. Institut fiziki atmosfery AN SSSR.
(Photography, Aerial) (Atmospheric transparency)

SOV/49-59-9-23/25

AUTHOR: Kastrov, V. G. and Feygel'son, Ye. M.

TITLE: Conference on the Actinometry and Atmospheric Optics

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya geofizicheskaya 1959, Nr 9, pp 1435-1436 (USSR)

ABSTRACT: The Conference was convened in Leningrad on January 28 to February 4, 1959, by the Commission of Physics of the Atmosphere, Academy of Sciences,USSR,the Leningrad State University and Central Geophysical Observatory. Altogether 102 papers were presented. The separate sessions were devoted to: radiation, sky luminosity and polarisation, reflective properties of the foundations surfaces, transition of atmospheric radiation, methods of actionometric measurements and radiation in industry. L. G. Makhotkin spoke on new characteristics of the atmospheric turbulence; T. G. Berlyand described the distribution of solar radiation on the Earth; N. T. Chernigovskiy, N. T. Rusin, T. V. Kirillova, M. S. Marshunova, B. M. Gal'perin and M. K. Gavrilova dealt with investigations of radiation in the Arctic and Antartic; G. N. Faraponova, Yu. I. Rabinovich, V. I. Myukhyur and G. P. Gushchin discussed the decreasing of sunlight at 6 to 7 km high;

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Conference on the Actinometry and Atmospheric Optics

O. D. Barten'yeva spoke on the determination of the indicatrix of light diffusion in ground surface layer of the atmosphere (apart maximum at 0 and 180° an additional maximum 130 to 145°, corresponding to the rainbow, was defined); B. A. Chayanov described an automatic photometer with a range of 25 km; G. V. Rozenberg dealt with investigations of the angular diffusion of polarised light in the ground surface atmosphere; Ye. M. Feygel'son considered the cooling of cloud tops and its effect on precipitations. The other papers and their authors were as follows: K. Ya. Kondrat'yev - Carbon oxide in the atmosphere; I. N. Minin - Transfer of radiation affected by refraction; Yu. D. Yanishevskiy - Pyrheliometer as a radiation counter; V. S. Atroshenko and O. A. Avaste - On the Sobolev transfer equation in optics; K. S. Lyalikov, L. B. Krasil'shchikov, N. Ye. Ter-Markaryants, N. I. Goys, K. Ya. Kondrat'yev, Z. F. Mironova and L. P. Dayeva - Determination of Albedo and spectral luminosity; M. S. Malkevich - Reflecting

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SOV/49-59-9-23/25

Conference on the Actinometry and Atmospheric Optics

properties of the ground surface in relation to light diffusion in the atmosphere; V. G. Kastrov - Errors in determining the absorption of solar radiation in the atmosphere. The Conference approved the formation of a special commission for the revision of therminology. The addresses of two members of the commission are given.

Card 3/3

FEYGELSON, YE.M.

Report submitted for the IUGG 12th General Assembly, Intl. Assn. of Meteorology and Atmospheric Physics, Helsinki, 26 July - 6 August 1960.

PAPERS ON THE STRUCTURE OF THE ATMOSPHERE

THE STRUCTURE OF CONVECTION CURRENTS IN Cu AND CuCg CLOUDS

by

K. Sh. Bibilashvili
U.S.S.R.

1. The method is described for determining air stream velocities in Cu and CuCg clouds by measuring the displacement of balanced balloons with a passive target the position of which is located by a radar.

2. Errors in determining air stream velocities, occurring due to hydrogen diffusion, the heating of the cover, the deposition of cloud droplets on the balloons cover and the instrument precision, are estimated.

3. Data on the distribution of vertical velocities in Cu and CuCg obtained by the described method in the North Caucasus and the Transcaucasus during 1956-1959 are given. Vertical velocity profiles of air streams obtained by using averaged data in case of Cu and CuCg clouds are given as well as separate more frequently encountered velocity distributions.

4. A comparison is drawn between the velocities of upward streams as calculated according to the atmosphere stratification data obtained by radar soundings of the atmosphere, on the one hand, and results of direct velocity observations, on the other.

5. Vertical stream velocity profiles in CuCg clouds are compared with radar echo data from a large drop region, fixed on photopictures of the cloud vertical profile.

6. A conclusion is made to the effect that there is a relation between the vertical velocity distribution in CuCg clouds and the occurrence of large drop regions.

THE DEVELOPMENT OF THE TEMPERATURE INVERSION IN STRATIFORM CLOUDS

by

Ye.M. Feygelson
U.S.S.R.

1. A layer of temperature inversion bounding as a rule stratiform clouds is considered usually as the cause of the cloud formation. In fact, the cloud itself can generate such inversion due to the process of radiative cooling of the cloud top.

2. The theory of radiative cooling of the cloud makes it possible to determine the power and the thickness of the inversion layer. The results of the calculation are in a satisfactory agreement with the observation.

PHASE I BOOK EXPLOITATION SOV/5019

Georgiyevskiy, Yu. S., A. Ya. Driving, N. V. Zolotavina, G. V. Rozenberg, Ye. M. Feygel'son and V. S. Khazanov

Prozhektornyy luch v atmosfere; issledovaniya po atmosfernoy optike (Searchlight Ray in the Atmosphere; Investigations in Atmospheric Optics) Moscow, Izd-vo AN SSSR, 1960. 243 p. Errata slip inserted. 1,600 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut fiziki atmosfery.

Ed. (Title page): G. V. Rozenberg, Professor; Ed. of Publishing House: N. L. Telesnin; Tech. Ed.: I. F. Koval'skaya.

PURPOSE: This book is intended for geophysicists concerned with searchlight sounding of the atmosphere and questions in atmospheric optics.

COVERAGE: The book reports on recent investigations of the effect of atmospheric conditions on the visibility of distant objects illuminated by a searchlight, and the utilization of a searchlight beam for investigations in atmospheric optics. The authors limit themselves to that side of the problem directly

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connected with atmospheric conditions, but give a sufficiently detailed review of present-day data on the optical properties of the atmosphere. Attention is concentrated on studies made by the authors and their colleagues at the Laboratoriya atmosfernoy optiki Instituta fiziki atmosfery Akademii nauk SSSR (Laboratory of Atmospheric Optics of the Institute of Physics of the Atmosphere AS USSR). No personalities are mentioned. There are 173 references: 100 Soviet, 38 English, 25 German, and 10 French.

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Searchlight Ray in the Atmosphere (Cont.) SOV/5019

AVAILABLE: Library of Congress

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JA/dvm/fal
5-2-61

S/049/60/000/02/013/022
E032/E414

AUTHOR: Feygel'son, Ye.M.

TITLE: The Effect of Turbulence on the Radiation Cooling of Clouds

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya geofizicheskaya, 1960, Nr 2, pp 299-308 (USSR)

ABSTRACT: It is to be expected that weak turbulent mixing, which was neglected in the previous paper by the present author (Ref 1), would tend to reduce radiation cooling since the latter takes place in a very thin layer (Ref 1). The present paper is therefore concerned with the extension of the model discussed in Ref 1 to the case which includes turbulent heat transfer. The latter effect is estimated approximately. It is found that the turbulent mixing coefficient D (cm^2/sec), which characterizes the turbulent heat transfer, lies between 2×10^4 and 50×10^4 cm^2/sec. For such values of D, the radiation cooling near the cloud boundary is shown to be of the order of 0.1 to 1.7° per half-hour. Pure radiation cooling under these conditions is 6°/half-hour. Simple calculations show that turbulent mixing

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E032/E414

The Effect of Turbulence on the Radiation Cooling of Clouds

considerably weakens the radiation cooling process for the upper parts of the cloud and leads to an increase in the thickness of the cooling layer. The numerical calculations are summarized in Tables 1 to 3, in which the symbols are said to be defined in the previous paper (Ref 1). There are 1 figure, 4 tables and 6 references, 5 of which are Soviet and 1 English.

ASSOCIATION: Akademiya nauk SSSR Institut fiziki atmosfery (Academy of Sciences USSR, Institute of Physics of the Atmosphere)

SUBMITTED: February 24, 1959

Card 2/2

FEYGEL'SON, Ye.M.

Some problems of radiative heat exchange in stratus clouds. Izv. AN SSSR. Ser. geofiz. no.8:1238-1245 Ag '60. (MIRA 13:8)

1. Akademiya nauk SSSR, Institut fiziki atomsfery.
(Cloud physics)

2

MALNEVICH, M.S.

ATROSHENKO, V.S., ~~MALNEVITCH, M.S.~~, FEYGELSON, E.M.

"Calculation of the brightness of the scattering light in the atmosphere in the case of anisotropic scattering."

Report submitted in connection with the Symposium on Radiation. Vienna, Austria 14-19 Aug 1961.

ATROSHENKO, V.S.; GLAZOVA, K.S.; MALKEVICH, M.S.; FEYGEL'SON, Ye.M.;
Prinimali uchastiye: KIM, E., studentka; TOMASHOVA, L., studentka;
ROZENBERG, G.G., prof., doktor fiz.-matem.nauk, otv.red.;
PENKINA, N.V., red.izd-va; SUSHKOVA, L.A., tekhn.red.

[Calculation of light intensity in the atmosphere during anisotropic scattering. Part 2] Raschet iarkosti sveta v atmosfere pri anizotropnom rasseianii. Chast' 2. Moskva, Izd-vo Akad.nauk SSSR, 1962. 222 p. (Akademiia nauk SSSR. Institut fiziki atmosfery. Trudy, no.3). [MICROFILM] (MIRA 15:8)

1. Moskovskiy gosudarstvennyy universitet (for Kim, Tomashova).
(Light--Scattering) (Atmosphere)

FEYGEL'SON, YE, M.

Dissertation defended for the degree of Doctor of Physicomathematical Sciences at the Joint Scientific Council of the Geophysical Institute of the Academy of Sciences USSR--Earth Physics, Atmospheric Physics, and Applied Geophysics in 1962:

"Radiation Processes in Stratified Clouds."

Vest. Akad. Nauk SSSR. No. 4, Moscow, 1963, pages 119-145

S/913/62/003/000/012/033
D405/D301

AUTHOR: Feygel'son, Ye. M.

TITLE: Interaction between scattered- and reflected light of diurnal sky

SOURCE: Akademiya nauk Kazkahskoy SSR. Astrofizicheskiy institut. Trudy. v. 3. 1962. Rasseyaniye i polyarizatsiya sveta v zemnoy atmosfere; materialy Soveshchaniya po rasseyaniyu i polarizatsii sveta v atmosfere. 74 - 82

TEXT: The intensity of the scattered light in a plane-parallel atmosphere can be regarded as a function of three independent variables and of four parameters; the independent variables are the optical thickness of the atmosphere and the polar and azimuth angles of the direction of light propagation. The main factors which affect the intensity are: 1) the relation between the fluxes of direct solar and descending scattered radiation at the Earth's surface; 2) the relation between the reflecting properties of the

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Earth's surface and the scattering properties of the atmosphere; 3) the interaction between weakening- and strengthening of radiation in the atmosphere due to scattering processes. The extensive and sufficiently-accurate calculations of the intensity of scattered light, carried out at the Institute of Atmospheric Physics, enable to ascertain its structure, its dependence on the different variables, and the contribution of the processes of reflection and scattering in brightness formation. The author discusses the intensity of the ascending and descending radiation separately. It was found that the brightness at high altitudes depends to a large extent on the reflecting properties of the Earth's surface. In various problems of atmospheric optics which are of practical importance, such as the study of ascending radiation and of sky brightness at high altitudes, the optical properties of the lower atmosphere are of secondary importance as compared to the reflection from the Earth's surface. The turbidity of the lower atmosphere affects in all likelihood only the sky brightness at low altitudes. Not alone does the reflected radiation substantially increase the brightness of the reflected light and change the

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regular behavior of the latter, but it also alters the ratio between simple- and multiple scattering. There are 3 figures and 4 tables.

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FEYGEL'SON, Ye.M.

Origin and development of stratiform clouds. Izv. AN SSSR. Ser. geofiz. no.3:408-417 Mr '62. (MIRA 15:2)

1. AN SSSR, Institut fiziki atmosfery.
(Cloud physics)

FEYGEL'SON, Ye.M.

Effect of scattering on the attenuation of a projector beam. Izv. AN SSSR. Ser. geofiz. no.6:833-839 Je '62. (MIRA 15:6)

1. Akademiya nauk SSSR. Institut fiziki atmosfery.
(Projectors) (Light—Scattering)

FEYGEL'SON, Ye.M.; DOBROVA, O.N.

Light scattering in flaky figurative cumulus. Izv. AN SSSR. Ser. geofiz. no.9:1268-1277 S '62. (MIRA 15:8)

1. Institut fiziki atmosfery AN SSSR.
(Clouds) (Solar radiation)

FEYGEL'SON, YE.M.

"Report on the present state of research on the optical and radiational properties of clouds."

Report presented at the 5th Conference on Atmospheric Optics and Actionometry, Moscow, 24-29 June 1963

FEYGEL'SON, Ye.M., kand. fiz.-matem. nauk

Conference on Actionometry and Atmospheric Optics, held in Moscow. Vest. AN SSSR 33 no.10:102-103 O '63. (MIRA 16:11)

FEYGEL'SON, Yeva Mikhaylovna; ROZENBERG, G.V., otv.red.

[Radiation process in stratified clouds] Radiatsionnye protsessy v sloistoobraznykh oblakakh. Moskva, Izd-vo "Nauka," 1964. 230 p. (MIRA 17:4)

ROZENBERG, G. V.; ROMANOVA, L. M.; FEYGELSON, Ye. M.; SHIFRIN, K. S.

"Optical and radiative cloud properties."

paper presented at the Atmospheric Radiation Symp, Leningrad, 5-12 Aug 64.

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AUTHOR: Feygel'son, Ye. M.

TITLE: Radiation and optical properties of clouds

SOURCE: Mezhvedomstvennoye soveshchaniye po aktinometrii i optike atmosfery. 5th, Moscow, 1963. Aktinometriya i optika atmosfery (Actinometry and atmospheric optics); trudy soveshchaniya. Moscow, Izd-vo Nauka, 1964, 9-10

TOPIC TAGS: cloud development, atmospheric optics, radiation absorption, atmospheric scattering, heat exchange, temperature inversion

ABSTRACT: This is a summary of a report to be published in Kosmicheskiye issledovaniya, Vol. 2, No. 3, 1964. The Institut fiziki atmosfery (Institute of Atmospheric Physics) has done considerable work on investigating the propagation of radiant energy in strongly scattering and absorbing media. In particular, these investigations have been directed at the study of the optical and radiation properties of clouds. The work has been pursued in four directions by three specialists: L. M. Romanova has developed numerical methods for solution of the precise transfer equations, adapted for high-speed computers, and ensuring high accuracy; Ye. M. Feygel'son, using Romanova's data for control and certain precise solutions, has obtained analytical expressions for the approximate solu-

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solution of the precise transfer equations. The comparative simplicity of the formulas has made it possible to give the work a geophysical direction and to consider real cloud types. In addition to radiation transfer, Ye. M. Feygel'son has considered heat and moisture exchange in the atmosphere, investigating the radiation regime of clouds, the thermal effect of clouds on the atmosphere and the process of development of the cloud cover. G. V. Rozenberg has obtained an approximate solution of the transfer equation for an arbitrary form of the indicatrix, taking into account polarization effects in analytical form for cases when absorption is large or small in comparison with scattering. The derived formulas make it possible to judge the absorption properties of matter from measurements of the brightness of radiation reflected from a layer of matter. Basic information has been obtained on the reflection and transmission of solar radiation horizontally by homogeneous cloud layers as a function of position of the sun, optical thickness of clouds and mean drop size. Mean albedo of clouds has been determined and the angular distribution of reflected and transmitted radiation evaluated. Absorption has been found to be of decisive influence on the character of light reflection from clouds, especially in the region of weak absorption. At present, basic problems in the field of radiation transfer in clouds are taking into account the irregular form of the cloud surface and determination of the optical regime created by limited clouds distributed statistically in space. The investigation of the radiation regime has revealed the great influence of

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clouds resulting from their special radiation properties on heat exchange in the atmosphere and the influence of radiation on cloud development. It has been concluded that: a) Clouds intensify (by a factor of approximately 1.5 and vertically redistribute absorption of solar radiation by the atmosphere; b) on the average, the radiation from cloud boundaries can be equated to the radiation of a black body with an error of 7-12%, depending on the temperature and liquid-water content of the cloud; c) Clouds do not transmit the long-wave radiation of the earth's surface in the layer beneath the clouds and solar infrared radiation above the clouds; d) Radiant heat exchange exerts an appreciable influence on the development of a cloud in its upper part: it facilitates the accumulation of liquid-water content and the formation of an unstable cold layer with a superadiabatic temperature gradient; e) Radiation cooling of the upper part of a cloud leads to the development of a temperature inversion above the cloud.

ASSOCIATION: Institut fiziki atmosfery AN SSSR, Moscow (Institute of Atmospheric Physics, AN SSSR)

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ACCESSION NR: AP4043909 S/0049/64/000/008/1247/1252

AUTHOR: Petrova, L. V.; Feygel'son, Ye. M.

TITLE: Role of radiation in cloud development

SOURCE: AN SSSR. Izvestiya. Seriya geofizicheskaya, no. 8, 1964, 1247-1252

TOPIC TAGS: cloud physics, atmospheric physics, atmospheric radiation, atmospheric longwave radiation, cloud formation, temperature inversion

ABSTRACT: In investigations of the origin and development of nonconvective clouds, it is customary to consider heat exchange and moisture exchange in the atmosphere brought about by vertical movements, turbulent mixing, and phase transformations of water. This paper differs in that, in addition to these factors, the authors also take into account the heat flux associated with the transfer of longwave radiation and the role of the latter in cloud formation. The method used in solving this problem was proposed by L. T. Matveyev and was described in an earlier paper by Ye.M. Feygel'son (Izv. AN SSSR, Ser. geofiz., no. 3, 1962). This article gives some numerical results showing the influence of a radiation heat flux on the variation in the liquid water content of a cloud. Computations, made with

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a "Ural-1" electronic computer, revealed that a cloud develops upward under the influence of radiation cooling. It was also found that the contribution to water content from radiation decreases with an increase in the velocity of ascending movement. In this case the role of vertical movements as the principal factor in cloud formation is manifested. With an intensification of vertical movements the relative importance of the other factors is lessened. In the center of a cloud the effect of radiation is less than that of turbulence, but it is not negligible in comparison with the latter. In the upper part of a cloud, the role of radiation transfer is the dominant one. The generally-accepted mechanism of formation of stratus clouds, taking into account vertical movements and turbulent transport of heat and moisture, is thus shown to be incomplete. This result confirms the conclusion previously drawn by Feygel'son (Izv. AN SSSR, Ser. geofiz., no. 6, 1959 and no. 7, 1960) that radiation has a decisive effect on the formation of the upper layers of a cloud. The conditions imposed in these earlier studies (liquid water content does not decrease in the direction of the upper boundary) made it possible to investigate directly the thermal effect of radiation, i.e., the development of a temperature inversion. In this new study the formulation of the problem is such that the liquid water content of a developing

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cloud decreases rapidly in the direction of the upper boundary. Under this condition no inversion of radiation origin will occur. Orig. art. has: 27 formulas and 5 tables.

ASSOCIATION: Institut fiziki atmosfery*, Akademiya nauk SSSR (Institute of Atmospheric Physics, Academy of Sciences, SSSR)

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ACCESSION NR: AP4041568 S/0293/64/002/003/0455/0461

AUTHOR: Feygel'son, Ye. M.

TITLE: Optical properties of clouds

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 3, 1964, 455-461

TOPIC TAGS: cloud, atmospheric optics, meteorology, meteorological satellite, cloud optics, cloud albedo

ABSTRACT: This article is a brief review of studies of cloud optics made at the Institute of Atmospheric Physics by Ye. M. Feygel'son, L.M. Romanova and G. V. Rozenburg; original sources are cited in the bibliography. Principal attention in the review is given to theoretical work on the transport of radiation in clouds, determining the laws of reflection and transmission of radiation by clouds, without taking into account the influence of the atmosphere outside clouds. In these studies the following conclusions were drawn. 1. In the visible part of the spectrum the scattered light of haze considerably distorts the light passing from the cloud to the upper boundary of the atmosphere. 2. The light of haze over clouds is not dependent on wavelength; this is true of cloud albedo as well. It therefore is impossible to

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count on distinguishing clouds situated at identical levels on the basis of a change of the spectral dependence of their brightness. 3. Low-lying clouds can be brighter than high-lying clouds due to the greater thickness and scattering capacity of the first. Therefore it also is doubtful if cloud levels can be distinguished on the basis of differences in their brightness. 4. The angular distribution of the light reflected from a cloud is relatively uniform except in the region of azimuthal angles $135^0 \leq \psi \leq 180^0$. In the latter case, in the event of low solar altitudes there is a rapid increase of brightness in the direction of the horizon. It scarcely will be possible to make use of this peculiarity, since it also is characteristic of snow and atmospheric haze. 5. A difference of albedo at the center ($\lambda = 0.76\mu$) and on the wing of the oxygen absorption band can introduce an error of the order of 10-20% into determination of the optical thickness of the atmosphere over the cloud. 6. An opaque cloud can be considered a black body with an error of 5-10% in the spectral range ($4 \leq \lambda \leq 7\mu$) and (12 40). In the atmospheric window of transparency ($8\mu \leq \lambda \leq 12\mu$) this error is 15-25%. These conclusions, important in the field of satellite meteorology, are followed by a listing of what the author feels are highly important unsolved problems in atmospheric optics. Orig. art. has: 3 formulas, 9 figures and 1 table.

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ASSOCIATION: Institut fiziki atmosfery AN SSSR (Institute of Atmospheric Physics)

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