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experimental investigations given. Individual articles analyze the temperature regime of the active surface of soil and the factors determining the thermal conditions of the boundary layer. Results of fog investigation are presented in two articles. In addition, some problems of methods in the experimental investigation of the near-surface layer are elucidated. No personalities are mentioned. References follow each article.

TABLE OF CONTENTS:

~~Laykhtman, D.L.~~ Formulation of the Problem of the Stationary Structure of the Boundary Layer 3

Tseytin, G.Kh., and L.R. Orlenko. Stationary Distribution of Wind, Temperature, and Turbulent Exchange in the Boundary Layer Under Different States of Stability 8

Ariyel', N.Z., and L.A. Klyuchnikova. Wind Under City Conditions 29

Klyuchnikova, L.A., and F.N. Shekhter. The Role of Radiant and Turbulent Heat Exchange in the Formation of the Temperature Stratification in the Boundary Layer 33

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86644

S/050/60/000/012/002/005
B012/B054

3,5000

AUTHORS: Laykhtman, D. L., Shnaydman, V. A.

TITLE: Criteria for a Steady Turbulence in Jet Currents

PERIODICAL: Meteorologiya i gidrologiya, 1960, No. 12, pp. 11 - 13

TEXT: The authors describe the relationship between the parameters of turbulence and the meteorological elements measured in the aerological network. They give a formula for the gradient wind in the region of jet currents; to calculate the turbulence coefficient k, the wind turbulence c'^2, and the thickness 2H of the turbulence layer, they use the equations of motion, as well as the equation for the equilibrium of turbulence energy given in Ref.2 (taking account of the dissipation of turbulence energy in heat). Fig.1 shows a diagram for the dimensionless quantities k_*, H_*, and x. x is a parameter which can be determined from a transcendental equation given here. $k_* = \frac{k_\alpha^2}{2\omega_z} = n$ and $H_* = \alpha H = x\sqrt{2n}$.

Card 1/2

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Criteria for a Steady Turbulence in Jet Currents

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All calculations can be made with the aid of this diagram. The authors used the data of Ref.1, and calculated the characteristics of turbulence for the jet current in the area of Leningrad. The results agree with the experimental data. n and x are functions of a certain parameter M which, in its physical meaning, approximately corresponds to Richardson's number. n can also be determined from a transcendental equation given here. There are 1 figure, 1 table, and 2 Soviet references.

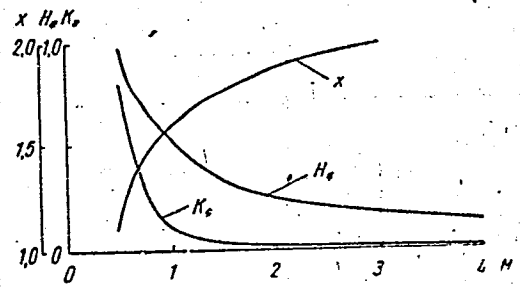

Рис. 1.

Fig.1

Card 2/2

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

LAYKHTMAN, D.L.; KAGAN, R.L.

Some problems associated with improved organization of snow surveys. Trudy GGO no.108:3-18 '60. (MIRA 13:11)
(Snow surveys)

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

LAYKHTMAN, David L'vovich; VLASOVA, Yu.V., red.; SOLOVEYCHIK, A.A., tekhn. red.

[Physics of the atmospheric boundary layer] Fizika pogranichnogo sloia atmosfery. Leningrad, Gidrometeor.izd-vo, 1961. 252 p. (MIRA 15:1)

(Meteorology)

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

S/169/61/000/012/064/089
D228/D305

AUTHORS: Laykhtman, D. L., and Utina, Z. M.

TITLE: Influence of macrometeorologic conditions on the structure of the boundary layer in the atmosphere

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 12, 1961, 46, abstract 12B282 (Tr. Gl. geofiz. observ., 1961, no. 107, 14-20)

TEXT: The distribution of the main meteorologic elements and turbulence characteristics in the boundary layer was obtained by means of solving the joint system of the equations of movement, heat inflow, water-vapor diffusion, and ground thermoconductivity. To close the system, the equation of the turbulence energy balance was used in an integral form for the whole boundary layer. The coefficient of turbulence is assign

Card 1/2

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Influence of macrometeorologic... S/169/61/000/012/064/089
D228/D305

to the"model with a fracture." On the basis of the derived formulas, appraisals are given for the changes in the profiles of meteorologic elements in the boundary layer and in the components of the heat balance during the variation of the radiation balance, and also for the degree of humidification of an active surface and its roughness. [Abstracter's note: Complete translation.]

Card 2/2

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

KLYUCHNIKOVA, L.A.; LAYKHTMAN, D.L.

Some characteristics of diurnal wind velocity variations according to the data of the Makhtaly Expedition. Trudy GGO no.107:52-54 '61. (MIRA 14:10)

(Winds)

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

LAYKHTMAN, D.L.; KAZHDAN, R.M.; UTINA, Z.M.

Experimental determination of radiant flow of heat into the lower atmospheric layer. Trudy GGO no.107:112-115 '61. (MIRA 14:10)

(Atmospheric temperature)

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S/531/62/00[illegible]27/006/007
I053/I253

3.5/40

AUTHORS: Laykhtman, D.L., Byutner, E.K.

TITLE: The problem of turbulence in the free atmosphere

SOURCE: Leningrad. Glavnaya geofizicheskaya observatoriya. Trudy. no. 127. 1962. Fizika prizemnogo sloya vozdukha, 122-126

TEXT: A total expression is obtained for the wind speed in a jet stream in terms of an arbitrary law concerning the change of the horizontal pressure gradient with altitude - z. The vertical profiles of the wind and its degree of gustiness when $f(z) = b(z)$ and the special case of the presence of a strong leap in horizontal gradient of pressure over a narrow interval of altitudes when $u_g(z) = b(z)$, are calculated. According to the formulae obtained, the values of the coefficient of turbulence k and of wind gustiness c^1, typical of the jet stream, were found to be $k = 500 \approx m^2/sec$ and $c_{max} \approx 1m/sec$.

Card 1/3

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

S/169/63/000/003/003/042
D263/D307

AUTHORS: Dolgin, I.M., Laykhtman, D.L., Rusin, N.P. and Treshnikov, A.F.

TITLE: Results of meteorological observations in the Arctic and in Antarctica

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 3, 1963, 5, abstract 3A10 (Tr. Vses. nauchn. meteorol. soveshchaniya. T.1. L., Gidrometeoizdat, 1962, 58-71)

TEXT: Apart from a short history of the development of meteorological observations in the Arctic and later in the Antarctic, the author compares regularities in meteorological phenomena in the 2 polar regions. In the coldest parts of the Arctic and the Antarctic the mean annual temperatures are respectively -20 and -55°C, and the absolute minimum temperatures are -50 and -90°C. Temperature of the coastal areas of Antarctica are close to the temperatures of the central Arctic. In central Antarctica the air temperature is 30-40°C lower than in the Arctic, both in the summer and in winter. The mean annual temperature of the free atmosphere up to 16 km is

Card 1/4

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Results of meteorological ...

however only ~ 5-10°C lower over the Antarctic. Stratospheric temperature of both regions compared is almost the same in the summer, and in winter the Arctic stratosphere is 5-15°C warmer. To characterize the effects of advection it is necessary to note that the annual variation of the troposphere over the Arctic is considerably greater than over the Antarctic. The reverse is true of the stratosphere. Wind directions in both regions are illustrated by mean annual graphs of wind directions. In the Antarctic, owing to the peculiarities of the relief of the continent, wind direction is highly constant. Western directions predominate in the Arctic, and eastern in the Antarctic. Mean annual wind velocities are 10-20 m/sec in the Antarctic, and 3-5 m/sec in the Arctic. Maximum wind velocities reach 90 in the Antarctic and 40 m/sec in the Arctic, and near the tropopause in both polar regions the velocity maximum is clearly expressed as 15-20 m/sec. The Arctic may be schematically considered as an ocean surrounded by land, and the Antarctic as a continent by an ocean. According to considerations adduced in the paper, this may explain the peculiarities of the meteorological conditions in the two regions, both in summer and in the winter.

Card 2/4

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On the basis of considerations of the radiation regimes, turbulent thermal currents, heat losses due to evaporation, and heat exchange of the active surface with lower layers, the authors show that, in contrast to atmospheres over middle and southern latitudes, polar atmospheres lose heat to the rest of the globe. Polar atmosphere is therefore a cold reservoir for the overall atmosphere. A sufficiently large amount of experimental data has already been collected regarding the problem of the 'iciness of the Arctic basin'; these data are of particular interest for the USSR. The following may specially be mentioned: (1) About 90% of the area of the Arctic basin is covered by ice, and in the summer ice covers 18-36% of the surface of the seas surrounding the Arctic. (2) It may be proposed that there is a certain critical thickness of ice, which decreases from N to S, for which thawing and freezing is balanced over the year. According to arguments put forward by the authors: (1) Results of meteorological observatories in polar regions helped in the solutions of such important national economy problems as ensuring of travel by sea or air, and growth of economical development of the extreme northern territories. (2) Daily variations of meteorological

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D263/D307

Results of meteorological ...

elements are practically nonexistent in polar regions, so that the latter may be regarded as vast natural laboratories for the study of atmospheric processes under most favorable conditions. (3) To solve the current problems of polar meteorology it is necessary to increase the complex of meteorological observations by a considerable amount, increase their true accuracy, and to develop in every way the theoretical foundations of polar studies. Numerical methods of weather forecasting in particular may apparently be used in these regions with greatest success.

[Abstracter's note: Complete translation]

Card 4/4

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

LAYKHTMAN, D.L., doktor fiz.-matem. nauk, red.; MIRONENKO, Z.I., red.; IVKOVA, G.V., tekhn. red.; ARONS, R.A., tekhn.red.

[Transactions of the All-Union Scietific Meteorological Conference] Trudy Vsesoiuznogo nauchnogo meteorologicheskogo soveshchaniia. Leningrad, Gidrometeoizdat. Vol.7. [Physics of the surface layer] Fizika prizemnogo sloia. Pod red. D.L.Laikhtmana. 1963. 319 p. (MIRA 16:11)

1. Vsesoyuznoye nauchnoye meteorologicheskoye soveshchaniye, Leningrad, 1961. 2. Glavnaya geofizicheskaya observatoriya (for Laykhtman).

(Atmosphere)

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

LAYKHTMAN, D.L.

Diffusion of pollution from point sources in the lowest atmospheric layer. Trudy Len. gidromet. inst. no.15:3-9 '63. (MIRA 17:1)

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

LAYKHTMAN, D.L.; KAPLAN, S.N.

Calculation of annual mean concentrations and the meteorological basis for selecting the height of factory chimneys. Trudy Len. gidromet. inst. no.15:32-36 '63. (MIRA 17:1)

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

LAYKHTMAN, D.L.; GISINA, F.A.; KAPLAN, S.N.

Calculation principle of meteorological conditions in planning industrial enterprises. Trudy Len. gidromet. inst. no.15:37-46 '63. (MIRA 17:1)

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

ACCESSION NR: AR4015475 S/0169/63/000/012/B054/B054

SOURCE: RZh. Geofizika, Abs. 12B300

AUTHOR: Laykhtman, D. L.; Shnaydman, V. A.

TITLE: Turbulence in the region of jet streams

CITED SOURCE: Sb. Materialy* Nauchn. konferentsii po aviats. meteorol. M., Gidrometeoizdat, 1963, 43-52

TOPIC TAGS: jet streams, geostrophic wind, turbulent pulsations, turbulence coefficient, turbulent layer, temperature gradient, atmosphere, equations of motion

TRANSLATION: Equations establishing motion and equations of energy balance are derived. The solutions of the equations of motion are constructed for the following cases: 1) the velocity of the geostrophic wind does not depend on altitude, but is different (changes by leaps) in the region of the jet streams (thickness 2h) and above and below it; 2) the geostrophic wind is an exponential function of the altitude. In both cases the pressure gradient is constant with altitude along the direction of motion. The atmosphere is assumed to be infinite in extent upwards and downwards from the jet stream axis. Formulas are obtained for the coefficient of

Card 1/2

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turbulence, the mean square velocity of turbulent pulsations and the thickness of the turbulent layer (at the boundary of this layer, from determinations, the wind for the first time attains the direction of the geostrophic wind). Graphics are constructed for the computation of these values. All of these depend, in addition to the velocity of the geostrophic wind and the vertical temperature gradient determined in practice, on the parameter δ, which is proportional to the value of the turbulent energy diffusion in the adjoining layer and its dissipitation into heat. L. Matveyev.

DATE ACQ: 09Jan64 SUB CODE: AS, PH ENCL: 00

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

LAYKHTMAN, D.L.; BYUTNER, E.K.

Determination time of the stationary distribution of concentrations from a point source. Trudy Len. gidromet. inst. no.15: 97-102 '63. (MIRA 17:1)

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

BYUTNER, E.K.; LAYKHTMAN, D.L.

Scattering of passive particles from a point source in a heterogeneous medium. Trudy Len. gidromet. inst. no.15:130-136 '63. (MIRA 17:1)

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

KAGAN, R.L.; LAYKHTMAN, D.L.

Optimum snow surveying methods. Trudy GGO no. 112:78-86 '63. (MIRA 17:5)

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

LAYKHTMAN, D.L.; ORLENKO, L.R.

Program and methods for observations made during the expedition. Trudy GGO no.144:3-8 '63. (MIRA 17:6)

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

LAYKHTMAN, D.L.; ORLENKO, L.R.; TKACHENKO, A.V.

Dispersion of the turbulence energy in the lowest layer of the atmosphere. Trudy GGO no.144:28-33 '63. (MIRA 17:6)

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

ACCESSION NR: AT4028745 S/2531/63/000/144/0081/0084

AUTHOR: Laykhtman, D. L.; Kozakov, L. A.; Melent'yeva, I. I.

TITLE: Experimental investigations of the vertical changes of turbulence intensity in the boundary layer of the atmosphere

SOURCE: Leningrad. Gl. geofiz. observ. i Ukr. n.-i. gidrometeorol. inst. Trudy*, no. 144/40, 1963. Fizika pogranichnogo sloya atmosfery* (physics of the atmospheric boundary layer); Dneprovskaya expeditsiya GGO i UkrNIGMI, 81-84

TOPIC TAGS: boundary layer, turbulence, wind velocity, Dnieper expedition

ABSTRACT: An attempt is made to evaluate the properties of the characteristic vertical profile of turbulence based on pilot balloon observations. Information is presented on the vertical profile of wind gust velocity of the atmospheric boundary layer; certain dependences of the profile on the stability characteristics are pointed out. Experimental data were obtained by conducting a series of specially organized balloon observations from 6 bases. The results of the observations are presented in graphs. Usually, sharp changes in the gradients of wind velocity or temperature (caused by cloudiness or the passing of fronts) strongly distort the vertical profile of wind pulsation. Pulsation maximum is observed at an altitude of

Card 1/2

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about 2.5 km. A minimum of wind gusts is observed in the layer from 750 m to 1500 m. The elimination of pulsations above this level is obviously explained by the comparative stability of layers above 3 km. However, one should not draw conclusions about the single valued connection of turbulence in the layer with the Richardson number at this level. Such a connection can be substantially disrupted by the energy diffusion of the turbulence of the upper and lower line layers. It is possible to expect that a satisfactory connection can be observed if thermodynamic uniformity exists in an adequately thick layer. A separate analysis of each series will be conducted in one of the future articles. Orig. art. has: 4 figures.

ASSOCIATION: Leningradskaya glavna geofizicheskaya observatoriya (Principle Geophysical Observatory of Leningrad)

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

LAYKHTMAN, D. L.; PODOLSKAYA, E. L.; SHEKHTER, F. N.

"Radiative heat exchange in the boundary layer of the atmosphere."

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

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

ZILITINKEVICH, S. S.; LAYKHTMAN, D. L.

"Turbulent transfer in multiphase media."

report submitted for 2nd All-Union Conf on Heat & Transfer, Minsk, 4-12 May 1964.

Voyeykov Geophysical Observatory

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

LAYKHTMAN, D.L., doktor fiz.-mat. nauk, prof.; RABINOVICH, Ya.S.

Spraying toxic chemicals and fertilizers from airplanes. Meteor. i gidrol. no.11:12-15 N '64. (MIRA 17:12)

1. Leningradskiy gidrometeorologicheskiy institut.

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

LAYKHTMAN, D.L.; ORLENKO, L.R.

Structure of the boundary layer of the atmosphere at different latitudes. Trudy GGO no.150:14-20 '64. (MIRA 17:7)

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

LAYKHTMAN, D.L.; BYUTNER, E.K.

Turbulence in jet streams in the presence of a geostrophic wind shift. Trudy GGO no.150:63-68 '64. (MIRA 17:7)

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

LAYKHTMAN, D.L.; RABINOVICH, Ya.S.

A problem of thermal conductivity. Trudy Len. gidromet. inst. no.17:113-117 '64. (MIRA 18:6)

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

ZILITINKEVICH, S.S.; LAYKHTMAN, D.L.

Heat conduction and moisture exchange in a turbulent atmosphere in the case of phase transitions of moisture. Dokl. AN SSSR 156 no. 5:1079-1082 Je '64. (MIRA 17:6)

1. Glavnaya geofizicheskaya observatoriya im. A.I.Voyeykova. Predstavleno akademikom Ye.K.Fedorovym.

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

LAYKHTMAN, D.L., doktor fiz.-matem.nauk, prof.; KAGAN, B.A.

Scheme of precalculating the hydrologic characteristics at the sea surface. Meteor. i gidrol. no.5:7-13 My '65. (MIRA 18:4)

1. Glavnaya geofizicheskaya observatoriya i Leningradskiy gidrometeorologicheskiy institut.

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L 14185-66 EWT(1)/FCC GW

ACC NR: AT6004148 SOURCE CODE: UR/2531/65/000/167/0044/0048

47
B+1

AUTHOR: Zilitinkevich, S. S.; Laykhtman, D. L.

ORG: Main Geophysical Observatory, Leningrad (Glavnaya geofizicheskaya observatoriya)

TITLE: Closing a system of equations of turbulent motion for the boundary layer of the atmosphere

12,44,55

SOURCE: Leningrad. Glavnaya geofizicheskaya observatoriya. Trudy, no. 1, 1965. Fizika pogranichnogo sloya atmosfery (Physics of the boundary layer of the atmosphere), 44-48

TOPIC TAGS: atmospheric boundary layer, atmospheric turbulence, turbulent boundary layer

ABSTRACT: A closed system of equations is set up for describing turbulent conditions in the boundary layer of the atmosphere for the case of arbitrary temperature stratification. The authors consider a horizontally homogeneous stationary air flow. A system of equations is given which takes account of motion, heat flux and

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ACC NR: AT6004148

turbulent energy balance for the boundary layer. Formulas are given for the coefficient of turbulent viscosity, the diffusion flux of turbulent energy and the rate of heat dissipation for turbulent energy. A method is proposed for closing this system of equations based on an expression for the scale of turbulence in terms of average flow characteristics. The equations derived in this paper may be used for calculating all constants appearing in the initial system of equations with the use of experimental data in the literature. Thus the initial system may be used for specific calculations. Future articles will give examples of these calculations for the ground sublayer and for the boundary layer as a whole as well as a comparison of these calculations with experimental data. Orig. art. has: 14 formulas.

SUB CODE: 08/ SUBM DATE: 00/ ORIG REF: 009/ OTH REF: 004

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ACCESSION NR: AP5009233 UR/0362/65/001/002/0150/0156

16
15
B

AUTHOR: Zilitinkevich, S. S.; Laykhtman, D.L.

TITLE: Turbulent conditions within the ground layer of the atmosphere

SOURCE: AN SSSR. Izvestiya. Fizika atmosfery i okeana, v. 1, no. 2, 1965, 150-156

TOPIC TAGS: atmospheric turbulence, atmospheric ground layer, generalized Karman equation, wind velocity profile, temperature profile

ABSTRACT: In recent years, numerous researchers have investigated the meteorological conditions of the ground layer of the atmosphere (see, A. S. Monin, A. M. Obukhov, Tr. Geofiz. In-ta AN SSSR, no. 24(151), 1954; A. B. Kazanskiy A. S. Monin, Izv. AN SSSR,

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to determine the mean turbulence scale by introducing (with the help of a special semi-

Card 1/2

L 52555-65

ACCESSION NR: AP5009233

empirical hypothesis) an expression which generalizes the Karman equation (T. Karman, Nachr. Ges. Wiss. Goettingen, Math. Phys. Kl., 58, 1930) to the case of a temperature-inhomogeneous flow. The results of the calculations agree very well with the experimental data. They indicate that energy diffusion plays a significant role only in the case of free convection. Orig. art. has: 24 formulas and 2 figures.

ASSOCIATION: Glavnaya geofizicheskaya observatoriya (Main Geophysical Observatory)

SUBMITTED: 13Feb64 ENCL: 00 SUB CODE: ES

NO REF SOV: 012 OTHER: 002

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Card 2/2

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

L 5022-66 EWT(1)/FCC GW

ACC NR: AT5024882 SOURCE CODE: UR/2531/65/000/171/0032/0037

35
B+1

AUTHORS: Laykhman, D. L.; Byutner, E. K.
44,55

ORG: Main Geophysical Observatory, Leningrad (Glavnaya geofizicheskaya observatoriya)
44,55

TITLE: Basic criteria defining the intensity of turbulence in a mountain region

SOURCE: Leningrad. Glavnaya geofizicheskaya observatoriya. Trudy, no. 171, 1965. Rezul'taty issledovaniya atmosfernoy turbulentnosti na vertoletnykh trassakh (Results of the investigation of atmospheric turbulence on helicopter routes), 32-37

TOPIC TAGS: wind, atmosphere, atmospheric turbulence, mountain atmospherics, meteorology
12,44155

ABSTRACT: An effort is made to compute the characteristics of air currents in mountainous regions. The study avoids the use of an oversimplified terrain model such as one in which a mountain ridge is treated as a single obstacle of one form or another. The authors take the approach that the complex structure of an air

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L 5022-66
ACC NR: AT5024882

stream in a mountainous area may be represented as a certain smoothed motion U upon which are superimposed macroscalar pulsations U'. These pulsations are the result of the current break up upon incidence with the mountain ridge. Hence, the mountains are visualized as a lattice wherein the basic generation of turbulence energy occurs in a layer ranging from a certain mean height to the mountain summits. Above this layer the inflow of energy of turbulence is caused by diffusion from below. This pulsation-diffusion concept is depicted in Fig. 1. The

Fig. 1. I- the layer in which the basic pulsation energy originates. II- the layer in which turbulence energy diffuses from below; III- free atmosphere

Card 2/4

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ACC NR: AT5024882

process is best quantified by a judicious analysis of properly selected parameters. It is desired to establish the physical dependency of the mean square wind gust U'^2 upon physical quantities which may be readily evaluated. A discussion of the necessary parameters is given and U'^2 is written as a function of six dimensioned parameters:

$$\overline{u'^2} = \Phi\left(L_z;\ U;\ z;\ \omega_z;\ \frac{g}{T};\ \frac{R}{\rho c_p}\right),$$

where L(z) is the vertical dimension parameter given by

$$L_z = \sqrt{\overline{[h(x, y) - \bar{h}]^2}},$$

where h(x,y) is the height of a relief point above sea level and $\bar{h}$ is the mean height of the mountain region above sea level. The variable z is the height measured from $\bar{h}$, ω_z is the Coriolis parameter, and $R/\rho c_p$ is the radiation balance and thermal nonuniformity parameter. The functional equation is transformed through considerations of nondistinct stratification and thermal convection. Wind gust data from the May, 1962, expedition of GGO, NIIGVF, MGU, and TsAO in Crimea are compared in a correlation analysis. The authors claim only that the results of the correlation do not contradict the validity of the model. Orig. art. has: 2 figures, 5 equations, and 1 table.

Card 3/4

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L 5022-66

ACC NR: AT5024882

SUB CODE: ES/ SUBM DATE: 00/ ORIG REF: 005/ OTH REF: 001

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

L 11181-66 EWT(1)/FCC GW

ACC NR: AT6004163 SOURCE CODE: UR/2531/65/000/167/0205/0210

30
B+1

AUTHOR: Laykhtman, D. L.; Shnaydman, V. L.

ORG: Main Geophysical Observatory, Leningrad (Glavnaya geofizicheskaya observatoriya)

TITLE: Wind and turbulent exchange close to frontal surfaces 12,44,55

SOURCE: Leningrad. Glavnaya geofizicheskaya observatoriya. Trudy, no. 1, 1965. Fizika pogranichnogo sloya atmosfery (Physics of the boundary layer of the atmosphere), 205-210

TOPIC TAGS: atmospheric turbulence, wind profile, atmospheric front

ABSTRACT: Wind profile and turbulent exchange close to frontal surfaces are determined from a closed system of equations. The proposed method may be used for finding all dynamic parameters of the state of the atmosphere close to the interface (component of wind velocity, vertical velocity and coefficient of turbulence) as a function of external parameters -- wind shear, temperature discontinuity at the interface and thermal stratification of both air masses. A system of equations for a

Card 1/2 2

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L 14181-66

ACC NR: AT6004163

stationary interface in the free atmosphere and the boundary conditions for the problem are given. In the proposed model, it is assumed that turbulence close to the front is caused by high vertical gradients in velocity due to passage through the interface. The intense transformation of kinetic energy of the fundamental motion into turbulent energy which takes place here leads to agitation of some layer on both sides of the interface. The thickness of the agitated layer is taken as that in which 75% of all the turbulent energy is generated. The thickness of this layer is determined by the wind shear and temperature discontinuity and by stratification of the separate air masses. The author considers the case where the coefficients of turbulence in both air masses are the same and are independent of altitude, and also the case where a difference in temperature stratification causes a difference in the coefficients of turbulence in the warm and cold air masses. An expression is derived for the effect of thermal stability in one layer on the parameters of turbulence in the other layer. A formula is given for the gustiness of the wind in the frontal region. A future paper will be dedicated to extending this method to the case of variation in geostrophic wind with altitude and time. Orig. art. has: 3 figures, 10 formulas.

SUB CODE: 08/ SUBM DATE: 00/ ORIG REF: 002/ OTH REF: 000

Card 2/2

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

L 11182-66 EWT(1)/FCC GW

ACC NR: AT6004145 SOURCE CODE: UR/2531/65/000/167/0003/0028

AUTHOR: Klyuchnikova, L. A.; Laykhtman, D. L.; Tseytin, G. Kh.

ORG: Main Geophysical Observatory, Leningrad (Glavnaya geofizicheskaya observatoriya)

TITLE: Calculation of the vertical wind profile in the boundary layer of the atmosphere

SOURCE: Leningrad. Glavnaya geofizicheskaya observatoriya. Trudy, no. 167, 1965. Fizika pogranichnogo sloya atmosfery (Physics of the boundary layer of the atmosphere), 3-28

TOPIC TAGS: atmospheric boundary layer, wind profile, atmospheric turbulence, mathematic analysis

ABSTRACT: This paper is a further development of the theoretical model for the structure of the boundary layer of the atmosphere in stationary conditions as a function of external parameters. A mathematical model is proposed for the coefficient of turbulence and a system of equations is given for determining the vertical

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ACC NR: AT6004145

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profiles of meteorological elements of the boundary layer under stationary conditions based on external parameters. This system of equations accounts for motion, heat transfer in the soil and in the atmosphere and humidity transfer in the atmosphere. The initial and boundary conditions for the problem are stated and a general solution is given. Formulas are derived for calculating the vertical wind profile in the boundary layer of the atmosphere and a computational scheme is proposed for determining the various parameters appearing in these formulas. Examples are given illustrating the effect of the coefficient of turbulence on the structure of the boundary layer of the atmosphere. It is found that the coefficient of turbulence increases with altitude according to a power law, reaching a maximum at some point and then decreasing with altitude. An appendix to the article gives tables of the functions appearing in the formulas derived. Orig. art. has: 2 figures, 6 tables, 70 formulas.

SUB CODE: 08/ SUBM DATE: 00/ ORIG REF: 009/ OTH REF: 000

Card 2/2

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

ZILITINKEVICH, S.S.; LAYKHTMAN, D.L.

Completing the system of equations of turbulent motion for the surface boundary layer. Trudy GGO no.167:44-48 '65. (MIRA 19:1)

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

LAYKHTMAN, D.L.; NADEZHINA, Ye.D.; SIMONOV, V.V.

Effect of a change in external conditions on the transformation of low clouds. Trudy GGO no.167:67-72 '65. (MIRA 19:1)

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

LAYKHTMAN, D.L.; SHNAYDMAN, V.L.

Wind and turbulent exchange near frontal surfaces.
Trudy GGO no.167:205-210 '65. (MIRA 19:1)

APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6"

"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

L 20471-66 EWT(1)/ECC GW

ACC NR: AP6012050 SOURCE CODE: UR/0362/65/001/011/1205/1208

34
B

AUTHOR: Laykhtman, D. L.; Gisina, F. A.; Kramer, N. I.

ORG: Leningrad Hydrometeorological Institute, Leningrad (Leningradskiy gidrometeorologicheskiy institut)

TITLE: Allowance for characteristics of atmospheric turbulence in computing intensity and height of factory stacks

SOURCE: AN SSSR. Izvestiya. Fizika atmosfery i okeana, v. 1, no. 11, 1965, 1205-1208

TOPIC TAGS: atmospheric diffusion, air pollution, atmospheric turbulence, energy distribution

ABSTRACT: In the investigation of diffusion processes in the atmosphere a serious difficulty encountered is that the spatial scales of turbulent fluctuations vary in a wide range; from 10^{-1} to 10^{6} m. It has been established experimentally that the distribution of turbulent energy in fluctuations of different scales has a minimum in the region of meso-scales. This gives basis for study of diffusion processes by dividing the entire range of scales into two parts. In the small-scale region the diffusion of an impurity from the sources at distances not more than 10-50 km can be described by the ordinary diffusion equation with the introduction of the vertical coefficient of turbulent viscosity. This makes it possible to determine the concentration of an impurity,

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L 20471-66

ACC NR: AP6012050

averaged for a short (5-10 min) period of time coinciding with the period of averaging of the meteorological parameters included in the equation. The effects caused by large eddies then can be taken into account statistically. As an example of such an approach the authors consider the problem of the distribution of the concentration of a passive impurity from a continuous point source for long periods of time (season, year). Characteristics of this type are needed in planning factories whose stack products contaminate the atmosphere. Proper stack height for a given admissible discharge must be computed. The method presently used for this purpose is unsatisfactory because in long intervals of time the complex of meteorological conditions changes in very wide limits. The correct approach should be based on calculation of the probability of occurrence of different meteorological conditions. The parameters of the planned factory should be selected in such a way that in the direction of maximum wind frequency the maximum surface concentration with a given probability does not exceed the admissible value. Numerical solutinn of the problem is given. Orig. art. has: 1 figure and 13 formulas. [JPRS]

SUB CODE: 04, 13, 20 / SUBM DATE: 19May65 / ORIG REF: 005 / OTH REF: 001

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

L 24367-66 EWT(1)/FCC GS/GW

ACC NR: AT6006921 SOURCE CODE: UR/0000/65/000/000/0361/0364

21

B+1

AUTHOR: Zilitinkevich, S. S.; Laykhtman, D. L.

ORG: Main Geophysical Observatory (Glavnaya geofizicheskaya observatoriya)

TITLE: Turbulent transfer in multiphase media

SOURCE: Teplo- i massoperenos. t. II: Teplo- i massoperenos pri vzaimodeystvii tel s potokami zhidkostey i gazov (Heat and mass transfer. v. 2: Heat and mass transfer in the interaction of bodies with liquid and gas flows). Minsk, Nauka i tekhnika, 1965, 361-364

TOPIC TAGS: mass transfer, cloud physics, vapor condensation

ABSTRACT: In the mathematical treatment of the problem, it is assumed that the drops making up a cloud are completely absorbed by the movements of the air particles. It is taken into account that the water vapor in a cloud is completely in a saturated state, that is,

$$q = \frac{R}{R_w} \frac{E(T)}{p}, \qquad (1)$$

where R and R_w are the gas constants of the air and the water vapor;

Card 1/3

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ACC NR: AT6006921

E(T) is the maximum tension of the water vapor at temperature T; p is the pressure. For points in the atmosphere lying within a cloud, the equations of transfer for the quantities under consideration have the form:

$$\left.\begin{aligned} \frac{\partial T}{\partial t}+(\mathbf{u},\nabla)T+u_z\gamma_a &= -\left(\nabla,\frac{\mathbf{P}}{c_p\rho}\right)-\frac{1}{c_p\rho}(\nabla,\mathbf{D})+\frac{L}{c_p}m \\ \frac{\partial q}{\partial t}+(\mathbf{u},\nabla)q &= -\left(\nabla,\frac{\mathbf{Q}}{\rho}\right)-m \\ \frac{\partial b}{\partial t}+(\mathbf{u},\nabla)b &= -\left(\nabla,\frac{\mathbf{B}}{\rho}\right)+m \end{aligned}\right\}, \quad (2)$$

where m is the mass of moisture condensed in unit time in unit mass of air; t is the time; u is the wind velocity; u_z is its vertical component; γ_a is the dry adiabatic temperature gradient; c_p is the heat capacity of the air at constant pressure; ρ is the air density; D is the radiation flux; P, Q, and B are the turbulent heat fluxes of the water vapor and the moisture. By mathematical manipulation, the author arrives at the following expression

Card 2/3

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ACC NR: AT6006921

$$\left(\frac{\partial}{\partial t}+u_1\frac{\partial}{\partial x_1}+u_2\frac{\partial}{\partial x_2}\right)\int_h^H b\,dx_3=\beta u_3(H-h)+\frac{\lambda}{1+c}\times$$
$$\times\left.\frac{\frac{1}{L}(P_3+D_3)-cQ_3}{\rho}\right|_{h=0}^{H+0} \qquad (7)$$

which describes the change in the total amount of liquid water held in a cloud under the influence of external factors. It is claimed that this expression can be used in practical weather forecasting. Orig. art. has: 7 formulas.

SUB CODE: 04, 20/ SUBM DATE: 09Nov65/ ORIG REF: 003.

Card 3/3

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

L 32931-66 EWT(1)/FCC GW/WS-2

ACC NR: AP6021510 SOURCE CODE: UR/2531/66/000/187/0115/0121

AUTHOR: Laykhtman, D. L.

ORG: none

TITLE: Using radiation to change meteorological conditions in lower atmospheric layers

SOURCE: Leningrad. Glavnaya geofizicheskaya observatoriya. Trudy, no. 187, 1966. Fizika pogranichnogo sloya atmosfery (Physics of the atmospheric boundary layer), 115-121

TOPIC TAGS: radiative energy, terrestrial atmosphere, radiation balance, albedo, cloud dissipation, effective radiation

ABSTRACT: Solar radiative energy reflected from the terrestrial atmosphere and clouds is very great, amounting to $70 \cdot 10^6$ million kw. This energy can be used to change climatic conditions on the Earth. It must be clarified which gain or loss in the radiation balance is utilized in artificial changes of the radiation process. Radiation balance may be changed by: 1) changing the albedo of the active surface, 2) smoke clouds in upper and lower layers of the atmosphere, and 3) artificial dissipation of clouds. The increased radiation balance may be computed for each region, taking its climatological conditions into consideration. At middle latitudes the maximum balance can be reached if clouds are totally dissipated in the daytime and

Card 1/2

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ACC NR: AP6021510

shortwave radiation is increased, and the whole sky is covered with clouds at night, decreasing the effective radiation. An inverse effect is reached when the whole sky is covered with clouds in the daytime and it is clear at night. Formulas were developed and used for computation of the radiation balance at various latitudes. Computational results are represented graphically in the original article. The area in which the artificial balance change occurs must be at least 100 km wide. Formulas prove that the increase in heat flux and evaporation is proportional to the increase in the radiation balance. This indicates that an additional flux of radiative energy to the active surface is distributed between turbulence and evaporation. Computations show that change of the radiation balance can markedly affect evaporation, which is very important in arid regions and during dry winds. The dissipation of radiative fogs, which are formed after sunset on clear nights, can be accomplished by changing the radiation balance. Orig. art. has: 1 figure, 1 table and 17 formulas. [EG]

SUB CODE: 04/ SUBM DATE: none/ ATD PRESS: 5028

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

ACC NR: AP7004586 SOURCE CODE: UR/0050/66/000/008/0012/0015

AUTHOR: Laykhtman, D. L. (Professor); Kopanov, I. D. (Candidate of geographical science)

ORG: Main Geophysical Observatory (Glavnaya geofizicheskaya observatoriya)

TITLE: Basis for a snow surveying method

SOURCE: Meteorologiya i gidrologiya, no. 8, 1966, 12-15

TOPIC TAGS: snow, hydrometeorology

ABSTRACT: In recent years the Main Geophysical Observatory has been developing the principles of a method for carrying out network snow surveys. The results of this work are described, it being shown that the depth of the snow cover is a random function of coordinates and time. Formulas have been derived for computing the parameters of snow surveys, ensuring the necessary accuracy in measurement of the characteristics of the snow cover (5-10%). It has been found that in the USSR (excluding mountainous regions) in order to achieve this percentage of accuracy in determining depth and density it is necessary to have the snow-measuring profile parameters given in Table 2 (for open areas). The tabulated data were obtained from 17 administrations of the Hydro-

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ACC NR: AP7004586

meteorological Service. In lowland areas the length of the profile and the distances between adjacent measurements of depth and density vary in dependence on the degree of nonuniformity of deposition of the snow cover. The time intervals for making surveys in different regions vary from 5 to 40 days./ Orig. art. has: 8 formulas and 2 tables. [JPRS: 38,460]

SUB CODE: 04 / SUBM DATE: 29Dec65 / ORIG REF: 005

Card 2/2

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

ACC NR: AP7006056 SOURCE CODE: UR/0362/66/002/010/1017/1025

AUTHOR: Laykhtman, D. L. -- Laikhtman, D. L.
ORG: Leningrad Hydrometeorological Institute (Leningradskiy gidrometeorologicheskiy institut)

TITLE: Dynamics of the boundary layers of the atmosphere and sea with allowance for interaction and nonlinear effects

SOURCE: AN SSSR. Izvestiya. Fizika atmosfery i okeana, v. 2, no. 10, 1966, 1017-1025
TOPIC TAGS: surface boundary layer, turbulent flow, friction coefficient
SUB CODE: 04,20

ABSTRACT: On the basis of a closed system of equations for a stratified turbulent flow proposed by S. S. Zilitinkevich and D. L. Laykhtman the author now has considered the dynamics of a system consisting of the boundary layer of the atmosphere and the boundary layer of the sea. For the roughness of the discontinuity he uses the analytically derived formula $z_0 \sim \nu + z/g$; roughness thus is considered as an internal characteristic flow. Its value is found in the process of solution of the problem as a function of external parameters. The article includes a table of the numerical values of the friction coefficient, the wind coefficient, wind velocity at a height of 10 m and roughness for different values of the geostrophic wind. The computed values agree satisfactorily with experimental data. Orig. art. has: 4 figures, 24 formulas and 1 table. [JPRS: 39,180]

Card 1/1 UDC: 551.465.7:551.554

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"APPROVED FOR RELEASE: 06/20/2000 CIA-RDP86-00513R000928830014-6

L 10257-67 EWT(1) GW

ACC NR: AP7003077

SOURCE CODE: UR/0362/66/002/005/0534/0536

AUTHOR: Laykhtman, D. L.; Al'ter-Zalik, Yu. Zh.

ORG: Leningrad Hydrometeorological Institute (Leningradskiy gidrometeorologicheskiy institut)

TITLE: Use of aerological data for determining aircraft turbulence in the free atmosphere

SOURCE: AN SSSR. Izvestiya. Fizika atmosfery i okeana, v. 2, no. 5, 1966, 534-536

TOPIC TAGS: atmospheric turbulence, surface boundary layer

ABSTRACT: Turbulence intensity at different heights in the free atmosphere is an important characteristic of flight conditions. Attempts to use the Richardson number as a criterion of turbulence intensity have not had good results. Numerous computations have revealed a poor correlation between the Richardson number and aircraft turbulence. This paper is based on the ideas used in developing a system of equations for solution of the problem of wind and temperature distribution in the boundary layer proposed by S. S. Zilitinkevich and D. L. Laykhtman (Tr. GGO, No. 167, 1965). The derivation of the equations in this paper is based on the following premises: a) the turbulent flux is stationary and horizontally homogeneous; b) the turbulence regime is determined

Card 1/2

UDC: 551.55.5

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ACC NR: AP7003077

entirely by two parameters — turbulence scale ℓ and the kinetic energy of turbulence b — and all other turbulence characteristics are functions of these two parameters; c) the turbulence scale is for a stratified flow in which both velocity and direction change from layer to layer and can be obtained by generalizing the Karman formula. Three formulas are derived for the turbulence characteristics K, ℓ and b. The formulas then were investigated to determine their validity in estimating the intensity of aircraft turbulence. It is demonstrated that there is virtually no correlation between the Richardson number and aircraft turbulence. At the same time, the value of the kinetic energy of turbulence b, computed using the same aerological data, correlates well with aircraft turbulence and can be used for estimating turbulence on the basis of aerological data. The authors thank N. Z. Pinus for providing the necessary material. Orig. art. has: 2 figures and 9 formulas. [JPRS: 37,710]

SUB CODE: 04 / SUBM DATE: 21Dec65 / ORIG REF: 003

Card 2/2

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