Model of real classification of meteorological parameters for regional prognosis

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Offered model of short-term regional prognosis. The main idea of the method is to pick out air mass of area investigation, using common meteorological variable and synoptical parameters. Thus, initial point of offered method is the classification of air mass. Certain limits are put on meteorological variable quantity. Firstly, they are to be all to distinguish will air mass and, at the same time, they are to change a little within air mass itself. Secondly, they are to be regularly observed by variable quantities in the net of the stations.

Presently initial information is usually given as a set of quantitative (numerical) indications. When transforming of initial information is the method of main components often used, which is will known in the meteorology as the method of decomposition into natural orthogonal components [1]. Decomposition of fields according to space is usually given. In contrast to that method in this paper decomposition was given according to time [1,2]. Fulfilling this work the data of aerological station “Sad-gorod” (Garden-City) and table TM-1 meteostation in Vladivostok (Primorie Territory) within 1975-1995 were used. Analysing these findings many factors were under consideration. Such as: direction and speed wind, temperature and air humidity, pressure, temperature of dew-point on the mixing surface level, and speed of wind, temperature air humidity, pressure above 500-1500 meters sea-level. According to aerological station height of air layer shift was counted average daily. As a parameter showing vertical atmosphere steadiness difference altitude temperature and the temperature 500 ms above surface of earth. Thus, matrix of meteorological parameters and synoptical variable quantities measured by 20*174 was used. Decomposition of variable quantities into natural orthogonal functions selected eleven components, describing 86 per cent of variable dispersion for cold season and 82 per sent for warm season. Coefficient of decomposition matrix results (measured 11*174) may be classified in groups by different methods. And finally, statistic method of objective classification was used in this work as well for revealing homogeneous local groups in certain point totality of multi-measured sign space. The task was being solved with the help of criteria searching, finding of it gave the possibility to evaluate the homogeneity of totality under consideration. Analogy criterion by Pirson was used in this work for classify of succession of variable quantities. Classify decomposition coefficients according to this method let us receive ten groups for cold half year and 12 groups for warm six months. Every of these groups can be characterized by the particularities of general circulation and complex of meteorological parameters. Mean quantity of meteorological variable quantities (such as: direction and wind speed, pressure, temperature, air humidity on the level of stretching surface, temperature, wind speed, pressure and air humidity on the level 500 meters and 1,5 km above earth surface and others) were counted for each group. Moreover, every group was depicted by typical synoptical situation let’s take an example of a few typical synoptical situation describing. Let’s describe a few typical synoptical situations as an example. Synoptical situation in the South region of Primorie Territory for the first group is determined by south cyclone. Trajectory of centre cyclone displacement passes from Yellow Sea region along Japanese Islands. South regions of Primorsky Territory are under influence of the North originally and then North-West

periphery of cyclone. As a result, we could observe relative low temperatures (-11C, -15C) in the investigated region. 10-15 m/sec speed North-East and North-Wind mainly. Sea air masses of temperate latitudes dominate over the South of Primoriye. The other group is characterized by intensive cyclonic activity over Far-Eastern Seas. This is a crest of Asian anticyclone over Primorye. Thus, each group had the following characteristics: typical air masses, meteorological parameters and certain synoptical situation. This approach may be useful for pollution prognosis in the close land air mass and population morbidity in the industrial city prognosis. Analysis give the possibility to pick out classters (and consequently, groups of synoptical situations and meteorological parameters) which greatly determine the high level atmosphere pollution and therefore the morbidity of population. Our investigation shows that in winter 3 synoptical situations from 10 being under study has high potential of atmosphere pollution. Low height of mixing atmosphere layer in the morning 70 meters, low wind speed at the earth surface (3,5m/s),little displacement of wind speed in the close land layer 3,5 m/s and 7,4 m/s) high background of temperature at the earth surface (-3,8 C) are the typical characteristics situation for these groups. Taking the second step, prognosis of a certain synoptical group gives the possibility to expand the results of out investigation for prognostic some meteorological components, potential of atmosphere pollution and population morbidity, using equation of step by step regression or discriminant analyses. To solve the second and the third tasks for building prognosis equation it is necessary to use the information on the atmosphere pollution and population morbidity in the cities.

This approach is very effective for getting good results, which are impossible to receive under traditional methods.

They are:

To identify specific synoptical situations and air mass, describe typical potential of air pollution for these synoptical situations;

To pick out the groups of dominating air mass, where the potential of pollution especially high;

To identify the groups of parameters, characterizing the conditions of low and high potential of atmosphere pollution;

To determine groups parameters, describing conditions of appearing close earth and slightly lifted inversion.

RFERENCES

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