

Reviews

Metodika sostavleniya prognozov pogody na 3-7 dnei, by Yu. B. Khrabrov, Publishing House (Division) for Hydrometeorology, Moscow; 1959.

A Method of Preparing Weather Forecasts for 3 to 7 days (Translated from Russian and published in 1961 for the National Science Foundation, Washington, D.C. and the Department of Commerce; U. S. A. by the Israel Program for Scientific Translations); 202 pages ; 46 figures.

In this monograph are presented the results of studies undertaken by the author to evolve a new method of weather forecasting for 3 to 7 day periods. The book consists of 4 chapters. The subjects dealt with in each one of the chapters are—Chapter I: The Present State and the Historical Development of the Methods of 3 to 7 Day Weather Forecasting; Chapter II: Characteristics of the Development of Processes in Synoptic Periods; Chapter III: Processes of the Current and of the Ensuing Synoptic Periods; and Chapter IV: The Forecast of Weather Elements.

In the first chapter is presented a good review of extended range forecasting research done in U.S.S.R. during the last 3 decades and of similar work done in other countries. The methods of forecasting evolved in Russia and those developed by Jerome Namias and his group in the U.S. Weather Bureau have been dealt with in greater detail.

The Russian methods have their basis in the classical concept of Mul'tanovskii that there are 'Natural Synoptic Periods' during which 'an orienting process develops in a definite manner with the sign of the field being preserved in the area of the natural region'. Such synoptic periods are associated with generally one 'Macro-homogeneous Synoptic Process'. An important feature of the atmospheric circulation which is used to identify or distinguish between different macro-synoptic processes is the 'high altitude planetary frontal zone (h.p.f.z.)'. The latter is identified as the region of maximum horizontal pressure gradient or the line joining points of maximum wind velocity at a level. A synoptic process during which the h.p.f.z. undergoes a well defined evolution is termed as 'macro-homogeneous synoptic process'. Thus in this method the position of the h.p.f.z. is treated as the most important characteristic of circulation in middle latitudes. The h.p.f.z. is found to reflect the basic features of synoptic processes such as, regions of maximum warm and cold advection, principal cyclogenetic and anticyclonic regions, the major upper wind pressure formations and their shift, the measure of zonality or meridionality of synoptic processes, the number of long waves in the northern hemisphere and such other features of circulation. The different kinds of evolution of h.p.f.z. during a macro-homogeneous process have been typed and their relation to the wave lengths of the h.p.f.z. is established.

Assuming that the change of position of h.p.f.z. is connected with formation of centres of vorticity and their movement, the author has indicated a qualitative method of assessing their changes based on the principle of the conservation of absolute vorticity. Making use of the trend, both in the vorticity changes as well as in the changes in the position of h.p.f.z., during the first two days of the macro-synoptic process, the future positions of the pressure systems and the evolution of the h.p.f.z. are inferred. Further, typical trajectories of pressure formations (cyclones and anticyclones) connected with a particular h.p.f.z. position are also utilised. Thus the character of the circulation conditions during the forthcoming homogeneous synoptic process is arrived at.

As a basis for the forecast of weather elements, the mean changes of the concerned weather elements (air temperature, cloudiness and precipitation) during the shift of the pressure system from one region to another along the typical trajectory are utilised. Analogues are also used for this purpose.

The concepts involved and the line of approach adopted by the author are of a fundamental nature. For, in this method attempts are made to discover the natural evolution of synoptic processes and to type this evolution. It can be seen from the above survey of the method that one of the findings on which the method very heavily leans is that changes in position and evolution of h.p.f.z. are connected with almost all changes in synoptic processes. The undulatory changes in h.p.f.z. are closely akin to changes in 'Zonal Index' in middle latitudes and it may be a little too much to expect that one parameter of that kind will be adequate under all circumstances to explain changes in synoptic processes though it is recognised even in other methods that it is one of the important parameters.

It is to be expected that there will be some practical difficulties in trying to identify the beginning and the end of "synoptic periods" and of "macro-homogeneous synoptic processes". Completely objective definitions cannot be laid down for this purpose and the judgment and experience of the forecaster have to be depended upon. But there is no doubt that it is well worth trying this line of approach, though subjectivity may have to enter at some stage.

Another result on which the method rests is that the trend of changes in the first two days of the homogeneous macro-synoptic process will hold for the rest of the period of the process. Prognostication in this method essentially involves extrapolation based on the trend shown in the first two days of the process. It is, therefore, to be expected that the success of the method will be limited when sharp changes of processes take place between two synoptic periods.

The method suggested by the author for arriving at the forecasted weather elements seems to be a promising one. Instead of using climatological means to characterise forecasted weather, he suggests that the mean difference in a particular weather element between a region in which the pressure system is at present located and another region through which it is expected to pass during the period of forecast may be utilised in conjunction with the latest observations to arrive at the forecast of the weather element concerned. Such mean differences worked out for typical trajectories of pressure systems during different seasons will be of invaluable help for extended range forecasting.

It also becomes apparent that though the starting point of the method described in the book and the mean circulation method developed by Jerome Namias and his collaborators is different, in actual practice, there is much in common between them. For, the concepts of undulatory changes of h.p.f.z. and that of the Index Cycle are very much alike. Both methods make use of the principle of conservation of absolute vorticity and the formula for velocity of displacement of long waves. Empiricism and subjectivity are not completely eliminated from either one of these methods.

The author has done a good service by presenting in this book the work so far done in U.S.S.R. based largely on the discoveries of Mul'tanovskii and the author's own developments of the method of forecasting taking into consideration the hydrodynamical principles introduced later.

The illustrations in the book are inadequate mainly because they are too small to observe and appreciate some of the details presented. The translation is generally adequate except at a few places where one may have to read more than once to get the meaning. The few printing errors noticed are of minor importance.

P. S. PANT

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Die Klimate der Erde (Ohne Das Gebiet der Ud SSR) by B. P. Alissow; Published by VEB Deutscher Verlag der Wissenschaften, Berlin, 1954; pp. viii+277, 99 diagrams.

This is the German translation of the original Russian text book on the subject of the 'World Climate' (excluding the region of USSR) by B. P. Alissow. It is intended for students of higher semesters who are already familiar with the fundamentals of meteorology and climatology. The book consists of 12 chapters. The first being an introduction in which the climatic zone of the geographical regions and the principal climatic types have been discussed. The subsequent Chapters II-VII are on more or less similar lines dealing with climatic regions of Europe, climatic regions of Asia, climatic regions of Africa, climatic regions of Australia, climatic regions of South America and the climatic regions of North and Central America. The oceans have also been brought into climatic regions mainly based on the work of A. I. Sorkina, a student of Geography, by whom the Chapters VIII, IX and X have been contributed. Here the climate of the Atlantic, Indian and the Pacific Oceans have been dealt with. In Chapters XI and XII the climatic regions of Arctic and the South Seas and the Antarctic have been covered. At the end there is a bibliography which not only gives the publications referred to in the text but also includes important works on climatology of the earth and of individual countries. This has been brought uptodate by the Editors of the translation.

It is but natural that within the space of 277 pages only the bare out-line of the climate of the continents could be covered. However, it is seen that a very large amount of data from all over the world has been brought forth in different chapters and presented in tables, charts and diagrams. Further, an attempt to treat the climate of the entire world within the compass of a single type of out-line as tried in Chapters II-VIII may smoothen out the individual characteristics of the regions to a large extent. Nevertheless, an examination of the climate of all the continents with the help of such a single standard may enable the students to get a firm grasp of the basic principles on which the climate of the different continents and oceans is determined. According to the author, the basic material for this climatological study was not confined only to the modern frontal theories but the work of the classical period, that of A.I. Wojeikow, J. Hann, W. Köppen etc have also been taken into consideration in particular that of Wojeikow which enables one to get directly to the very core of the physical basis of the climatological phenomena. The present study has been directed from the stand point that the geographical variations of the atmospheric circulation can serve as an index of the entire complex of the climate forming processes in different geographical regions. Yet it does not follow that the atmospheric circulation must necessarily be the most important factor of the climate. It is mainly utilized as climatological index that will correspond most closely with the total climate forming factors.

The book is neatly printed and well bound and will serve as a very useful hand book for students of climatology.

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