

GENETIC CLASSIFICATIONS OF EARTH'S CLIMATE

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Major approaches to genetic climatic classifications, which group climates according to their cause, are discussed. Special attention is given to classifications derived from air mass analysis and to those based on heat and water balance of the Earth's surface. Among classifications that employ air mass analysis, the system of the Russian scientist B.P. Alisov is considered in detail. Particular features of grouping methods by the American geographer A. Strahler are described. Principles of climatic classification based on heat-budget climatology developed by Russian scientist M.I. Budyko are also presented.

1. Introduction

Genetic classifications are based upon real mechanisms that form the different climates. They not only characterize climatic types, but also explain the causes of peculiarities arising in regional climatic patterns.

There are many classifying schemes that use spatial variations of a single meteorological variable (temperature, precipitation, energy budget, etc.) to differentiate climatic zones. Such work has been useful for particular purposes, but it is doubtful that such groupings can be called genetic classifications. Real observed climate is essentially a multidimensional concept, and climatic classification has to take into account the most important controlling factors. We consider two approaches to making genetic classifications: (1) based on air mass analysis, and (2) based on characteristics of surface energy budget.

2. Classifications derived from air mass analysis

The most extensively used genetic approaches to classifying climates are those that employ air mass concepts. Air masses are large bodies of air that have relatively homogeneous physical characteristics in the horizontal. Fundamentally most major weather changes consist of advances and interaction of air masses. Classifications based on this concept take into account the main features of general circulation, heat transfer by sea and air currents, and the position of continents and oceans.

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Biographical Sketch

E.I. Khlebnikova was born in 1945 in Leningrad, USSR. In 1963 she entered Leningrad State University, Mathematics and Mechanics Faculty, and in 1968 graduated from the Dept. of Theory of Probabilities and Mathematical Statistics of this University. In 1968 she began to work at the Main Geophysical Observatory in the Dept. of Climatology and in 1975, after postgraduate studies in meteorology and climatology, she received the scientific degree of Candidate in Maths & Physics. Since 1998 she has held a position of leading scientist in the Dept. of Applied Climatology. Dr. Khlebnikova has thirty years of experience in climatology including research on statistical modeling of meteorological processes, methodology of climate monitoring and different aspects of statistical interpretation of meteorological and other observations. She has more than 50 publications in these fields.