The Muskingum Climatic Study

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Historical Development

The Oklahoma Climatic Research Center at Kingfisher, organized in the fall of 1935, was a pioneer in the field of microclimatology. This project comprised approximately 200 stations located about three miles apart in three counties of west-central Oklahoma. It was in operation about 18 months and furnished the data for several scientific papers such as Thornthwaite's "Life History of Rainstorms".[1] It was discontinued in June, 1937.

In February, 1937, plans were begun for establishing a similar, but larger unit in the Muskingum Valley of eastern Ohio. The first station of the new project began reporting the last of April, and all the data received after June 1 is considered satisfactory.

Undoubtedly the individuals in charge of this project had various and sundry reasons for choosing an area in Eastern Ohio. Certainly the associated work already in progress there was a vital factor in the final decision. The Muskingum Conservancy District was then in the process of constructing a series of 14 flood control dams in that drainage basin. There were two permanent Soil Conservation Service Experiment Stations in the area, namely at Zanesville and Coshocton; as well as the State Agriculture Experiment Station at Wooster. Furthermore there were four demonstration projects and several CCC soil erosion camps in operation. All of these agencies were able to give physical, and, in some cases, scientific assistance to the project. Scientifically, southeastern Ohio offered physiographic and climatic phenonoma which were almost a direct antithesis of those experienced in Oklahoma.

Objects of the Study

It is expected that such a detailed climatic study will permit a more accurate determination and give a better understanding of the frequency and intensity of rainstorms in individual areas; and, at the same time, give further information on the areal expanse and movement of individual storms. In this work each rainstorm can be treated as an individual unit and traced in detail across the entire 8,000 square miles of the Muskingum drainage basin.

Also, the hydrologists of the Muskingum Conservancy District are working in close cooperation with the members of the Washington staff of the Conservation Service in developing improved methods of flood forecast. This, of course, suggests a new approach to the problem of flood hazards by studying the characteristics of complete storms through the data obtained by simultaneous observations from numerous, closely-spaced stations.

There is also the problem of soil erosion and the technical people of the Soil Conservation Service are now utilizing this data in studying the rainfall-run-off relationship, thereby giving it a practical application in the field of soil erosion and land utilization. This is in keeping with the policy of the Conservation Service in studying erosion processes and their variation with changing rainfall intensities.

Personnel

This project is under the general supervision of C. W. Thornthwaite, and under the immediate supervision of Leonard B. Corwin, both in the section of Climatic and Physiographic Research, Soil Conservation Service. The project manager, as well as the laboratory supervisors and most of the field supervisors have had geographic or climatic training. The routine laboratory, shop and observation work is done entirely by W.P.A. labor; of course, under the constant supervision of these trained individuals.

It may be assumed that individuals of the caliber found on relief roles would not be suitable for scientific work. However, in most cases, they have proved to be quite satisfactory. Many of the observers became quite competent in a very short time and, generally speaking, have put themselves wholeheartedly into their work, realizing that they are merely a cog in a large scientific wheel. The laboratory workers, too, have turned out some excellent examples of isopleth maps, which were neatly and accurately colored.

Station Location and Equipment

The 500-odd stations are located at the home of the respective observers. Theoretically they were to be four miles apart; however, the final location and distribution was somewhat dependent upon the number and residence location of the available WPA workers.

Each station is equipped with a rain gage, wind tower, and shelter house, the latter containing a minimum thermometer and both a wet and dry bulb psychrometer. The purchase of such a quantity of meteorological apparatus would probably have been the defeat of the project. Therefore, the Service was required to build all but the most technical equipment. For example, the wind towers and shelter houses were constructed entirely by the W.P.A. shop laborers, the shelter houses costing only a mere fraction of what they would command on the market. The total cost of one of these S. C. S. stations was less than 15 per cent of the cost of similar previous installations.

Compilation of Data

Each observer is required to make his wind, temperature, and cloudiness observations and recordings at 30-minute intervals from 7 A. M. to 7 P. M. These are recorded on convenient printed cards and mailed the morning following their completion. The chart on the rain gauge is inspected daily, being removed and mailed each morning following a rain.

Upon receipt of these cards and charts the laboratory workers check them and plot the data for each 30-minute interval on large onion paper base maps of the Muskingum Drainage Area. To avoid confusion each phenonomon is plotted on a separate map. After the plotting is completed the isopleths are drawn and inked, the map smoothly colored, then checked by a supervisor and filed for reference.

Results and Conclusions

This detailed climatic study in conjunction with the work being done in the field of flood control by the Muskingum Conservancy Project has caused this drainage basin to be referred to as the world's greatest hydrographic laboratory. Certainly the climatic study provides observations at more frequent intervals of time and space than is carried on by any other organization, and this procedure may easily give new knowledge concerning some aspects of local meteorology. Undoubtedly this information will prove valuable to anyone working on a geographic problem in eastern Ohio, and it has already created an interest in the area for two or three individuals are now planning to work or are working on Ph.D. dissertations dealing with the Muskingum Valley or some portion of it.

The real value of this study is not due to its continuation over a period of years, but to the obtaining of sufficient simultaneous observations to permit the classification of rainstorms on the basis of their individual characteristics.

In conclusion, I wish to use the words of one of our outstanding physical geographers, Richard J. Russel of Louisiana State University. At the Ann Arbor meeting of the Association of American Geographers he said, "The Muskingum Climatic Project is an outstanding cooperative project in physical geography and the results should justify the expense a thousand times".

[1] *Geog. Rev.*, vol. 27, pp. 92-111, (Jan. 1937).