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WESTERN NATIONAL MEETING PROGRAM

Section of Hydrology

Business Session and General Session

14h 00m, December 27

(H2) D. L. Chery (Agricultural Research Service, Logan, Utah), *Runoff Studies with a Physical Model of a Watershed.* The theory of similitude is used as a guide in developing a scaled physical model of a watershed. Recognizing that similitude has limitations in modeling such a complex phenomenon, it can still be useful in designing the model and analyzing the relative importance of the several watershed variables. Discussions of the problems encountered and techniques used in modeling the rainfall-runoff relationship previously observed on a 97-acre semiarid watershed near Albuquerque, New Mexico, are presented here. The approach is to design a scaled physical model with considerable flexibility in the topographical part and adequate control in the rainfall simulator. With such adaptability the model can be manipulated until the best verification between it and the prototype is obtained, thus giving the significant variables and relationships in the rainfall-runoff phenomenon. After verification of the model, the rainfall simulator and topographical factors will be manipulated in order to study the basic relationships and influences of the watershed variables further. The topographical model, formed from fiberglass, is a thin shell, whose surface can be roughened, smoothed, machined, and instrumented easily. The rainfall simulator is a combination of positive displacement pumps and variable-speed electric motors which are automatically controlled to reproduce the time-depth-area relationships of a convective rain storm.

(H3) Wm. S. Eisenlohr, Jr. (U. S. Geological Survey, Denver, Colo.), *Current Studies of the Hydrology of Prairie Potholes.* The Geological Survey is currently making broad studies of the hydrology of prairie potholes in a region of North Dakota covered with a thick layer of glacial drift. A prairie pothole is defined as any natural depression in the prairie which collects water, usually without overflowing, in sufficient amount to form a pond which persists for a month or more; thus it is a topographic rather than geologic feature. Prairie potholes have a wide range of sizes and the quality of water contained. The relation between a pothole pond and groundwater is complex and frequently undefined. Many prairie pothole ponds are filled with vegetation that fluctuates in amount and character with cyclic variations of the amount of water and possibly with its chemical quality. Water loss is being measured in several ponds using a mass transfer concept employing both meteorologic and hydrologic data. Results to date indicate that the water loss from prairie pothole ponds is about equal to the evaporation from free water surfaces in that region, and that the presence of vegetation has little effect. The emergent vegetation in a pond seems to reduce the evaporation by almost the same amount as the vegetation transpires.