

KWDS

INTERNAL REPORT 22

CLIMATOLOGICAL STATIONS

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MATERIALS AND METHODS

An automatic weather station has been installed and is operating at the lysimetric tree location. Meteorological parameters being recorded at the present time are temperature of the air, vapor pressure, solar radiation, net radiation, wind speed, wind direction, precipitation, and soil temperatures inside and outside the lysimeter.

These data are being recorded at 10-minute intervals on a magnetic tape digital data-logging system (Metrodata DL620B). The Metrodata-logging system was chosen over a telemetry system because of simplicity and cost. The data-logging system will operate for 30 days on heavy-duty 12-volt automobile battery and will operate for 30 days on a magnetic-tape supply if recorded once an hour. In practice, the batteries and tape supply are to be changed at two-week intervals to insure up-to-date data and, at the same time, all sensors will be checked and serviced.

In the future, parameters such as radiation, both solar and net, wind speed, and precipitation will be integrated. The integral will be recorded once an hour on the magnetic-tape system and digital form. The integrals for radiation will be obtained by first amplifying the signal, converting it into pulses, and then counting and storing the pulses for an hour. The integral for wind speed and precipitation will be obtained by counting pulses generated by these two devices for an hour. If suitable sensors can be found for vapor pressure, then the vapor pressure and air temperature signals also will be integrated. When this is done, all signals will be recorded once an hour to conserve the magnetic-tape supply.

Vapor pressure currently is being sensed by two heated lithium chloride vapor pressure sensors, manufactured by Logan Scientific Supply. The two sensors are mounted side by side and recorded continuously to see how they compare. If the sensors are sufficiently stable, they may be used for critical vapor pressure gradients. Also, if the stability is good enough, the output of these transducers will be integrated continuously, along with their temperature. Solar radiation is being sensed by a solarmeter manufactured by Lyntronics of England. Net radiation, wind speed, and wind direction are being sensed by instruments designed and built at the University of Washington. Precipitation is being sensed by a tipping-bucket rain gage available from Meteorological Research, Inc. Both air and soil temperatures are being sensed with copper constantan thermocouples.

After sufficient testing of the Thompson Site Weather Station has been completed, a similar station will be built and located at Finley Lake.

Data obtained from these climatological stations will be processed and summarized on the University of Washington Burrows 5500 computer. A computer program has been written that will convert the analog data to physical units, and, with 10-minute samples, will average the parameters for each hour, and then finally average the parameters for each day, as presenting hourly and daily averages for all parameters recorded. Two copies of these data will be made. One copy will be stored in the climatological data file; the other will be stored in the data bank.