MET O 8 - EVAP. MEMO. NUMBER 2

EVAPORATION IN NUMERICAL MODELS OF THE ATMOSPHERE

by P. B. Wright

MET O 11 - Numerical models for short-range forecasting

They are interested in instantaneous rates of evaporation over a large area (say 200 km^2). Periods of more than one day are not of interest.

It may well turn out that, because of the short period of the forecast, errors in the evaporation term will have negligible effect; this must be determined by experiment. Thus an accurate determination of evaporation may not be necessary. I would think that potential evaporation would be perfectly acceptable over the area covered by their model, except perhaps over Spain and North Africa in summer.

They are quite well equipped to use Penman, as they have reasonable estimates of:

net radiation

wind speed (known at 1000 mb; a constant factor times this quantity should give an acceptable value of the speed at 2m).

Humidity is probably their greatest difficulty; their nearest level is 950 mb. Perhaps the assumption of 100% R.H. at the surface, with a suitable gradient to the value at 950 mb, would be adequate.

One of the main assumptions in Penman is that heat transfer below the surface is negligible. This assumption could cause appreciable errors over periods of a few hours, even if it is reasonably correct over a day.

They intend to devise a suitable formula and obtain some results, which they will then compare with our results from Penman and from evaporimeters.

Details should be confirmed with Mr. A. Gadd.

MET O 20 - General Circulation models

It does not appear likely that Met O 20 will want to make use of Penman in the near future. They do not have a level near the surface, so any assessment of surface conditions must be very crude. At present they assume that over the sea the surface R.H. is 100%, and over the land 50%. Presumably the difference in humidity between the surface and their lowest level determines the rate of vapour flux. The question which arises, and about which neither they nor I are clear, is what is meant by "surface". If we mean literally the air in contact with the ground, then (assuming that potential evaporation is taking place) 100% should be used for land also.

Perhaps a climatological value of evaporation, modified using radiation (which they measure) might serve their purposes best?

Details should be confirmed with Mr. D. Shaw.