

Met O 8 Evap Memo No 14

COMPARISONS OF BRITISH STANDARD AND RUSSIAN GGI 3000 EVAPORATION
TANKS AT KEW, CARDINGTON AND ESKDALEMUIR.

by B G Wales-Smith

1. INTRODUCTION. This memo should be read in conjunction with Memos 1 and 5.

The period of comparison (in this memo) between pairs of tanks (one of each sort) was 1 October 1969 to 30 September 1970 at Kew and Eskdalemuir and 1 September 1969 and 31 August 1970 at Cardington. Values of rainfall were obtained from a standard 5-inch rain gauge with rim 1 foot above ground; both tanks were sunk in the ground and painted white on the inside.

The British tank is of square section and the Russian tank is circular; the British tank has approximately 11 times the surface water area of the Russian tank (33,445 sq.cm.; 3000 sq.cm.) - both tanks are approximately 61 cm. deep.

2. PREPARATION OF DATA. Where values of evaporation were obtained for all days in the month (days when no measurement could be made due to thickness of ice cover being counted as days with zero evaporation) from both tanks at a station, true monthly totals were obtained and divided by the number of days in the month to provide mean daily values. Whenever a tank missed a day, for any reason, the corresponding value from the other tank was rejected so that mean daily values could be obtained from totals of the same daily value sets from both tanks.

3. GRAPHICAL TREATMENT. The mean daily values of evaporation for sets of twelve months are compared in Figs. 1, 2 and 3. In each case it has been considered justifiable to insert a regression line by inspection. The points from Figs. 1, 2 and 3 are all shown on Fig. 4, together with the three regression lines.

4. DISCUSSION OF RESULTS. In Memo 1, Wright found correlation coefficients of 0.91 to 0.93 for two British and two Russian tanks at Kew for the period 1 June to 30 November 1968. The Russian tank evaporation values were, on average, 110 % (approx.) of the British tank values. The slope of the line in Fig. 1 gives a value of 120 % in the same sense. The lines for Cardington and Eskdalemuir are almost parallel to one another. At Cardington the larger values are almost exactly the same whilst at Eskdalemuir evaporation from the British tank appears to have averaged 111 % of that from the Russian tank.

Correlation is very good at all three stations. On the basis of this brief examination, the reasons for the differences in relationship between the tanks, from station to station must remain a matter for conjecture but it seems reasonable to assume that the difference in water surface area and volume, heat storage, received radiation, average wind speed and saturation deficit and site characteristics must all be involved.

At all events, from the practical point of view, it would appear that both tanks yield comparable measures of evaporation from fairly small water surfaces.

Appendix. Comparison of daily values at Kew.

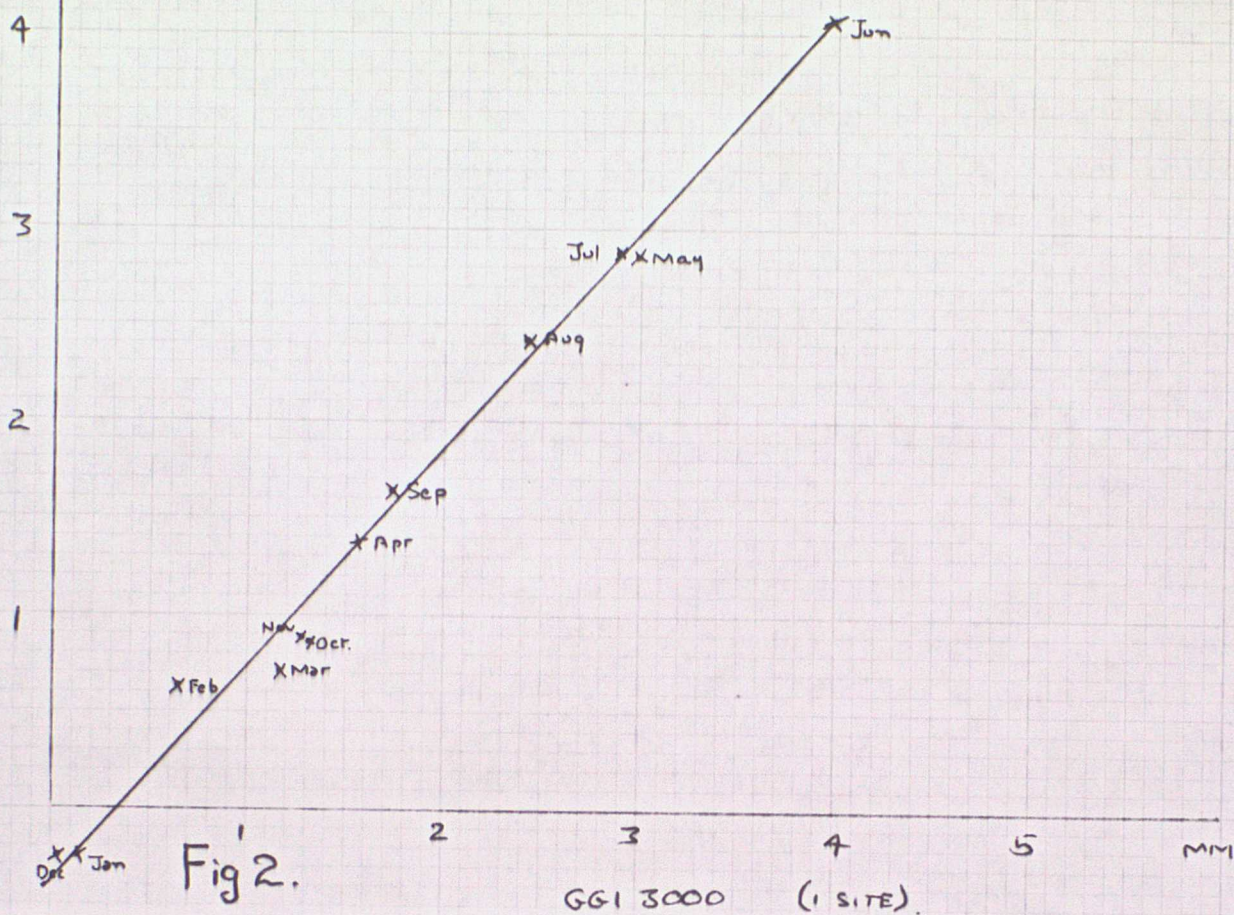
Figure 5 compares daily evaporation measurements made at Kew from 1 April to 30 September 1969. None of these measurements is included in the main comparison but it will be seen, at a glance, that individual daily values are quite well correlated and that the Russian tank tends to lose some 12-13% (on average) more than the British tank.

October 1970

Met. O. 8c
BRACKNELL

BRIT. STD. TANK

CARDINGTON (SEP 1969 - AUG 1970) TANK EVAPORATION (mean daily values)



MM

5

4

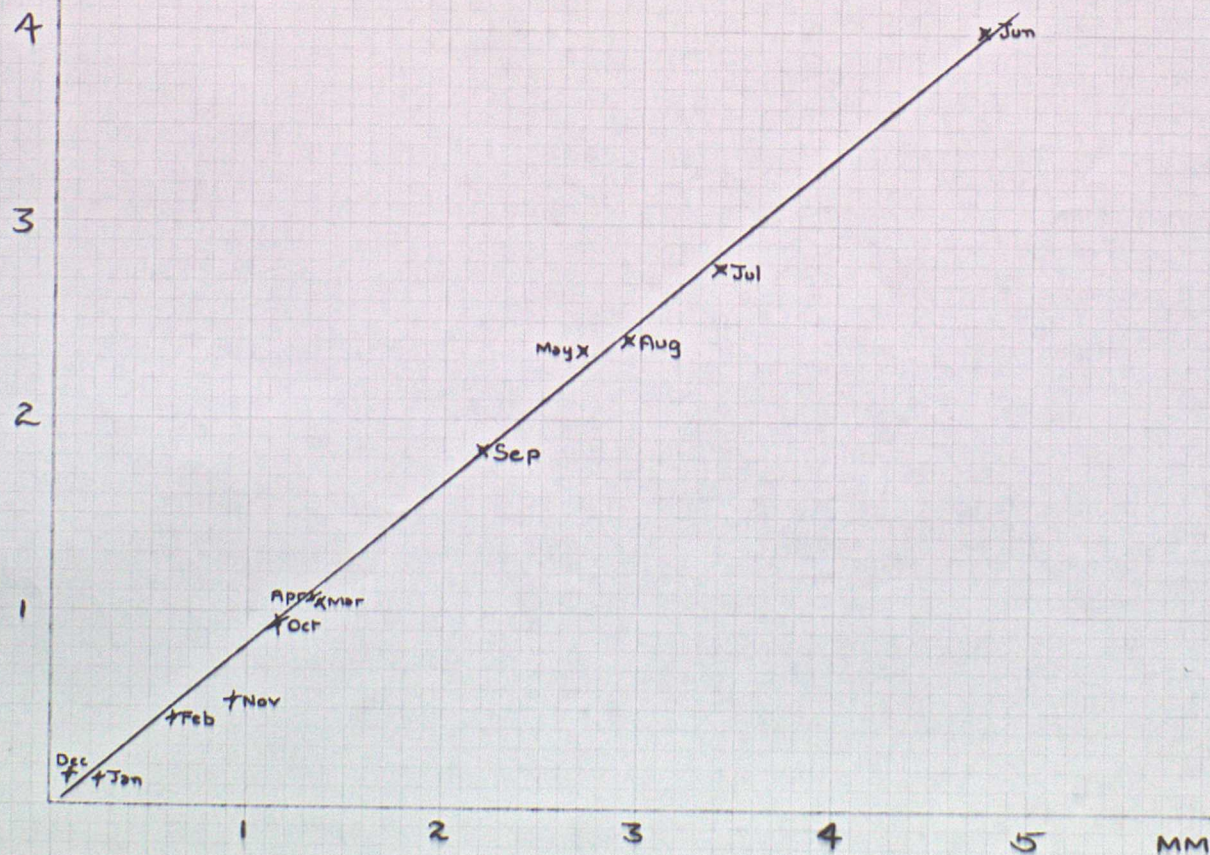
3

2

1

0

KEW (OCT 1969 - SEP 1970) TANK EVAPORATION (mean daily values).



BRIT. STD. TANK (OLD SITE)

CARDINGTON, KEW AND ESKDALEMUIR. TANK EVAPORATION (mean daily values)

BRIT. STD. TANK

4

3

2

1

Fig. 4.

2

3

4

5

mm.

GGI 3000

C

K

E

mm

5

4

3

2

1

ESKDALEMUIR. (OCT 1969 - SEP 1970) TANK EVAPORATION (mean daily values)

BRIT. STD TANK.

Apr +

+ Jul

+ Sep

Nov
+ Oct.
Dec + Mar

Jan + Feb

+ Jun

+ Aug

+ May

1

2

3

4

5

mm.

GGI 3000

Fig. 3.

Fig. 5.

TANK EVAPORATION MEASUREMENTS (KEW)

APR-SEP 1969

