

## Comparison of class A pan, tank and Piche evaporimeter

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**ABSTRACT.** The object of this paper is to study the variation of evaporation at Karaj (Long. 51° 00'E, Lat. 35° 48'N, Alt. 1321m) by different evaporimeters and comparison the results to find out a suitable conversion factor. The results of analysis of 2 years (1975-76) data of evaporation show that the correlation coefficient between Piche and U.S.A. evaporimeter, is higher than that U.S.A. and U.S.S.R. evaporimeters. Conversion factors varied from month to month.

### 1. Introduction

Measurements of evaporation of water from land, sea and vegetation are of great importance in meteorology and agriculture. Among the known methods to estimate evaporation, the evaporimetric method is the simplest. The measure of evaporation by Piche and U.S.A. pan or Soviet tank evaporimeters is the most direct index of the evaporation from the water surface. The object of this study was to determine the variation of evaporation at Karaj as measured by different evaporimeters. The Piche evaporimeter is the cheapest and most commonly used evaporimeter in Iran. Therefore, an attempt was made to find a suitable conversion factor where Piche data can be converted to that obtained from standard U.S.A. pan or Soviet 20m<sup>2</sup> tank evaporimeters.

### 2. Location and exposure of evaporimeters

The evaporimeters located at Karaj (Long. 51° 00'E, Lat 35° 48' N, Alt. 1321m) in the centre of a 200-hectare farm, free from any obstruction. Description of the evaporimeters is given in WMO Technical Note No. 83 (1966) the class A pan (USA) was above ground, whereas the Soviet 20 m<sup>2</sup> tank was installed in the ground, and the Piche evaporimeter was located in a Stevenson Screen.

### 3. Variation of evaporation

Data were collected from April to September both in 1975 and 1976. Evaporation data were collected once daily, at 18.30 hours for the Soviet tank, but twice per day, at 06.30 and

18.30 hours for the Piche and U.S.A. pan evaporimeters. The average day time evaporation value was two times higher than at night.

All three evaporimeters showed the minimum daily evaporation value occurred in April: 1.2, 3.4 and 3.0 mm respectively, for the tank, pan and Piche evaporimeters. The maximum daily evaporation value occurred in July: 12.0, 20.2 and 30.0 mm respectively, for tank, pan and Piche evaporimeters. The annual variation in monthly evaporation values for the three types of evaporimeters is presented in Table 1.

### 4. Comparison of evaporimeters

Comparisons made of Piche, U.S.A. pan and Soviet tank evaporation data show a significant correlation. Relationship between pan and Piche daily data was higher than between other evaporimeter data.

The variation of mean monthly evaporation, measured by U.S.A. pan or Soviet tank, indicated a high correlation with those measured by Piche evaporimeter. The coefficient of this correlation was nearly same for all the evaporimeters mentioned. Correlation coefficients and factors of conversion of evaporation values are given respectively in Tables 2 and 3.

The mean monthly coefficient from class A pan evaporimeter readings as compared to the 20 m<sup>2</sup> evaporation tank, was very close to the coefficients given in report of Hounam (1973). The mean monthly ratio of pan to Piche or tank to Piche data varies from month to month but these variations, specially for U.S.A. pan to

TABLE 1

Monthly values of evaporation (mm)

Evaporimeters	Apr	May	Jun	Jul	Aug	Sep
Piche	8.3	7.3	12.7	16.2	14.4	10.7
U.S.A. Pan	7.2	7.2	11.4	14.3	12.1	9.4
Soviet tank	3.1	4.0	6.6	8.1	7.3	5.7

Piche was not so high as given by Sansom (1954) or published in WMO Technical Note No. 83.

### 5. Conclusion

This study shows that ratio of daily evaporation values from the Piche, to standard U.S.A. pan or U.S.S.R. tank vary considerably. Because of this variation, it was not possible to use a single correction factor for daily data. But, on an annual (April to September) basis, the Piche evaporimeter data could be correlated satisfactorily with the data of both from the U.S.A. pan and Soviet tank evaporimeters. A factor of 0.89 can be used to convert Piche data to that which would be expected from U.S.A. pan evaporimeter during the April to September period. A factor 0.50 can be used to convert Piche data to that which would be expected from the 20 m<sup>2</sup> U.S.S.R., tank for the same period.

TABLE 2

Coefficients of correlation between evaporimeters

Evaporimeters	Apr	May	Jun	Jul	Aug	Sept	Year
Pan and tank	0.24	0.27	0.42	0.47	0.42	0.52	0.97
Pan and Piche	0.14	0.75	0.80	0.57	0.66	0.81	0.98
Piche and tank	0.17	0.49	0.55	0.37	0.55	0.57	0.95

TABLE 3

Factors of conversion of evaporation values from Piche to U.S.A. pan and Soviet tank

Evaporimeters	Apr	May	Jun	Jul	Aug	Sept	Year
Pan to Piche	0.87	0.89	0.89	0.88	0.84	0.88	0.89
Tank to Piche	0.37	0.55	0.52	0.50	0.50	0.53	0.50

### References

- Hounam, C.E., 1973, *Comparison between pan and lake evaporation*, WMO Tech. Note No. 126.
- Sansom, H.W., 1954, *Tech. Memo.*, East African met. Dep., 5. WMO Tech. Note No. 83, 1966, *Report of Working Group on evaporation Measurement of the Commission for Instruments and Methods of Observation.*