

SEES 503 SUSTAINABLE WATER RESOURCES
2011-12 Fall

Due Date: November 18, 2011

ASSIGNMENT - 3
EVAPORATION

Problem 1

Problem 5.7 (Engineering Hydrology by Usul, N., METU Press, 2005, Chapter 5, page 133).

Average daily evaporation measurements from a nearby pan and average monthly lake areas are given for a reservoir for seven months. Estimate average monthly evaporation losses in mm and m³ from this lake.

Month	March	April	May	June	July	Aug.	Sep.
E (mm/day)	1.7	2.1	3.1	3.9	4.3	4.1	1.8
A (ha)	3.3	3.0	2.5	1.7	1.5	1.2	1.1

Assume a fix pan coefficient of 0.7.

Problem 2

Problem 5.8 (Engineering Hydrology by Usul, N., METU Press, 2005, Chapter 5, page 133).

The following crops (Table 5.6) will be planted in a new agricultural area where irrigation water will be obtained from a newly found groundwater source. Mean monthly precipitation and temperature values are given in Table 5.7 for an average and also for the driest year for this area, which lies at 34° latitude. Compute the consumptive use for each month then determine the necessary irrigation amount for an average year and also for the driest year.

Table 5.6 Information about the planted crops.

Crop	Area (ha)	Growing Season (month)
Corn	100	June-Sep.
Small grains	50	March-June
Tomato	70	July-Sep.
Potato	100	June-Sep.
Cotton	200	June-Sep.

Table 5.7 Temperature and precipitation data.

Month	March	April	May	June	July	Aug.	Sep.
Mean t (°C)	12.3	15.7	18.2	21.2	22.4	21.6	16.8
P _{ave} (mm)	18.5	23.4	15.2	7.3	3.1	1.3	8.9
P _{driest} (mm)	6.2	12.3	8.7	-	-	-	3.1

Problem 3

Problem 1.3 (Engineering Hydrology by Usul, N., METU Press, 2005, Chapter 1, page 23).

The following data were observed at Demirkopru Dam site on Gediz River in June 1971. Find the monthly evaporation in mm from the reservoir surface of this dam. If there were a Class A pan installed nearby the reservoir, what would be the monthly evaporation observed from this pan?

Storage at the beginning of the month	: $495.5 \times 10^6 \text{ m}^3$
Storage at the end of the month	: $476.4 \times 10^6 \text{ m}^3$
Average surface area of reservoir in the month	: 42.5 km^2
Mean inflow	: $15.8 \text{ m}^3/\text{s}$
Amount of water used for power generation	: $50.5 \times 10^6 \text{ m}^3$
Depth of rainfall for the month	: None
Average seepage rate in the month	: 424.38 lt/s