



**CIVIL ENGINEERING FACULTY HYDRAULICS DIVISION  
HYDROLOGY**

***Examples –2 Analysis of Precipitation***

1. The following table presents the annual precipitation depths between 1951-68 measured from 10 precipitation gauges located over a river basin. The homogeneity of data from Gauge 8 is suspicious.

a. Check the homogeneity of the gauge using *double mass curve method*. At which year does the change of the gauge location correspond?

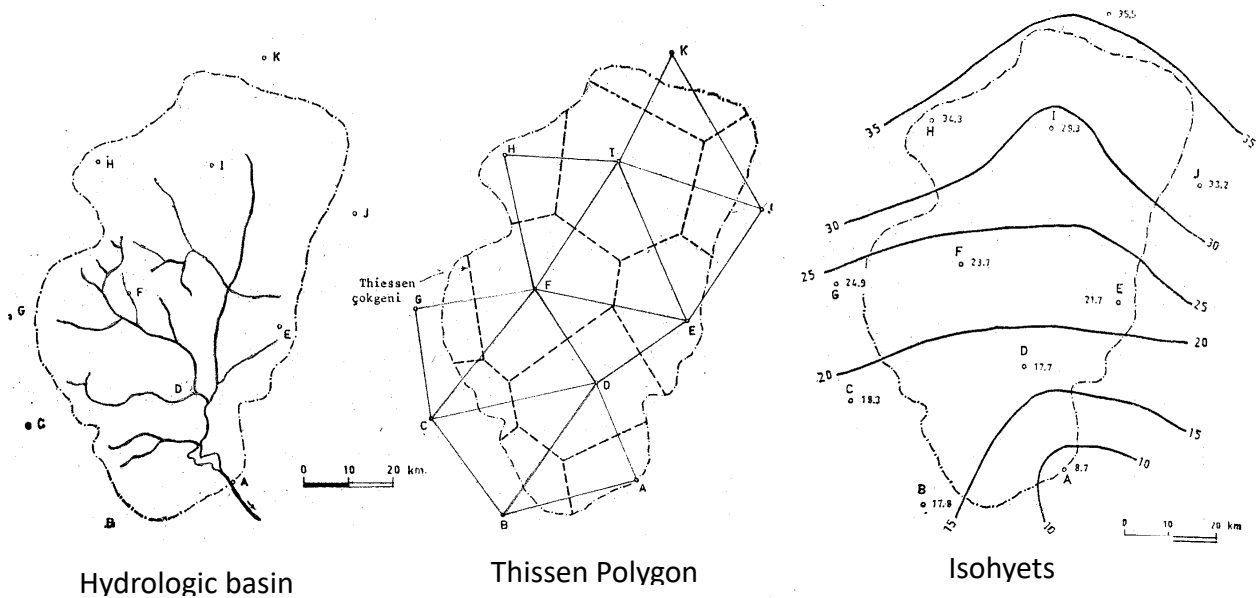
b. Homogenise the readings of gauge 8 before this year

YEAR	1	2	3	4	5	6	7	8	9	10
1951	52	76	80	57	61	72	102	103	114	107
1952	43	58	62	47	45	60	80	91	92	92
1953	52	66	72	55	53	65	89	89	96	100
1954	73	94	99	78	77	100	137	159	139	152
1955	37	55	55	41	41	49	72	95	76	82
1956	42	54	51	48	47	56	70	101	78	80
1957	51	63	69	59	55	64	96	134	112	108
1958	52	65	67	59	53	61	86	105	94	89
1959	46	60	66	52	51	58	87	117	99	100
1960	52	74	79	58	55	71	96	135	108	110
1961	51	68	70	56	56	68	106	125	108	110
1962	53	73	71	56	55	72	103	131	112	109
1963	47	66	63	55	55	65	99	120	102	103
1964	43	61	60	48	44	62	87	110	94	93
1965	50	65	64	59	56	65	87	108	98	96
1966	55	75	79	60	55	78	106	138	118	113
1967	60	80	84	69	65	83	120	166	131	132
1968	52	64	64	58	56	65	88	118	109	100

2. The precipitation values measured during a storm in the basin given below is listed.

a. The precipitation values measured during a storm in the basin given below is listed. Calculate the mean precipitation values in the area with arithmetical mean method, Thiessen method and isohyet method (the interval of isohyets will be 5 mm).

b. Determine the local distribution of precipitation in this basin for this storm and draw the “precipitation-area” curve.



Gage	Precipitation Pi(mm)	Thiessen Polygon Area Ai (km <sup>2</sup> )
A	8.7	233.10
B	17.8	644.91
C	18.3	481.74
D	17.7	186.48
E	21.7	85.47
F	23.7	828.80
G	24.9	160.58
H	34.3	297.85
I	29.3	903.91
J	33.2	297.85
K	35.5	248.64

Isohyeths	Pi (mm)	Ai (km <sup>2</sup> )
35-30	32.5	1103.34
30-25	27.5	818.44
25-20	22.5	1186.22
20-15	17.5	924.63
15-10	12.5	300.44
<10	7.5	36.26

3. Precipitation heights (P) at stations in the basin shown in the figure are given. Find the average precipitation height in the basin using :

a. Arithmetic average

b. Thiessen Method.

$P_A = 10 \text{ mm}$        $P_B = 12 \text{ mm}$

$P_C = 24 \text{ mm}$        $P_D = 8 \text{ mm}$

$P_E = 14 \text{ mm}$        $P_F = 16 \text{ mm}$

