Romblon State University
COLLEGE OF ENGINEERING AND TECHNOLOGY
Odiongan, Romblon
Tel. no. (042) 567-5588

HANDOUT #5: PRECIPITATION

CE4214 Hydrology
Engr. Reynaldo P Ramos, PhD

A. RAINFALL ANALYSIS

The following variables are commonly used in analyzing rainfall distribution determination.

1. Space: the average rainfall over the area
2. Intensity: how hard it rains
3. Duration: how long it rains at an given intensity
4. Frequency: how often it rains at any given intensity and duration

B. SPATIAL DISTRIBUTION RAINFALL

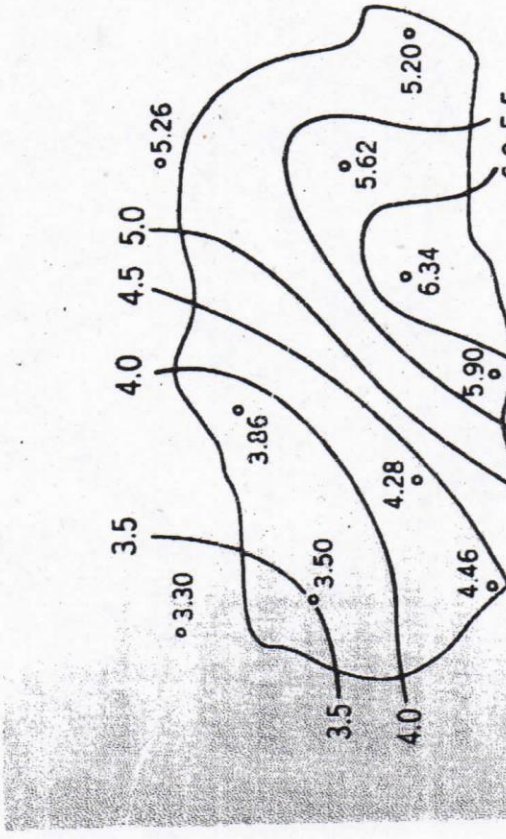
1. **Arithmetic Average Method**
   This is the simplest method to determine the average depth of rainfall over the basin. It is determined by the mean depth recorded by the gages in the basin.

2. **Thiessen Method**
   This method assumes that the rainfall reading measured at any gage could be applied to a point halfway to the next gage. Polygons are drawn by constructing perpendicular bisectors to lines drawn between adjoining gages. The fractional contribution of each polygon to the total area is computed. The rainfall at each gage is multiplied by the fractional area (weighted) and the results are summed.

3. **Isohyetal Method**
   This method is used for analyzing individual storms because it gives the best approximation to the real rainfall pattern. Lines are drawn with equal rainfall amount called as isohyets. Observed data and any other available information such as spot checks, are used to interpolate between gages. The average depth over the area is computed by determining the incremental volume between each pair of isohyets. Then the incremental volumes are added and divided by the total area.

EXERCISES/EXAMPLES: Refer to the attached sheets.

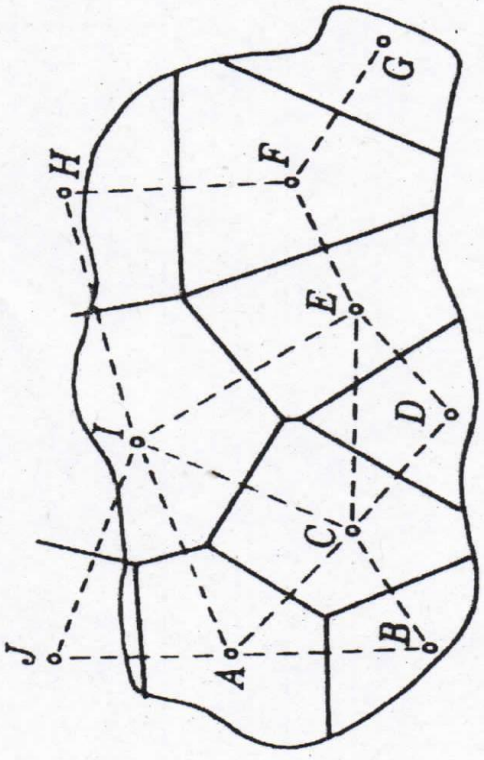
Isohyets	Area between isohyets, mi^2	Average precipitation, in.	Product $A \times P$ mi^2 in.
3.0	19	3.45	66
3.5	106	3.75	398
4.0	102	4.25	434
4.5	60	4.75	285
5.0	150	5.25	788
5.5	84	5.75	483
6.0	47	6.20	291
6.5			
Total	568	—	2745



Average precipitation = $\frac{\Sigma AP}{\Sigma A} = \frac{2745}{568} = 4.83$ in.

FIGURE 2.4
An isohyetal map.

Station	Thiessen area mi²	Precipitation, in.	Product, mi² in.
A	72	3.50	252
B	34	4.46	152
C	76	4.28	325
D	40	5.90	236
E	76	6.34	482
F	92	5.62	517
G	46	5.20	239
H	40	5.26	211
I	86	3.86	332
J	6	3.30	20
Total	568	47.72	2766



Average precipitation = $\frac{\Sigma \text{ Product}}{\Sigma \text{ Area}} = \frac{2766}{568} = 4.87$ in.

FIGURE 2.3
Thiessen network.