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Empirical Formulae for Flood-Peak Area Relationships Formulas

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List of 17 Empirical Formulae for Flood-Peak Area Relationships Formulas

Empirical Formulae for Flood-Peak Area Relationships

Dicken's Formula (1865)

1) Catchment area when maximum flood discharge is considered in Dickens formula

Open Calculator

fx $$A = \left(\frac{Q_{mp}}{C_D}\right)^{\frac{1}{0.75}}$$

ex $$36.06445\text{km}^2 = \left(\frac{88.3\text{m}^3/\text{s}}{6.0}\right)^{\frac{1}{0.75}}$$

2) Dicken's Formula for maximum flood discharge

Open Calculator

fx $$Q_{mp} = C_D \cdot A^{\frac{3}{4}}$$

ex $$96.32578\text{m}^3/\text{s} = 6.0 \cdot (40.5\text{km}^2)^{\frac{3}{4}}$$

3) Dicken's Formula for Maximum Flood Discharge in Central Andhra and Orrisa

Open Calculator

fx $Q_{mp} = C_{CA} \cdot A^{\frac{3}{4}}$

ex $417.4117 m^3/s = 26 \cdot (40.5 km^2)^{\frac{3}{4}}$

4) Dicken's Formula for Maximum Flood Discharge in Central India

Open Calculator

fx $Q_{mp} = C_{CI} \cdot A^{\frac{3}{4}}$

ex $401.3574 m^3/s = 25 \cdot (40.5 km^2)^{\frac{3}{4}}$

5) Dicken's Formula for Maximum Flood Discharge in North-Indian Hilly Regions

Open Calculator

fx $Q_{mp} = C_{NH} \cdot A^{\frac{3}{4}}$

ex $192.6516 m^3/s = 12 \cdot (40.5 km^2)^{\frac{3}{4}}$

6) Dicken's Formula for Maximum Flood Discharge in North-Indian Plains

Open Calculator

fx $Q_{mp} = 6 \cdot A^{\frac{3}{4}}$

ex $96.32578 m^3/s = 6 \cdot (40.5 km^2)^{\frac{3}{4}}$

Inglis Formula (1930)

7) Inglis Formula for Areas between 160 to 1000 square kilometers

Open Calculator

fx $$Q_{mp} = 123.2 \cdot \sqrt{A} - (2.62 \cdot (A_L - 259))$$

ex $$784.04 m^3/s = 123.2 \cdot \sqrt{40.5 km^2} - (2.62 \cdot (259 km^2 - 259))$$

8) Inglis Formula for Larger Areas

Open Calculator

fx $$Q_{mp} = \frac{124 \cdot A}{\sqrt{A + 10.4}}$$

ex $$703.9111 m^3/s = \frac{124 \cdot 40.5 km^2}{\sqrt{40.5 km^2 + 10.4}}$$

9) Inglis Formula for Small Areas (also applicable for fan shaped catchment)

Open Calculator

fx $$Q_{mp} = 123.2 \cdot \sqrt{A}$$

ex $$784.04 m^3/s = 123.2 \cdot \sqrt{40.5 km^2}$$

Other Formulae

10) Baird and McIllwraith (1951) Formula for Maximum Flood Discharge

Open Calculator

fx $$Q_{mp} = \frac{3025 \cdot A}{(278 + A)^{0.78}}$$

ex $$1366.958 m^3/s = \frac{3025 \cdot 40.5 km^2}{(278 + 40.5 km^2)^{0.78}}$$

11) Fuller's formula for Maximum Flood Discharge

Open Calculator

fx $$Q_{Tp} = C_f \cdot A^{0.8} \cdot (1 + 0.8 \cdot \log 10(T_r))$$

ex $$95.30714 m^3/s = 1.80 \cdot (40.5 km^2)^{0.8} \cdot (1 + 0.8 \cdot \log 10(150))$$

12) Jarvis Formula for Peak Discharge

Open Calculator

fx $$Q_{mp} = C_J \cdot \sqrt{A}$$

ex $$89.09545 m^3/s = 14 \cdot \sqrt{40.5 km^2}$$

Ryves Formula (1884)

13) Catchment area when maximum flood discharge in Ryve's formula

Open Calculator

fx $$A = \left(\frac{Q_{mp}}{C_R} \right)^{1.5}$$

ex $$46.79265\text{km}^2 = \left(\frac{88.3\text{m}^3/\text{s}}{6.8} \right)^{1.5}$$

14) Ryves Formula for maximum flood discharge

Open Calculator

fx $$Q_{mp} = C_R \cdot A^{\frac{2}{3}}$$

ex $$80.19469\text{m}^3/\text{s} = 6.8 \cdot (40.5\text{km}^2)^{\frac{2}{3}}$$

15) Ryves Formula of Maximum Flood Discharge for Areas within 80-160km from East Coast

Open Calculator

fx $$Q_{mp} = 8.5 \cdot A^{\frac{2}{3}}$$

ex $$100.2434\text{m}^3/\text{s} = 8.5 \cdot (40.5\text{km}^2)^{\frac{2}{3}}$$

16) Ryves Formula of Maximum Flood Discharge for Areas within 80km from East Coast

Open Calculator

fx $$Q_{mp} = 6.8 \cdot A^{\frac{2}{3}}$$

ex $$80.19469\text{m}^3/\text{s} = 6.8 \cdot (40.5\text{km}^2)^{\frac{2}{3}}$$

17) Ryves Formula of Maximum Flood Discharge for Limited Areas near Hills

Open Calculator

fx $$Q_{mp} = 10.2 \cdot A^{\frac{2}{3}}$$

ex $$120.292 m^3/s = 10.2 \cdot (40.5 km^2)^{\frac{2}{3}}$$

Variables Used

- **A** Catchment Area *(Square Kilometer)*
- A_L Catchment for Larger Area *(Square Kilometer)*
- C_{CA} Dickens's Constant for Coastal Andhra and Orissa
- C_{CI} Dicken's Constant for Central Indian
- C_D Dicken's Constant
- C_f Fuller's Coefficient
- C_J Coefficient (Jarvis Equation)
- C_{NH} Dickens's Constant for North India hilly regions
- C_R Ryve's Coefficient
- Q_{mp} Maximum Flood Discharge *(Cubic Meter per Second)*
- Q_{Tp} Maximum 24-hour Flood Peak Discharge *(Cubic Meter per Second)*
- T_r Return Period

Constants, Functions, Measurements used

- Function: **log10**, log10(Number)
  Common logarithm function (base 10)
- Function: **sqrt**, sqrt(Number)
  Square root function
- Measurement: **Area** in Square Kilometer (km²)
  Area Unit Conversion
- Measurement: **Volumetric Flow Rate** in Cubic Meter per Second (m³/s)
  Volumetric Flow Rate Unit Conversion

Check other formula lists

- **Empirical Formulae for Flood-Peak Area Relationships Formulas**
- **Gumbel's Method for Prediction of Flood's Peak Formulas**
- **Rational Method to Estimate the Flood Peak Formulas**

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