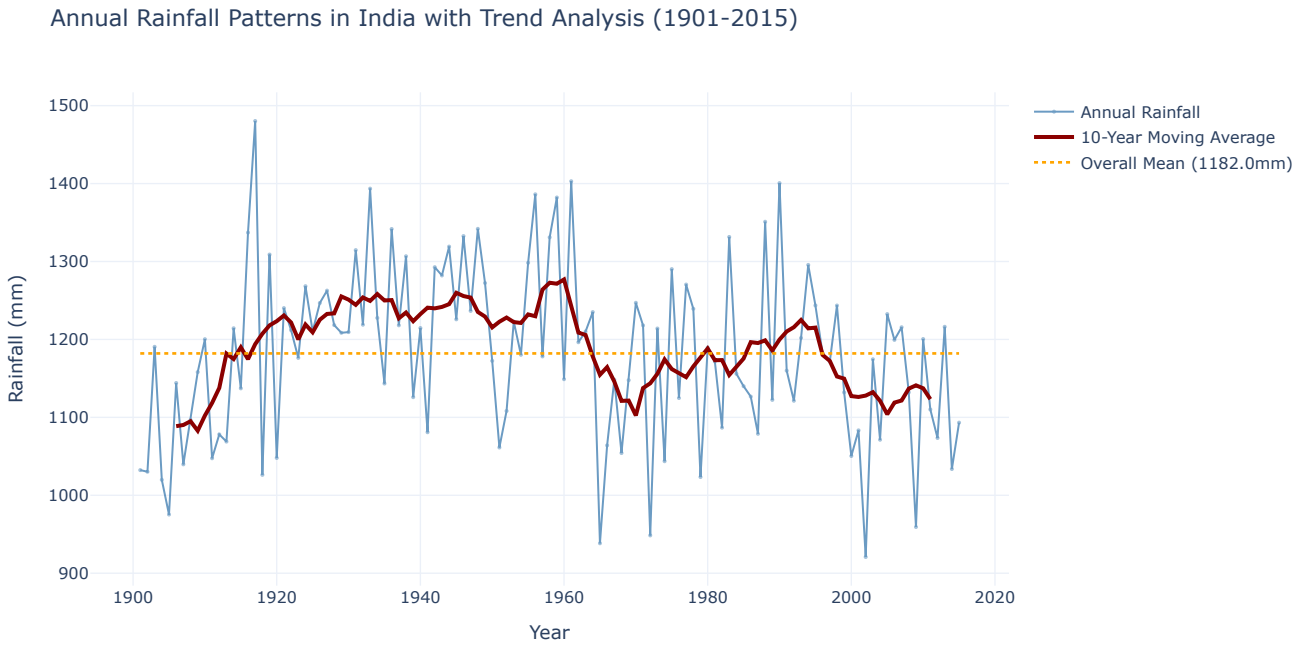
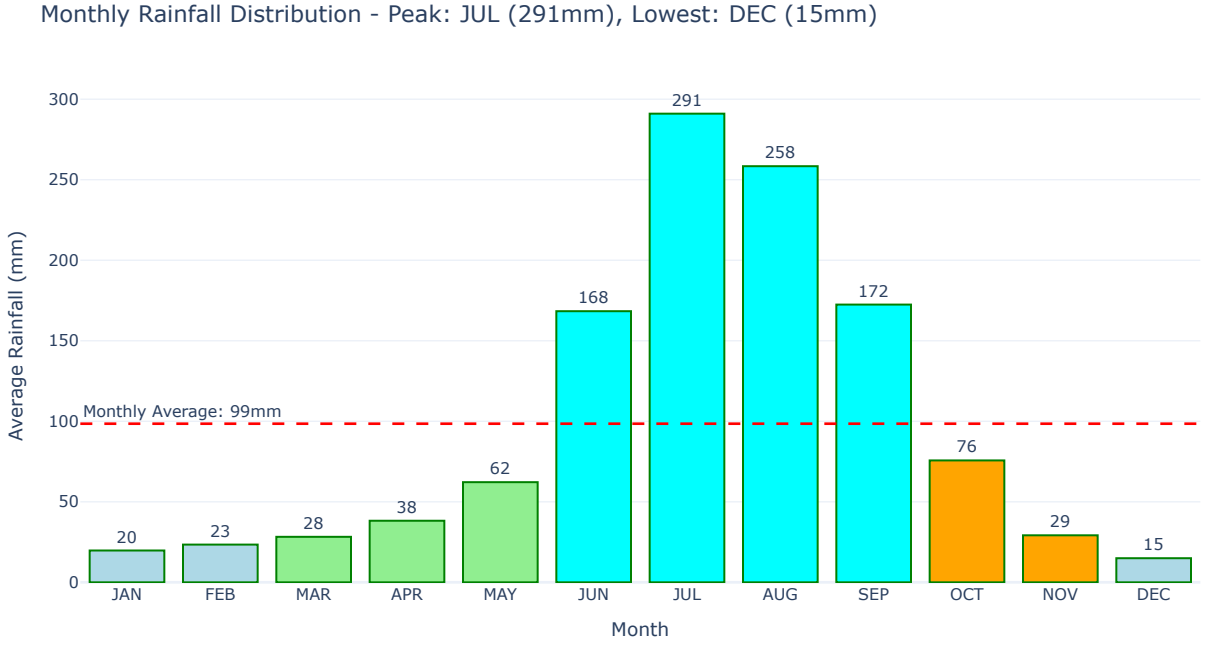
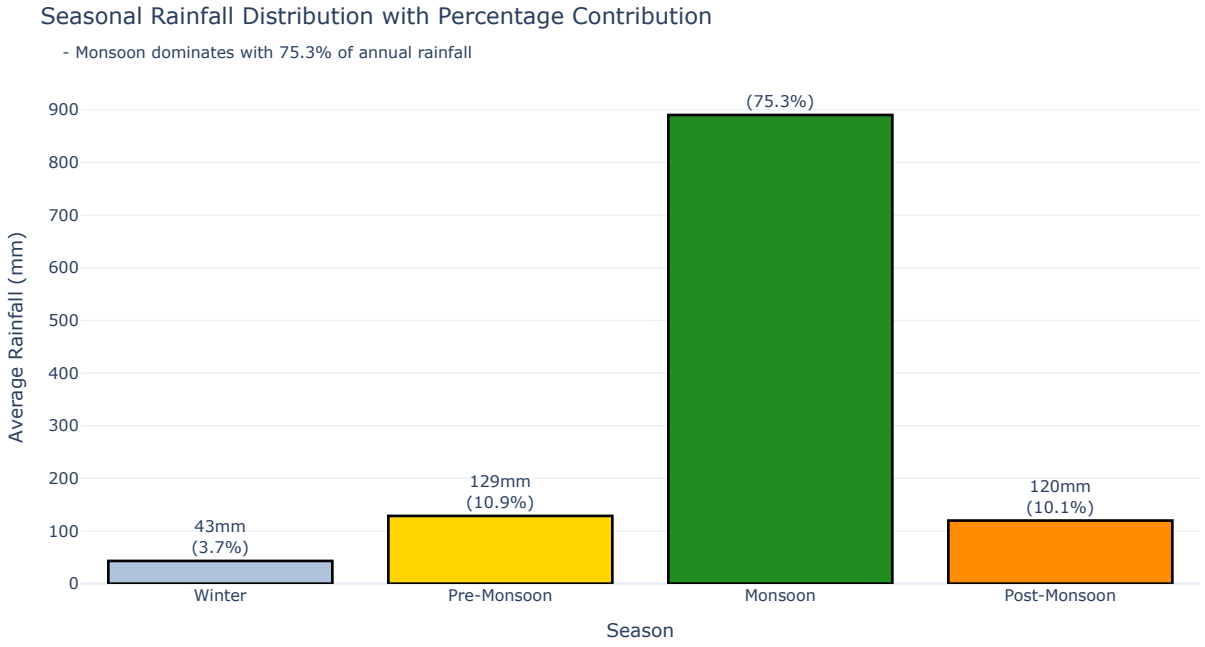
	REGION	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
0	INDIA	1901	34.7	37.7	18.0	39.3	50.8	113.4	242.2	272.9	124.4
1	INDIA	1902	7.4	4.3	19.0	43.5	48.3	108.8	284.0	199.7	201.5
2	INDIA	1903	17.0	8.3	31.3	17.1	59.5	118.3	297.0	270.4	199.1
3	INDIA	1904	14.4	9.6	31.8	33.1	72.4	164.8	261.0	206.4	129.6
4	INDIA	1905	25.3	20.9	42.7	33.7	55.7	93.3	252.8	200.8	178.4

	OCT	NOV	DEC	ANNUAL	Jan-Feb	Mar-May	Jun-Sep	Oct-Dec
0	52.7	38.0	8.3	1032.3	72.4	108.1	752.8	99.0
1	61.5	27.9	24.4	1030.2	11.7	110.8	794.0	113.8
2	117.9	36.9	17.7	1190.5	25.3	107.9	884.8	172.5
3	69.0	11.2	16.3	1019.8	24.0	137.4	761.8	96.6
4	51.4	9.7	10.5	975.3	46.2	132.2	725.4	71.6







📊 RAINFALL ANALYSIS SUMMARY
==
Peak Rainfall Month: JUL (291mm)
Driest Month: DEC (15mm)
Annual Average: 1182mm
Monsoon Season Contribution: 75.3% of total rainfall

🌧️ ENHANCED RAINFALL ANALYSIS RESULTS
==

📉 DROUGHT YEARS (≤ 1016.0mm)

Year	Rainfall (mm)	Category	Anomaly Score	Percentile Rank
2002	920.8	Extreme Drought	-2.36	0.9%
1965	938.4	Extreme Drought	-2.20	1.7%
1972	948.5	Extreme Drought	-2.11	2.6%
2009	959.3	Extreme Drought	-2.01	3.5%
1905	975.3	Severe Drought	-1.87	4.3%

📈 EXCESS RAINFALL YEARS (≥ 1348.1mm)

Year	Rainfall (mm)	Category	Anomaly Score	Percentile Rank
1917	1480.3	Extreme Excess	2.69	100.0%
1961	1403.0	Severe Excess	2.00	99.1%
1990	1400.6	Severe Excess	1.97	98.3%
1933	1393.5	Severe Excess	1.91	97.4%
1956	1386.2	Severe Excess	1.84	96.5%
1959	1382.1	Severe Excess	1.81	95.7%
1988	1351.0	Severe Excess	1.53	94.8%

🔁 SEASONAL CORRELATION ANALYSIS

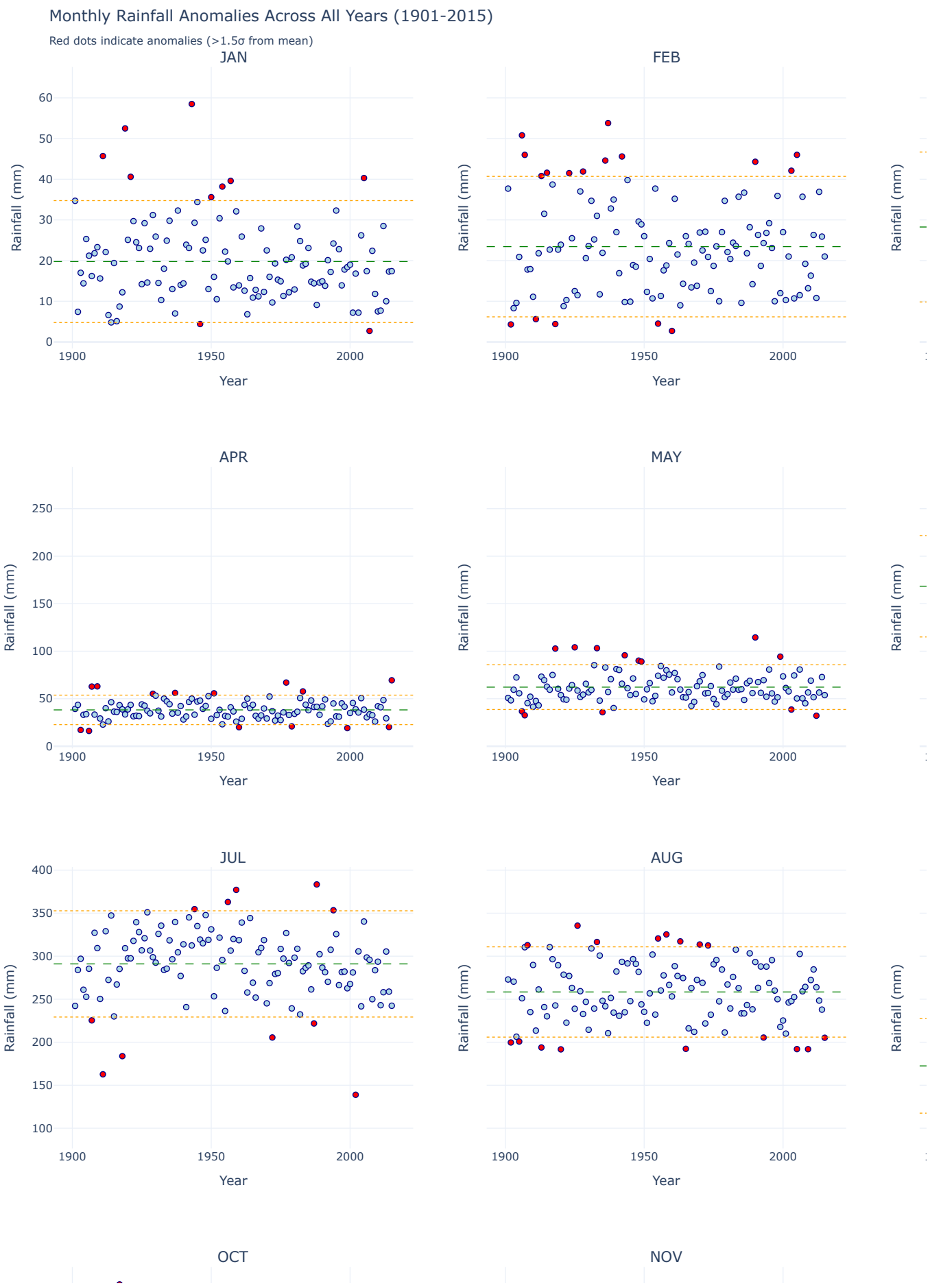
Season	Pearson Corr	Pearson P-Val	Spearman Corr	Spearman P-Val	Significance
Winter	0.2289	0.0139	0.2301	0.0134	Significant
Pre_Monsoon	0.3131	0.0007	0.2897	0.0017	Significant
Monsoon	0.9300	0.0000	0.9124	0.0000	Significant
Post_Monsoon	0.5316	0.0000	0.4755	0.0000	Significant

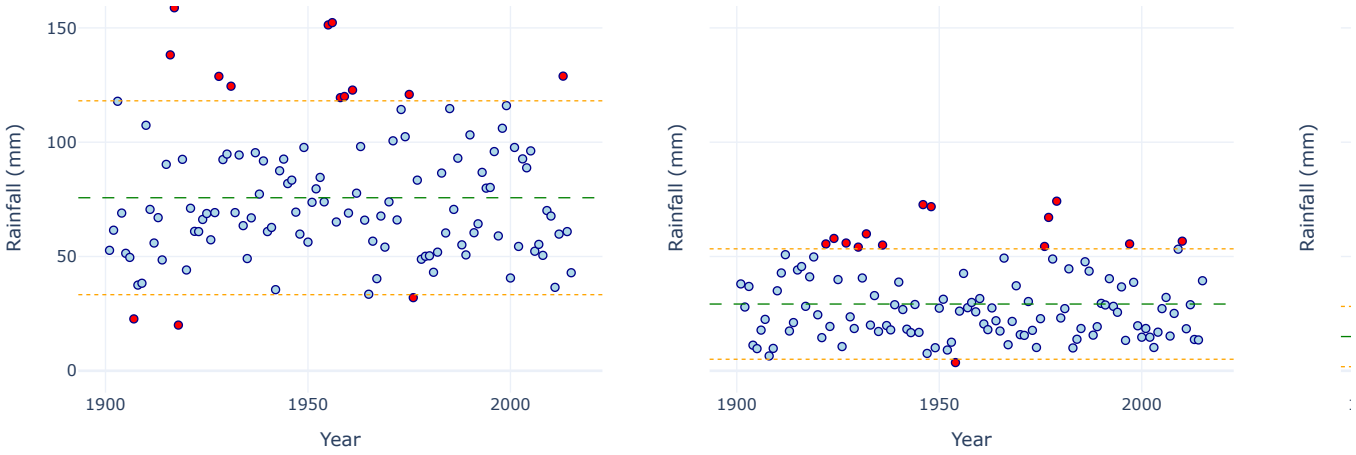
📊 OVERALL STATISTICS SUMMARY

Statistic	Value
Total Years Analyzed	115
Mean Annual Rainfall	1182.0 mm
Standard Deviation	110.7 mm
Median Rainfall	1190.5 mm
Drought Years Count	5
Excess Years Count	7
Drought Frequency	4.3%
Excess Frequency	6.1%

💡 KEY INSIGHTS

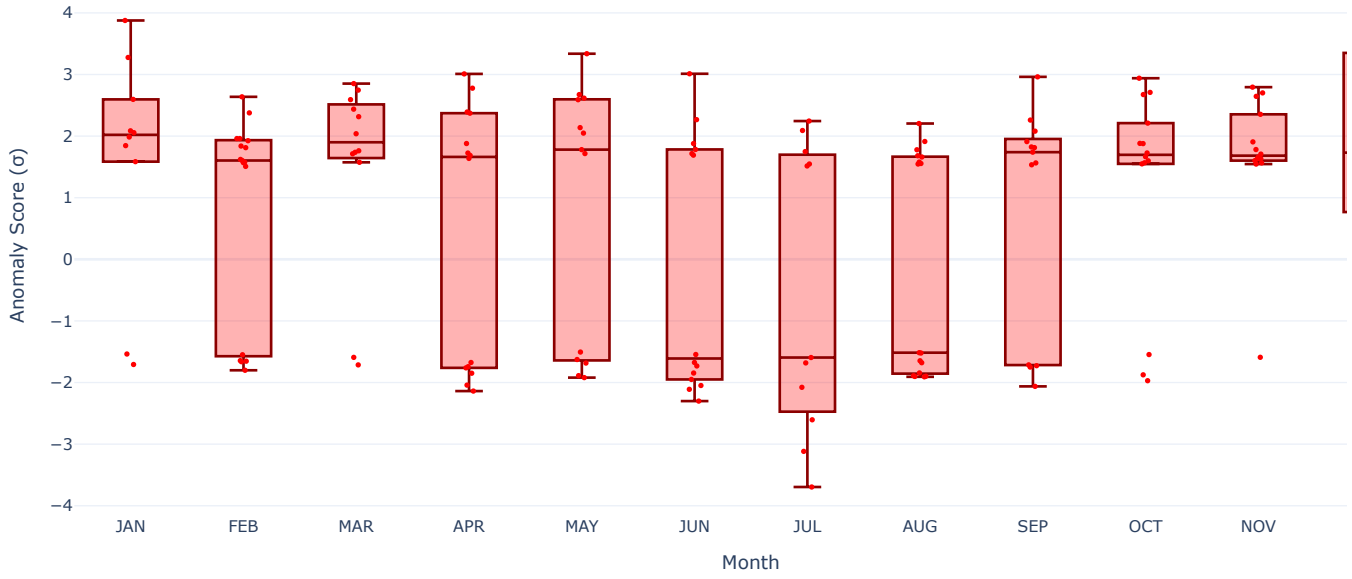
Insight	Description
Driest Year	2002 (920.8mm)
Wettest Year	1917 (1480.3mm)
Most Influential Season	Monsoon (r=0.930)
Extreme Event Frequency	12 years (10.4%)

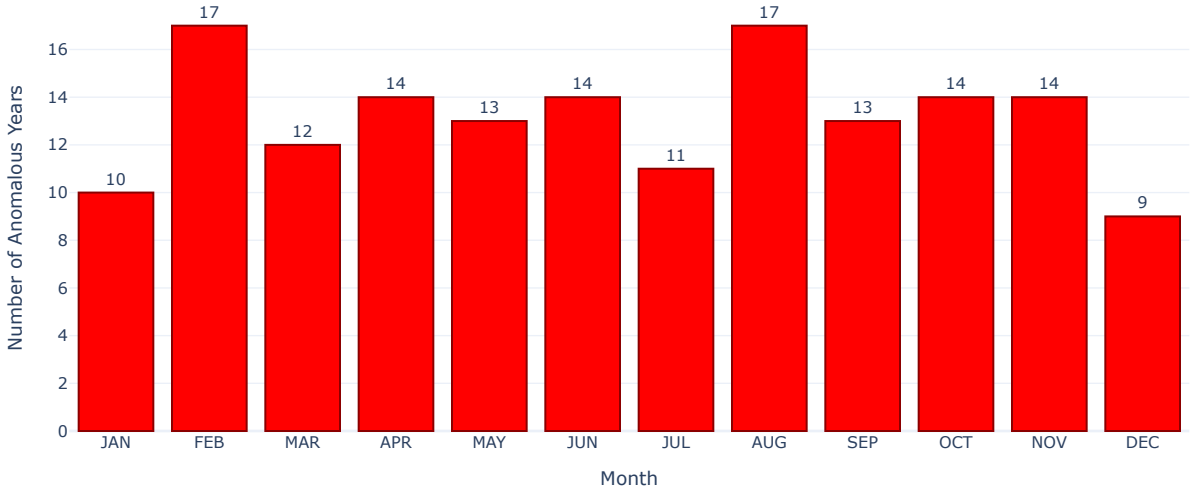

Monthly Rainfall Anomalies Across All Years (1901-2015)
Red dots indicate anomalies (>1.5σ from mean)
JAN
FEB
APR
MAY
JUL
AUG
OCT
NOV
Rainfall (mm)
Year
1900
1950
2000



Distribution of Anomaly Magnitudes by Month

Statistical spread of extreme events - reveals which months show most variable anomaly patterns





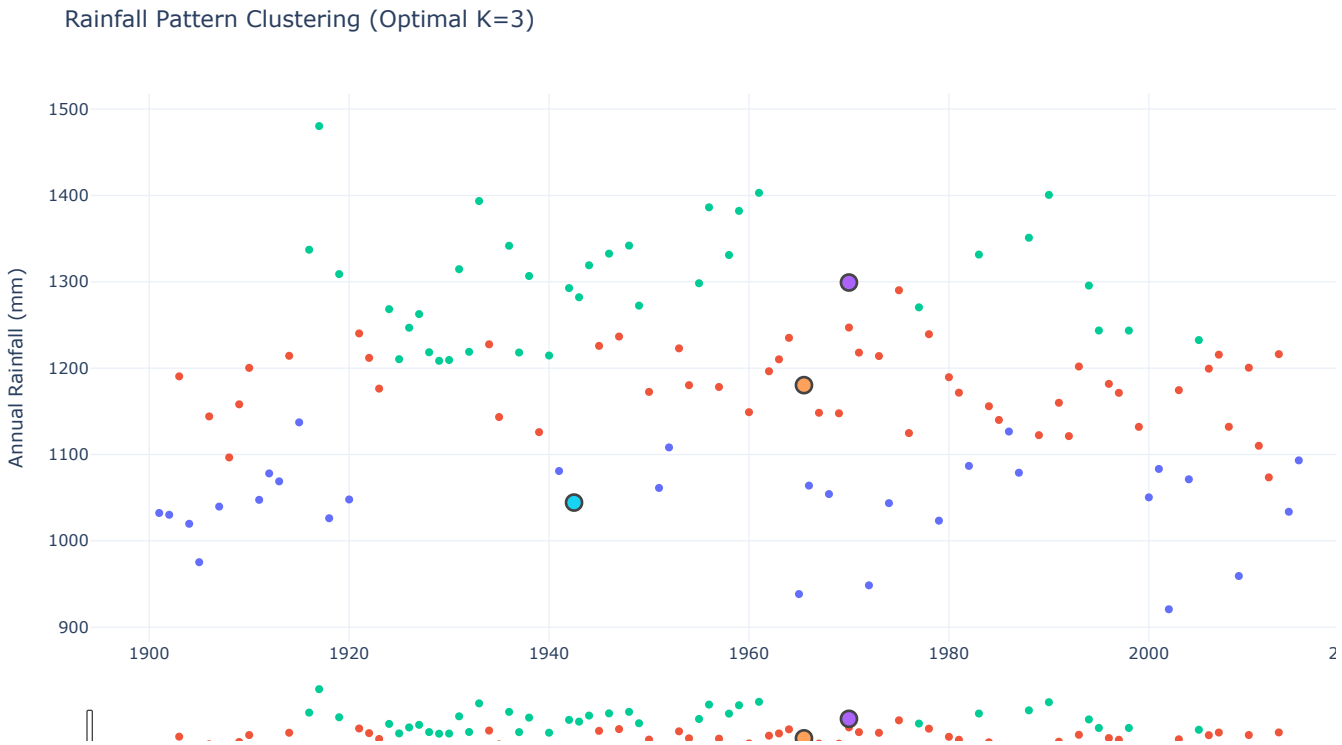
🔍 MONTHLY RAINFALL ANOMALY ANALYSIS
==
📊 Total Anomalous Months: 158
📈 Most Anomalous Month: FEB (17 years)
📉 Least Anomalous Month: DEC (9 years)
⚡ Anomaly Threshold: ±1.5 standard deviations

🎯 MOST EXTREME EVENTS BY MONTH

JAN: 1943 (58.5mm, σ=3.88)
FEB: 1937 (53.8mm, σ=2.64)
MAR: 1967 (63.3mm, σ=2.85)
APR: 2015 (69.4mm, σ=3.01)
MAY: 1990 (114.5mm, σ=3.34)
JUN: 1938 (275.5mm, σ=3.01)
JUL: 2002 (138.9mm, σ=-3.70)
AUG: 1926 (335.5mm, σ=2.20)
SEP: 1917 (281.0mm, σ=2.96)
OCT: 1917 (158.8mm, σ=2.94)
NOV: 1979 (74.2mm, σ=2.79)
DEC: 1967 (54.4mm, σ=4.49)

🗓️ ANOMALIES BY DECADE

1900s: 21 anomalous months
1910s: 20 anomalous months
1920s: 17 anomalous months
1930s: 13 anomalous months
1940s: 13 anomalous months
1950s: 17 anomalous months
1960s: 9 anomalous months
1970s: 13 anomalous months
1980s: 7 anomalous months
1990s: 10 anomalous months
2000s: 10 anomalous months
2010s: 8 anomalous months

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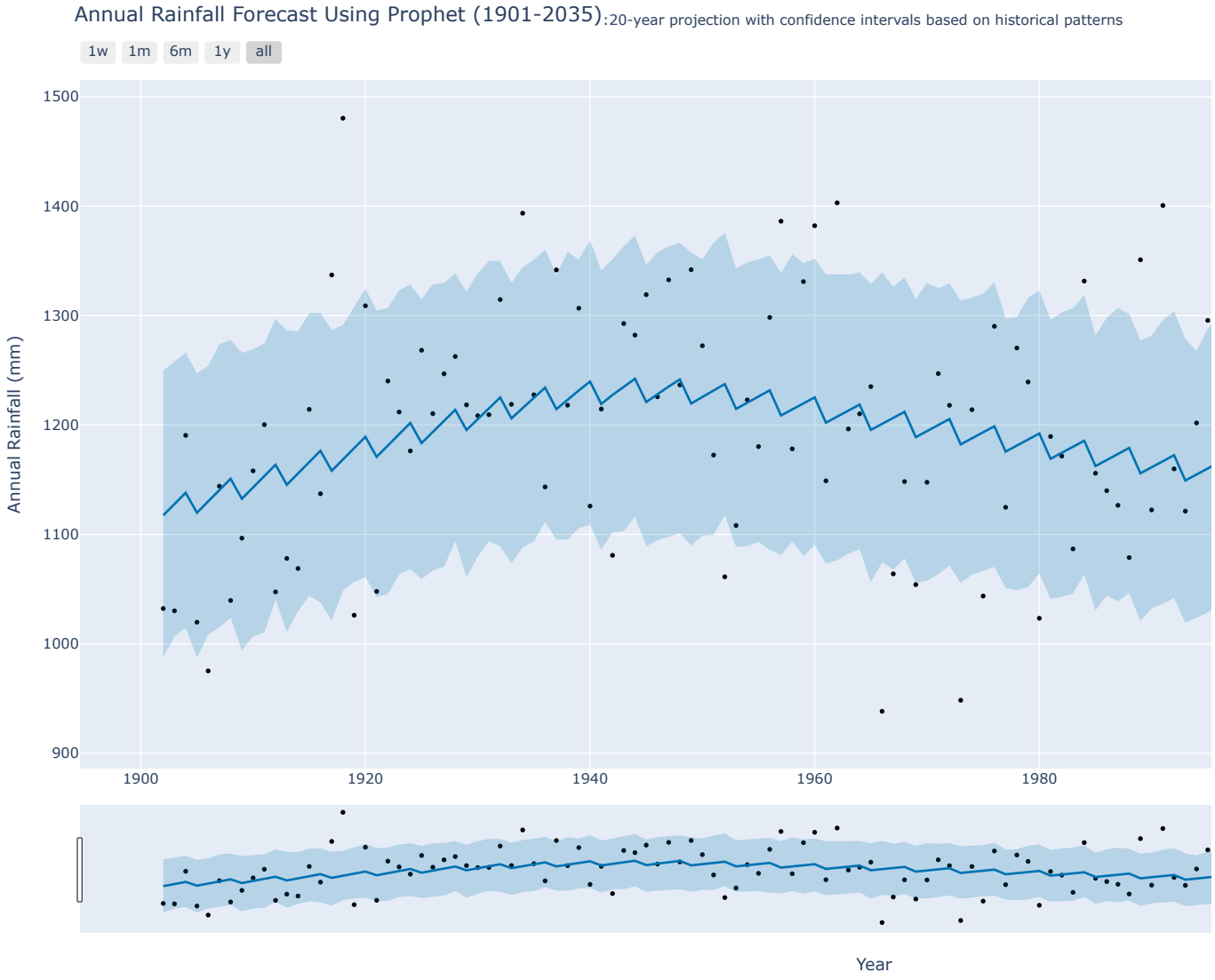
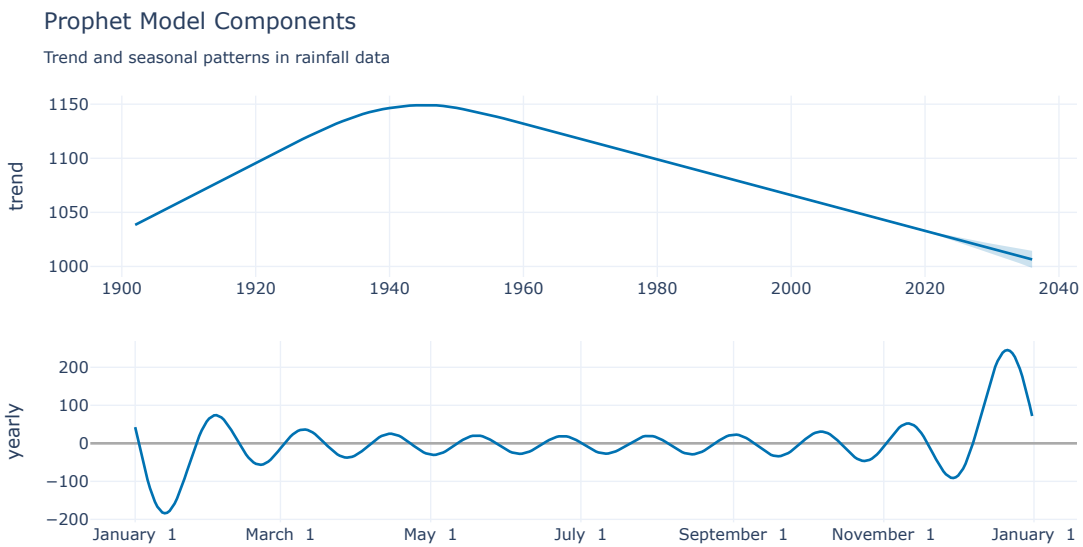

Annual Rainfall Forecast Using Prophet (1901-2035):20-year projection with confidence intervals based on historical patterns
1w
1m
6m
1y
all
Annual Rainfall (mm)
1500
1400
1300
1200
1100
1000
900
1900
1920
1940
1960
1980
Year


Prophet Model Components
Trend and seasonal patterns in rainfall data
trend
1150
1100
1050
1000
1900
1920
1940
1960
1980
2000
2020
2040
yearly
200
100
0
−100
−200
January 1
March 1
May 1
July 1
September 1
November 1
January 1

Historical Average (1901-2015): 1182.0 mm
Forecast Average (2016-2035): 1104.7 mm
Projected Change: -77.3 mm (-6.5%)