SOUTH FLORIDA WATER MANAGEMENT DISTRICT

ENSO Strength to Rainfall Outlook Tercile Probability Conversion

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Methodology

- Use historical record of SST Anomaly – Relative Oceanic Niño Index (RONI) and rainfall information to convert ENSO strength probabilities into tercile probabilities
- For each of the 12 3-month seasons

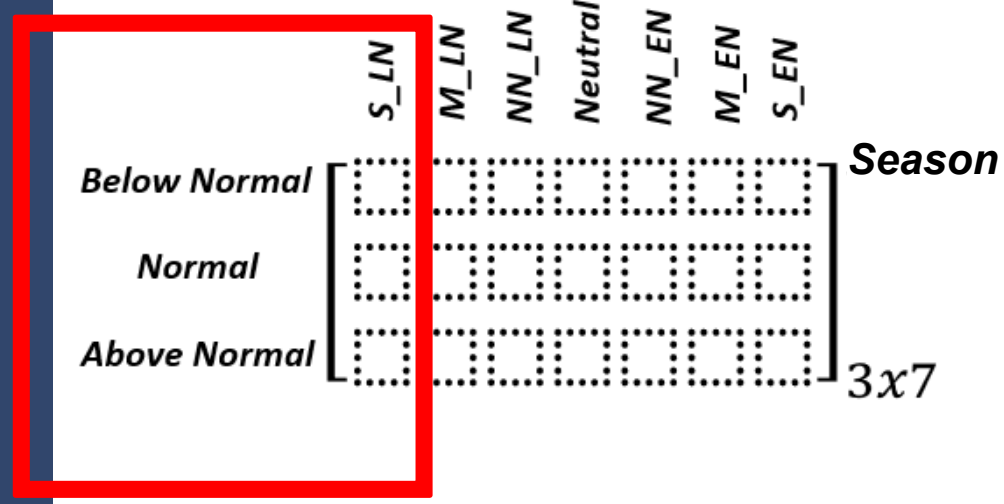
$$\begin{matrix} & \begin{matrix} S\_LN & M\_LN & NN\_LN & Neutral & NN\_EN & M\_EN & S\_EN \end{matrix} \\ \begin{matrix} Below\ Normal \\ Normal \\ Above\ Normal \end{matrix} & \begin{bmatrix} & & & & & & \end{bmatrix}_{3x7} \end{matrix}^{S} \quad \begin{matrix} S \\ \begin{bmatrix} S\_LN \\ M\_LN \\ NN\_LN \\ Neutral \\ NN\_EN \\ M\_EN \\ S\_EN \end{bmatrix}_{7x1} \end{matrix} = \begin{matrix} \\ \begin{bmatrix} Below\ Normal \\ Normal \\ Above\ Normal \end{bmatrix} \end{matrix}$$

ENSO-Rainfall conversion coefficient Matrix

ENSO Cat-Strength Probability Matrix

Rainfall Tercile Probability Matrix

ENSO Strength to Rainfall Probability conversion coefficient Matrix



ENSO to Rainfall conversion coefficient Matrix

S_LN – Strong La Nina (RONI ≤ -1.5 °C)
M_LN – Moderate La Nina (-1.5 °C < RONI ≤ -1 °C)
NN_LN – Near Neutral La Nina (-1 °C < RONI ≤ -0.5 °C)
Neutral – Neutral (-0.5 °C < RONI < +0.5 °C)
NN_EN – Near Neutral El Nino (+0.5 °C ≤ RONI < +1 °C)
M_EN – Moderate El Nino (+1 °C ≤ RONI < +1.5 °C)
S_EN – Strong El Nino (+1.5 °C ≤ RONI)

Season – 3-month seasons {DJF, JFM, FMA, MAM, AMJ, MJJ, JJA, JAS, ASO, SON, OND, NDJ}

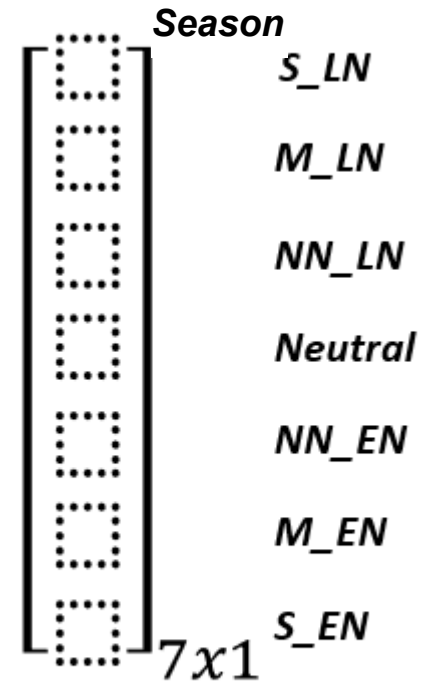
Step 1:
Classify SST Anomaly/RONI into ENSO Strength Categories for each 3-month season

Step 2:
Calculate counts/probabilities of Below Normal, Normal, and Above Normal rainfall events for each ENSO Strength Category

Step 3:
Repeat steps 1 and 2 for each 3-month seasons

Note: each column of this matrix will/should add to 1

ENSO Strength Probability Vector



ENSO Cat-Strength Probability Matrix

ENSO Strength Probabilities

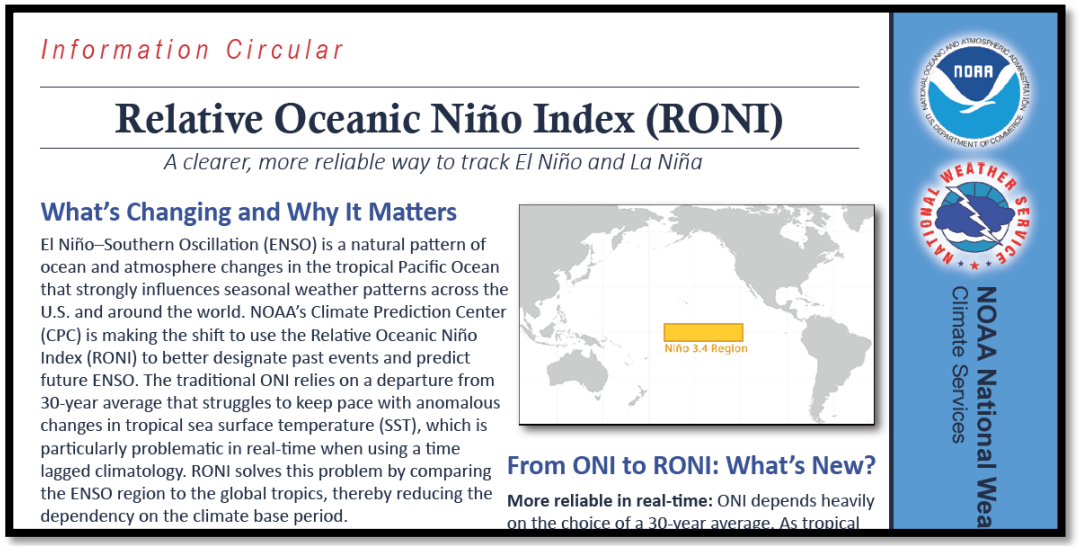
Season	Index ≤ -2.0°C	-1.5°C ≥ Index > -2.0°C	-1.0°C ≥ Index > -1.5°C	-0.5°C ≥ Index > -1.0°C	−0.5°C < Index < 0.5°C	0.5°C ≤ Index < 1.0°C	1.0°C ≤ Index < 1.5°C	1.5°C ≤ Index < 2.0°C	Index ≥ 2.0°C
AMJ	0	0	0	0	84	16	0	0	0
MJJ	0	0	0	0	18	72	10	0	0
JJA	0	0	0	0	8	52	37	3	0
JAS	0	0	0	0	4	30	48	17	1
ASO	0	0	0	0	2	17	41	31	9
SON	0	0	0	0	2	11	30	35	22
OND	0	0	0	0	2	9	24	32	33
NDJ	0	0	0	0	2	9	22	30	37
DJF	0	0	0	0	4	11	25	29	31

Climate Prediction Center - Official NOAA CPC ENSO Strength Probabilities

CALCULATION DETAILS

Step 1: RONI Data

- In early 2026 NOAA's CPC started using Relative Oceanic Niño Index (RONI) instead of Oceanic Niño Index (ONI) to better designate past events and predict future ENSO (https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso/roni/announcement.php)
- Key difference between RONI and ONI is that ONI calculations are based on 30 year moving window for a specific region, while RONI captures the anomaly relative to average tropical ocean temperature anomaly.
- RONI produces better and more stable ENSO Classification compared to ONI using the same classification thresholds values.
- RONI Data is available from (https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso/roni/) with period of record – 1950 to 2026
- Since May 2026 NOAA CPC has stopped producing ONI based ENSO Strength probability table



Information Circular

Relative Oceanic Niño Index (RONI)

A clearer, more reliable way to track El Niño and La Niña

What's Changing and Why It Matters

El Niño–Southern Oscillation (ENSO) is a natural pattern of ocean and atmosphere changes in the tropical Pacific Ocean that strongly influences seasonal weather patterns across the U.S. and around the world. NOAA's Climate Prediction Center (CPC) is making the shift to use the Relative Oceanic Niño Index (RONI) to better designate past events and predict future ENSO. The traditional ONI relies on a departure from 30-year average that struggles to keep pace with anomalous changes in tropical sea surface temperature (SST), which is particularly problematic in real-time when using a time lagged climatology. RONI solves this problem by comparing the ENSO region to the global tropics, thereby reducing the dependency on the climate base period.

From ONI to RONI: What's New?

More reliable in real-time: ONI depends heavily on the choice of a 30-year average. As tropical

NOAA National Wea
Climate Services

Step 1: ENSO Classification

- RONI produces better and more stable ENSO Classification, but uses same classification thresholds as ONI.

S_LN – Strong La Nina (RONI ≤ -1.5 °C)
M_LN – Moderate La Nina (-1.5 °C < RONI ≤ -1 °C)
NN_LN – Near Neutral La Nina (-1 °C < RONI ≤ -0.5 °C)
Neutral – Neutral (-0.5 °C < RONI < +0.5 °C)
NN_EN – Near Neutral El Nino (+0.5 °C ≤ RONI < +1 °C)
M_EN – Moderate El Nino (+1 °C ≤ RONI < +1.5 °C)
S_EN – Strong El Nino (+1.5 °C ≤ RONI)

RONI Classification Summary over 76-year period (1950-2025)

	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
S_LN	5	0	0	0	0	1	1	1	3	4	6	6
M_LN	8	11	6	3	4	1	3	5	7	8	9	7
NN_LN	12	12	13	12	12	15	10	13	11	11	11	13
N	23	32	40	43	45	43	45	37	34	30	25	23
NN_EN	14	11	10	15	12	10	11	12	11	9	9	11
M_EN	6	4	5	2	3	6	5	4	5	9	9	8
S_EN	8	6	2	1	0	0	1	4	5	5	7	8
Total	76	76	76	76	76	76	76	76	76	76	76	76

RONI Data

Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
1950	-1.47	-1.27	-1.11	-1.09	-1	-0.71	-0.41	-0.24	-0.22	-0.29	-0.41	-0.56
1951	-0.5	-0.17	0.25	0.6	0.64	0.69	0.68	0.81	0.87	0.98	0.91	0.8
1952	0.58	0.44	0.42	0.44	0.31	0.07	-0.04	0.03	0.13	0.01	-0.01	0.2
1953	0.53	0.76	0.77	0.83	0.84	0.79	0.67	0.66	0.7	0.77	0.81	0.93
1954	0.99	0.73	0.14	-0.2	-0.34	-0.26	-0.49	-0.74	-0.85	-0.7	-0.56	-0.41
1955	-0.38	-0.32	-0.35	-0.39	-0.37	-0.36	-0.44	-0.61	-1.02	-1.43	-1.63	-1.27
1956	-0.75	-0.32	-0.2	-0.06	-0.05	-0.08	-0.28	-0.32	-0.31	-0.33	-0.37	-0.25
1957	0.04	0.41	0.73	0.97	1.1	1.18	1.23	1.26	1.23	1.31	1.52	1.87
1958	2.02	1.88	1.4	1.07	0.83	0.68	0.49	0.26	0.18	0.25	0.39	0.68
1959	0.77	0.84	0.66	0.44	0.25	-0.06	-0.23	-0.4	-0.29	-0.26	-0.11	-0.02
1960	0.03	0.04	0	0.08	0.06	0.04	0.11	0.17	0.17	0.07	0.01	0.02
1961	0.05	0.06	0.03	0.1	0.26	0.34	0.2	-0.09	-0.32	-0.31	-0.24	-0.12
1962	-0.13	-0.09	-0.11	-0.22	-0.26	-0.21	-0.11	-0.18	-0.25	-0.4	-0.46	-0.5
1963	-0.38	-0.1	0.17	0.24	0.23	0.41	0.73	0.99	1.04	1.1	1.22	1.25
1964	1.13	0.68	0.1	-0.37	-0.63	-0.59	-0.59	-0.62	-0.72	-0.76	-0.7	-0.51
1965	-0.25	0.07	0.15	0.37	0.62	1.03	1.38	1.67	1.94	2.03	2.04	1.9
1966	1.65	1.52	1.26	0.87	0.46	0.29	0.27	0.13	-0.02	-0.07	-0.12	-0.17
1967	-0.17	-0.2	-0.39	-0.4	-0.19	0.18	0.3	0.1	-0.02	-0.08	0.01	-0.02
1968	-0.21	-0.33	-0.31	-0.19	0.16	0.45	0.69	0.58	0.45	0.55	0.77	1.06
1969	1.24	1.13	0.85	0.54	0.35	0.23	0.23	0.43	0.72	0.78	0.74	0.57
1970	0.51	0.31	0.25	0.11	0.01	-0.29	-0.58	-0.69	-0.69	-0.63	-0.7	-0.91
1971	-1.03	-1.02	-0.83	-0.6	-0.48	-0.41	-0.44	-0.44	-0.47	-0.48	-0.52	-0.47
1972	-0.31	0.02	0.41	0.77	0.94	1.12	1.27	1.49	1.7	1.96	2.21	2.27
1973	2.02	1.4	0.56	-0.25	-0.76	-1.06	-1.24	-1.4	-1.54	-1.8	-1.95	-1.88
1974	-1.54	-1.19	-0.95	-0.86	-0.79	-0.64	-0.37	-0.19	-0.18	-0.36	-0.45	-0.25
1975	-0.08	-0.13	-0.32	-0.47	-0.61	-0.78	-0.91	-0.94	-1.05	-1.03	-1.08	-1.12
1976	-1.03	-0.65	-0.3	-0.11	0	0.23	0.46	0.67	0.94	1.1	1.13	1.13
1977	1.01	0.93	0.52	0.31	0.19	0.35	0.42	0.58	0.78	0.97	1.09	1.05
1978	0.94	0.6	0.13	-0.18	-0.36	-0.29	-0.32	-0.28	-0.2	-0.05	0.15	0.17
1979	0.17	0.15	0.21	0.2	0.08	-0.08	-0.02	0.2	0.39	0.49	0.54	0.66
1980	0.64	0.47	0.27	0.21	0.31	0.33	0.19	0.01	-0.04	0.06	0.2	0.17
1981	0.01	-0.27	-0.34	-0.34	-0.26	-0.3	-0.26	-0.18	-0.12	-0.16	-0.19	0.01
1982	0.14	0.33	0.4	0.64	0.77	0.82	0.92	1.25	1.81	2.21	2.43	2.52
1983	2.49	2.2	1.71	1.37	1	0.57	0.1	-0.24	-0.59	-0.94	-1.14	-0.96
1984	-0.54	-0.35	-0.35	-0.52	-0.57	-0.43	-0.23	-0.07	-0.15	-0.51	-0.83	-1

RONI Classification

Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
1950	M_LN	M_LN	M_LN	M_LN	M_LN	NN_LN	N	N	N	N	N	NN_LN
1951	NN_LN	N	N	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN
1952	NN_EN	N	N	N	N	N	N	N	N	N	N	N
1953	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN
1954	NN_EN	NN_EN	N	N	N	N	N	NN_LN	NN_LN	NN_LN	NN_LN	N
1955	N	N	N	N	N	N	N	NN_LN	M_LN	M_LN	S_LN	M_LN
1956	NN_LN	N	N	N	N	N	N	N	N	N	N	N
1957	N	N	NN_EN	NN_EN	M_EN	M_EN	M_EN	M_EN	M_EN	M_EN	S_EN	S_EN
1958	S_EN	S_EN	M_EN	M_EN	NN_EN	NN_EN	N	N	N	N	N	NN_EN
1959	NN_EN	NN_EN	NN_EN	N	N	N	N	N	N	N	N	N
1960	N	N	N	N	N	N	N	N	N	N	N	N
1961	N	N	N	N	N	N	N	N	N	N	N	N
1962	N	N	N	N	N	N	N	N	N	N	N	NN_LN
1963	N	N	N	N	N	N	NN_EN	NN_EN	M_EN	M_EN	M_EN	M_EN
1964	M_EN	NN_EN	N	N	NN_LN	NN_LN	NN_LN	NN_LN	NN_LN	NN_LN	NN_LN	NN_LN
1965	N	N	N	N	NN_EN	M_EN	M_EN	S_EN	S_EN	S_EN	S_EN	S_EN
1966	S_EN	S_EN	M_EN	NN_EN	N	N	N	N	N	N	N	N
1967	N	N	N	N	N	N	N	N	N	N	N	N
1968	N	N	N	N	N	N	NN_EN	NN_EN	N	NN_EN	NN_EN	M_EN
1969	M_EN	M_EN	NN_EN	NN_EN	N	N	N	N	NN_EN	NN_EN	NN_EN	NN_EN
1970	NN_EN	N	N	N	N	N	NN_LN	NN_LN	NN_LN	NN_LN	NN_LN	NN_LN
1971	M_LN	M_LN	NN_LN	NN_LN	N	N	N	N	N	N	NN_LN	N
1972	N	N	N	NN_EN	NN_EN	M_EN	M_EN	M_EN	S_EN	S_EN	S_EN	S_EN
1973	S_EN	M_EN	NN_EN	N	NN_LN	M_LN	M_LN	M_LN	S_LN	S_LN	S_LN	S_LN
1974	S_LN	M_LN	NN_LN	NN_LN	NN_LN	NN_LN	N	N	N	N	N	N
1975	N	N	N	N	NN_LN	NN_LN	NN_LN	NN_LN	M_LN	M_LN	M_LN	M_LN
1976	M_LN	NN_LN	N	N	N	N	N	NN_EN	NN_EN	M_EN	M_EN	M_EN
1977	M_EN	NN_EN	NN_EN	N	N	N	N	NN_EN	NN_EN	NN_EN	M_EN	M_EN
1978	NN_EN	NN_EN	N	N	N	N	N	N	N	N	N	N
1979	N	N	N	N	N	N	N	N	N	N	NN_EN	NN_EN
1980	NN_EN	N	N	N	N	N	N	N	N	N	N	N
1981	N	N	N	N	N	N	N	N	N	N	N	N
1982	N	N	N	NN_EN	NN_EN	NN_EN	NN_EN	M_EN	S_EN	S_EN	S_EN	S_EN
1983	S_EN	S_EN	S_EN	M_EN	M_EN	NN_EN	N	N	NN_LN	NN_LN	M_LN	NN_LN
1984	NN_LN	N	N	NN_LN	NN_LN	N	N	N	N	NN_LN	NN_LN	M_LN

Step 2: Rainfall Classification

- Daily rainfall data over SFWMD was converted into 3-month seasonal sums.
- The seasonal values were then classified as either below normal (BN), normal (N) or above normal (AN) using by comparing them tercile thresholds (33.33% and 66.67% thresholds) calculated for each of 12 seasons for 1950-2025 period.

	Thresholds for 1950-2025 period											
	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
33.33%	4117550	4419345	5542389	7645071	12534711	17710978	20984356	19804772	16328754	10970075	6212722	3840331
66.67%	5855874	7080016	7762180	10243504	16342017	20383006	23328072	22057293	19259088	14239974	8895977	6468284

Rainfall Classification Based on 1950-2025 periods' thresholds

	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
1950	BN	BN	BN	BN	BN	BN	BN	BN	AN	AN	AN	BN
1951	BN	BN	N	N	BN	BN	BN	N	N	AN	AN	BN
1952	N	AN	AN	N	BN	BN	BN	N	AN	AN	AN	N
1953	N	N	AN	N	N	N	AN	AN	AN	AN	AN	N
1954	N	N	AN	AN	AN	AN	N	N	BN	N	N	N
1955	BN	BN	BN	BN	N	N	N	BN	BN	BN	BN	BN
1956	BN	BN	BN	BN	BN	BN	BN	BN	N	N	N	BN
1957	AN	AN	AN	AN	AN	N	BN	AN	AN	N	AN	AN
1958	AN	AN	AN	AN	N	N	BN	BN	BN	BN	AN	AN
1959	AN	AN	AN	AN	AN	AN	AN	AN	AN	AN	AN	N
1960	N	N	AN	AN	N	AN	AN	AN	AN	AN	N	N
1961	N	N	BN	N	BN	BN	BN	BN	BN	BN	BN	BN
1962	BN	N	BN	N	N	N	AN	AN	N	N	BN	N
1963	AN	N	N	BN	N	BN	BN	BN	N	N	N	AN
1964	AN	N	N	BN	N	BN	BN	BN	N	N	N	BN
1965	N	N	N	BN	BN	BN	N	N	AN	N	AN	N
1966	AN	AN	N	N	AN	AN	AN	N	N	N	BN	BN
1967	N	N	BN	BN	BN	N	AN	BN	N	N	N	BN
1968	N	BN	BN	AN	AN	AN	AN	N	N	AN	N	N
1969	N	AN	AN	AN	AN	AN	AN	N	AN	AN	AN	AN
1970	AN	AN	AN	AN	N	N	BN	BN	BN	BN	BN	BN
1971	BN	BN	BN	BN	BN	N	N	N	AN	AN	AN	N
1972	N	N	AN	AN	AN	N	BN	BN	BN	BN	N	AN
1973	AN	AN	N	BN	BN	N	AN	AN	N	BN	BN	N
1974	BN	BN	BN	BN	AN	AN	AN	AN	BN	BN	BN	BN

Rainfall Classification Summary

	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
BN	26	26	26	26	26	26	26	26	26	26	26	26
N	25	25	25	25	25	25	25	25	25	25	25	25
AN	25	25	25	25	25	25	25	25	25	25	25	25
Total	76	76	76	76	76	76	76	76	76	76	76	76

Step 3: ENSO-Rainfall Conversion Matrix

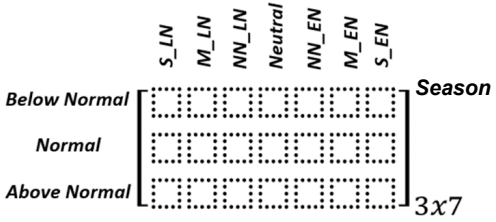
- **Finally, we calculated the 3x7 matrix for each 3-month season using the Rainfall and ENSO tables.**

RONI Classification Table

Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
1950	M_LN	M_LN	M_LN	M_LN	M_LN	NN_LN	N	N	N	N	N	NN_LN
1951	NN_LN	N	N	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN
1952	NN_EN	N	N	N	N	N	N	N	N	N	N	N
1953	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN	NN_EN
1954	NN_EN	NN_EN	N	N	N	N	N	NN_LN	NN_LN	NN_LN	NN_LN	N
1955	N	N	N	N	N	N	N	NN_LN	M_LN	M_LN	S_LN	M_LN
1956	NN_LN	N	N	N	N	N	N	N	N	N	N	N
1957	N	N	NN_EN	NN_EN	M_EN	M_EN	M_EN	M_EN	M_EN	M_EN	S_EN	S_EN
1958	S_EN	S_EN	M_EN	M_EN	NN_EN	NN_EN	N	N	N	N	N	NN_EN
1959	NN_EN	NN_EN	NN_EN	N	N	N	N	N	N	N	N	N
1960	N	N	N	N	N	N	N	N	N	N	N	N
1961	N	N	N	N	N	N	N	N	N	N	N	N
1962	N	N	N	N	N	N	N	N	N	N	N	NN_LN
1963	N	N	N	N	N	N	NN_EN	NN_EN	M_EN	M_EN	M_EN	M_EN
1964	M_EN	NN_EN	N	N	NN_LN	NN_LN	NN_LN	NN_LN	NN_LN	NN_LN	NN_LN	NN_LN
1965	N	N	N	N	NN_EN	M_EN	M_EN	S_EN	S_EN	S_EN	S_EN	S_EN
1966	S_EN	S_EN	M_EN	NN_EN	N	N	N	N	N	N	N	N
1967	N	N	N	N	N	N	N	N	N	N	N	N
1968	N	N	N	N	N	N	NN_EN	NN_EN	N	NN_EN	NN_EN	M_EN
1969	M_EN	M_EN	NN_EN	NN_EN	N	N	N	N	NN_EN	NN_EN	NN_EN	NN_EN
1970	NN_EN	N	N	N	N	N	NN_LN	NN_LN	NN_LN	NN_LN	NN_LN	NN_LN
1971	M_LN	M_LN	NN_LN	NN_LN	N	N	N	N	N	N	NN_LN	N
1972	N	N	N	NN_EN	NN_EN	M_EN	M_EN	M_EN	S_EN	S_EN	S_EN	S_EN
1973	S_EN	M_EN	NN_EN	N	NN_LN	M_LN	M_LN	M_LN	S_LN	S_LN	S_LN	S_LN
1974	S_LN	M_LN	NN_LN	NN_LN	NN_LN	NN_LN	N	N	N	N	N	N
1975	N	N	N	N	NN_LN	NN_LN	NN_LN	NN_LN	M_LN	M_LN	M_LN	M_LN
1976	M_LN	NN_LN	N	N	N	N	N	NN_EN	NN_EN	M_EN	M_EN	M_EN
1977	M_EN	NN_EN	NN_EN	N	N	N	N	NN_EN	NN_EN	NN_EN	M_EN	M_EN
1978	NN_EN	NN_EN	N	N	N	N	N	N	N	N	N	N
1979	N	N	N	N	N	N	N	N	N	N	NN_EN	NN_EN
1980	NN_EN	N	N	N	N	N	N	N	N	N	N	N
1981	N	N	N	N	N	N	N	N	N	N	N	N
1982	N	N	N	NN_EN	NN_EN	NN_EN	NN_EN	M_EN	S_EN	S_EN	S_EN	S_EN

South Florida Rainfall Classification Table

Year	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA	JAS	ASO	SON	OND	NDJ
1950	BN	BN	BN	BN	BN	BN	BN	BN	AN	AN	AN	BN
1951	BN	BN	N	N	BN	BN	BN	N	N	AN	AN	BN
1952	N	AN	AN	N	BN	BN	BN	N	AN	AN	AN	N
1953	N	N	AN	N	N	N	AN	AN	AN	AN	AN	N
1954	N	N	AN	AN	AN	AN	N	N	BN	N	N	N
1955	BN	BN	BN	BN	N	N	N	BN	BN	BN	BN	BN
1956	BN	BN	BN	BN	BN	BN	BN	BN	N	N	N	BN
1957	AN	AN	AN	AN	AN	N	BN	AN	AN	N	AN	AN
1958	AN	AN	AN	AN	N	N	BN	BN	BN	BN	AN	AN
1959	AN	AN	AN	AN	AN	AN	AN	AN	AN	AN	AN	N
1960	N	N	AN	AN	N	AN	AN	AN	AN	AN	N	N
1961	N	N	BN	N	BN	BN	BN	BN	BN	BN	BN	BN
1962	BN	N	BN	N	N	N	AN	AN	N	N	BN	N
1963	AN	N	N	BN	N	BN	BN	BN	N	N	N	AN
1964	AN	N	N	BN	N	BN	BN	BN	N	N	N	BN
1965	N	N	N	BN	BN	BN	N	N	AN	N	AN	N
1966	AN	AN	N	N	AN	AN	AN	N	N	N	BN	BN
1967	N	N	BN	BN	BN	N	AN	BN	N	N	N	BN
1968	N	BN	BN	AN	AN	AN	AN	N	N	AN	N	N
1969	N	AN	AN	AN	AN	AN	AN	N	AN	AN	AN	AN
1970	AN	AN	AN	AN	N	N	BN	BN	BN	BN	BN	BN
1971	BN	BN	BN	BN	BN	N	N	N	AN	AN	AN	N
1972	N	N	AN	AN	AN	N	BN	BN	BN	BN	N	AN
1973	AN	AN	N	BN	BN	N	AN	AN	N	BN	BN	N
1974	BN	BN	BN	BN	AN	AN	AN	AN	BN	BN	BN	BN
1975	BN	BN	BN	N	N	AN	BN	N	N	N	BN	BN
1976	BN	BN	BN	AN	AN	AN	N	N	BN	BN	BN	AN
1977	N	BN	BN	BN	BN	N	BN	N	N	N	N	AN
1978	AN	AN	N	N	N	AN	N	BN	BN	BN	N	AN
1979	AN	N	N	AN	N	BN	BN	AN	AN	AN	N	AN
1980	AN	N	N	N	BN	BN	BN	BN	BN	BN	N	N
1981	N	N	BN	BN	BN	BN	N	AN	AN	BN	BN	BN
1982	BN	AN	AN	AN	AN	AN	AN	N	N	N	N	AN



ENSO to Rainfall conversion coefficient Matrix

RESULTS

Counts (76 years of data)

DJF	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	3	8	10	4	1	0	0
Normal	2	0	1	13	6	2	1
Above	0	0	1	6	7	4	7

JFM	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	0	8	9	8	1	0	0
Normal	0	2	1	17	4	0	1
Above	0	1	2	7	6	4	5

FMA	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	0	3	9	13	1	0	0
Normal	0	2	4	14	3	2	0
Above	0	1	0	13	6	3	2

MAM	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	0	2	7	16	0	0	1
Normal	0	1	3	11	9	1	0
Above	0	0	2	16	6	1	0

AMJ	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	0	2	5	14	5	0	0
Normal	0	0	5	16	3	1	0
Above	0	2	2	15	4	2	0

MJJ	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	1	0	6	12	4	3	0
Normal	0	1	3	15	3	3	0
Above	0	0	6	16	3	0	0

JJA	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	0	1	3	16	2	4	0
Normal	0	1	5	14	3	1	1
Above	1	1	2	15	6	0	0

JAS	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	0	0	4	16	3	2	1
Normal	0	2	5	9	6	1	2
Above	1	3	4	12	3	1	1

ASO	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	0	2	2	13	5	2	2
Normal	3	3	3	10	2	2	2
Above	0	2	6	11	4	1	1

SON	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	3	2	2	12	3	3	1
Normal	0	2	4	10	2	3	4
Above	1	4	5	8	4	3	0

OND	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	4	2	5	10	4	1	0
Normal	0	3	3	10	2	4	3
Above	2	4	3	5	3	4	4

NDJ	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	2	4	8	9	2	0	1
Normal	3	2	4	11	3	1	1
Above	1	1	1	3	6	7	6

Coefficient Matrices*

DJF	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	0.6000	1.0000	0.8333	0.1739	0.0714	0.0000	0.0000
Normal	0.4000	0.0000	0.0833	0.5652	0.4286	0.3333	0.1250
Above	0.0000	0.0000	0.0833	0.2609	0.5000	0.6667	0.8750

JFM	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	*0.6000*	0.7273	0.7500	0.2500	0.0909	0.0000	0.0000
Normal	*0.4000*	0.1818	0.0833	0.5313	0.3636	0.0000	0.1667
Above	*0.0000*	0.0909	0.1667	0.2188	0.5455	1.0000	0.8333

FMA	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	*0.5000*	0.5000	0.6923	0.3250	0.1000	0.0000	0.0000
Normal	*0.5000*	0.3333	0.3077	0.3500	0.3000	0.4000	0.0000
Above	*0.0000*	0.1667	0.0000	0.3250	0.6000	0.6000	1.0000

MAM	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	*0.3333*	0.6667	0.5833	0.3721	0.0000	0.0000	1.0000
Normal	*0.3333*	0.3333	0.2500	0.2558	0.6000	0.5000	0.0000
Above	*0.3333*	0.0000	0.1667	0.3721	0.4000	0.5000	0.0000

AMJ	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	*0.3333*	0.5000	0.4167	0.3111	0.4167	0.0000	*0.3333*
Normal	*0.3333*	0.0000	0.4167	0.3556	0.2500	0.3333	*0.3333*
Above	*0.3333*	0.5000	0.1667	0.3333	0.3333	0.6667	*0.3333*

MJJ	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	1.0000	0.0000	0.4000	0.2791	0.4000	0.5000	*0.3333*
Normal	0.0000	1.0000	0.2000	0.3488	0.3000	0.5000	*0.3333*
Above	0.0000	0.0000	0.4000	0.3721	0.3000	0.0000	*0.3333*

JJA	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	0.0000	0.3333	0.3000	0.3556	0.1818	0.8000	0.0000
Normal	0.0000	0.3333	0.5000	0.3111	0.2727	0.2000	1.0000
Above	1.0000	0.3333	0.2000	0.3333	0.5455	0.0000	0.0000

JAS	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	0.0000	0.0000	0.3077	0.4324	0.2500	0.5000	0.2500
Normal	0.0000	0.4000	0.3846	0.2432	0.5000	0.2500	0.5000
Above	1.0000	0.6000	0.3077	0.3243	0.2500	0.2500	0.2500

ASO	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	0.0000	0.2857	0.1818	0.3824	0.4545	0.4000	0.4000
Normal	1.0000	0.4286	0.2727	0.2941	0.1818	0.4000	0.4000
Above	0.0000	0.2857	0.5455	0.3235	0.3636	0.2000	0.2000

SON	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	0.7500	0.2500	0.1818	0.4000	0.3333	0.3333	0.2000
Normal	0.0000	0.2500	0.3636	0.3333	0.2222	0.3333	0.8000
Above	0.2500	0.5000	0.4545	0.2667	0.4444	0.3333	0.0000

OND	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	0.6667	0.2222	0.4545	0.4000	0.4444	0.1111	0.0000
Normal	0.0000	0.3333	0.2727	0.4000	0.2222	0.4444	0.4286
Above	0.3333	0.4444	0.2727	0.2000	0.3333	0.4444	0.5714

NDJ	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	0.3333	0.5714	0.6154	0.3913	0.1818	0.0000	0.1250
Normal	0.5000	0.2857	0.3077	0.4783	0.2727	0.1250	0.1250
Above	0.1667	0.1429	0.0769	0.1304	0.5455	0.8750	0.7500

Coefficient Matrices*

JFM	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	*0.6000*	0.7273	0.7500	0.2500	0.0909	0.0000	0.0000
Normal	*0.4000*	0.1818	0.0833	0.5313	0.3636	0.0000	0.1667
Above	*0.0000*	0.0909	0.1667	0.2188	0.5455	1.0000	0.8333

FMA	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	*0.5000*	0.5000	0.6923	0.3250	0.1000	0.0000	0.0000
Normal	*0.5000*	0.3333	0.3077	0.3500	0.3000	0.4000	0.0000
Above	*0.0000*	0.1667	0.0000	0.3250	0.6000	0.6000	1.0000

MAM	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	*0.3333*	0.6667	0.5833	0.3721	0.0000	0.0000	1.0000
Normal	*0.3333*	0.3333	0.2500	0.2558	0.6000	0.5000	0.0000
Above	*0.3333*	0.0000	0.1667	0.3721	0.4000	0.5000	0.0000

AMJ	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	*0.3333*	0.5000	0.4167	0.3111	0.4167	0.0000	*0.3333*
Normal	*0.3333*	0.0000	0.4167	0.3556	0.2500	0.3333	*0.3333*
Above	*0.3333*	0.5000	0.1667	0.3333	0.3333	0.6667	*0.3333*

MJJ	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	1.0000	0.0000	0.4000	0.2791	0.4000	0.5000	*0.3333*
Normal	0.0000	1.0000	0.2000	0.3488	0.3000	0.5000	*0.3333*
Above	0.0000	0.0000	0.4000	0.3721	0.3000	0.0000	*0.3333*

Coefficient values shown in (blue color + *italics)*

- corresponding values could not be calculated because for those specific Seasons and ENSO Strength Category did not have any counts from historical dataset
- values were assigned based on conceptual understanding

EXAMPLE CALCULATIONS
JUNE 1, 2026

ENSO Strength Probabilities

Season	Index ≤ -2.0°C	-1.5°C ≥ Index > -2.0°C	-1.0°C ≥ Index > -1.5°C	-0.5°C ≥ Index > -1.0°C	−0.5°C < Index < 0.5°C	0.5°C ≤ Index < 1.0°C	1.0°C ≤ Index < 1.5°C	1.5°C ≤ Index < 2.0°C	Index ≥ 2.0°C
AMJ	0	0	0	0	84	16	0	0	0
MJJ	0	0	0	0	18	72	10	0	0
JJA	0	0	0	0	8	52	37	3	0
JAS	0	0	0	0	4	30	48	17	1
ASO	0	0	0	0	2	17	41	31	9
SON	0	0	0	0	2	11	30	35	22
OND	0	0	0	0	2	9	24	32	33
NDJ	0	0	0	0	2	9	22	30	37
DJF	0	0	0	0	4	11	25	29	31

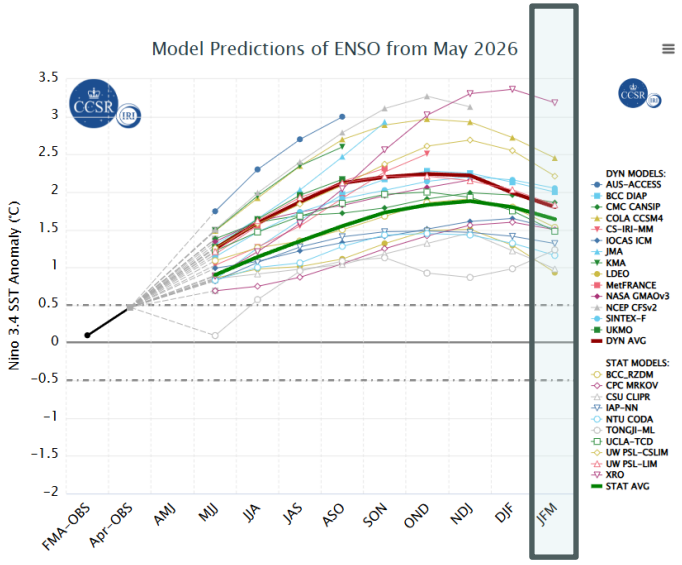
https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso/roni/strengths/

JJA	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	0.0000	0.3333	0.3000	0.3556	0.1818	0.8000	0.0000
Normal	0.0000	0.3333	0.5000	0.3111	0.2727	0.2000	1.0000
Above	1.0000	0.3333	0.2000	0.3333	0.5455	0.0000	0.0000

$$\begin{bmatrix} 0 \\ 0 \\ 0 \\ 0.08 \\ 0.52 \\ 0.37 \\ 0.03 \end{bmatrix}_{7x1}^{JJA} \Rightarrow \begin{bmatrix} 0.4189 \\ 0.2707 \\ 0.3104 \end{bmatrix} \Rightarrow \begin{bmatrix} 0.4189 \\ 0.6896 \\ 1.0000 \end{bmatrix}$$

DJF	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	0.6000	1.0000	0.8333	0.1739	0.0714	0.0000	0.0000
Normal	0.4000	0.0000	0.0833	0.5652	0.4286	0.3333	0.1250
Above	0.0000	0.0000	0.0833	0.2609	0.5000	0.6667	0.8750

$$\begin{bmatrix} 0 \\ 0 \\ 0 \\ 0.04 \\ 0.11 \\ 0.25 \\ 0.60 \end{bmatrix}_{7x1}^{DJF} \Rightarrow \begin{bmatrix} 0.0148 \\ 0.2281 \\ 0.7571 \end{bmatrix} \Rightarrow \begin{bmatrix} 0.0148 \\ 0.2429 \\ 1.0000 \end{bmatrix}$$



https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/?enso_tab=enso-sst_table

S_LN	RONI ≤ -1.5 °C
M_LN	-1.5 °C < RONI ≤ -1 °C
NN_LN	-1 °C < RONI ≤ -0.5 °C
N	-0.5 °C < RONI < +0.5 °C
NN_EN	0.5 °C ≤ RONI < 1 °C
M_EN	1 °C ≤ RONI < 1.5 °C
S_EN	RONI ≤ 1.5 °C

JFM	S_LN	M_LN	NN_LN	N	NN_EN	M_EN	S_EN
Below	0.6000	0.7273	0.7500	0.2500	0.0909	0.0000	0.0000
Normal	0.4000	0.1818	0.0833	0.5313	0.3636	0.0000	0.1667
Above	0.0000	0.0909	0.1667	0.2188	0.5455	1.0000	0.8333

$$\begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0.125 \\ 0.250 \\ 0.625 \end{bmatrix}_{7x1}^{JFM} \Rightarrow \begin{bmatrix} 0.0114 \\ 0.1496 \\ 0.8390 \end{bmatrix} \Rightarrow \begin{bmatrix} 0.0114 \\ 0.1610 \\ 1.0000 \end{bmatrix}$$

- Count the number of temperature values (in °C) that fall into each tercile based on the defined thresholds. This gives the frequency of values in each group.
- The probability is calculated for each group by dividing the number of values in that tercile by the total number of traces.

June 1, 2026 PrefSce for CPA

```
// Run name
PrefSce
// Current Month
6
// Outlook Probability for Jun 2026 Precipitation from CPC Map, 2 Jun 2026
0.243
0.576
// Outlook Probability 12 3-monthly seasons based on Nino3.4 Forecasts
```

//JJA	JAS	ASO	SON	OND	NDJ	DJF	JFM	FMA	MAM	AMJ	MJJ
0.419	0.377	0.409	0.259	0.075	0.108	0.015	0.011	0.139	0.220	0.284	0.284
0.690	0.747	0.770	0.846	0.488	0.253	0.243	0.161	0.415	0.539	0.616	0.615

- Red box = CPC and NOAA
- Yellow Box = IRI
- Blue Box = CPC

- The highlighted red tercile probabilities are calculated as shown in the previous slide.
- The highlighted yellow tercile probability is calculated using IRI as shown in the previous slide.