



Optimum Big Rain Indicator of Extremes for the Southeast USA

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Hurricanes and Tornadoes are Categorical

Hurricanes

Saffir-Simpson Scale

<u>Category</u>	<u>Wind Speed</u>
Cat 1	74-95 mph
Cat 2	96-110 mph
Cat 3	111-130 mph
Cat 4	131-155 mph
Cat 5	> 155 mph

Tornadoes

Enhanced Fujita Scale

<u>Category</u>	<u>Wind Speed</u>
EF0	65-85 mph
EF1	86-110 mph
EF2	111-135 mph
EF3	136-165 mph
EF4	166-200 mph
EF5	> 200 mph

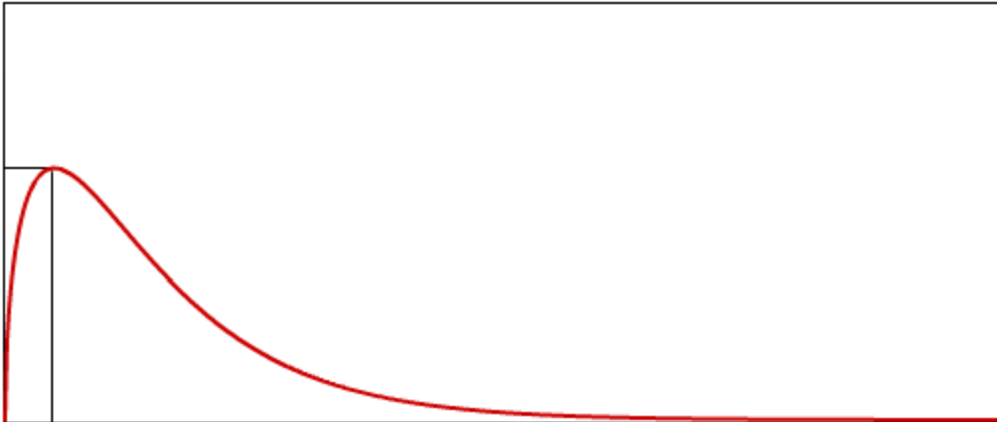
Both scales are based on damage potential.



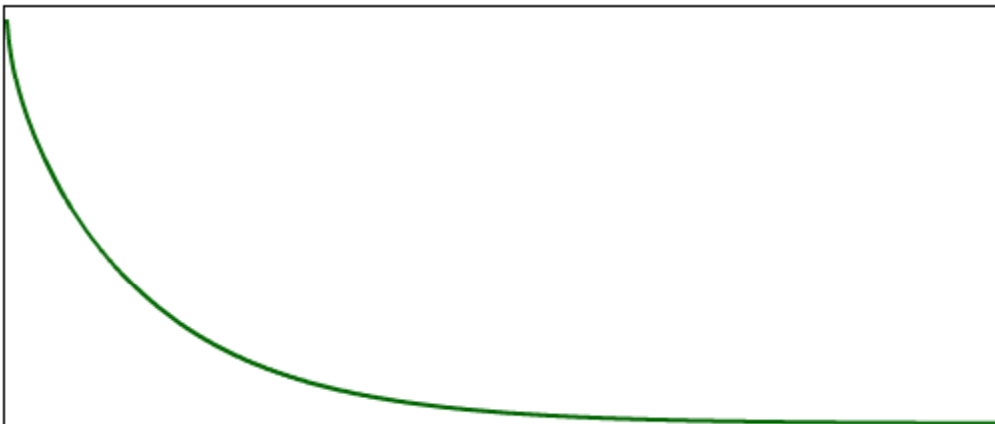


Gamma Distribution

Alpha > 1.0



Alpha < 1.0



Gamma Function

$$\Gamma(\alpha) = \int_0^{\infty} t^{\alpha-1} e^{-t} dt$$

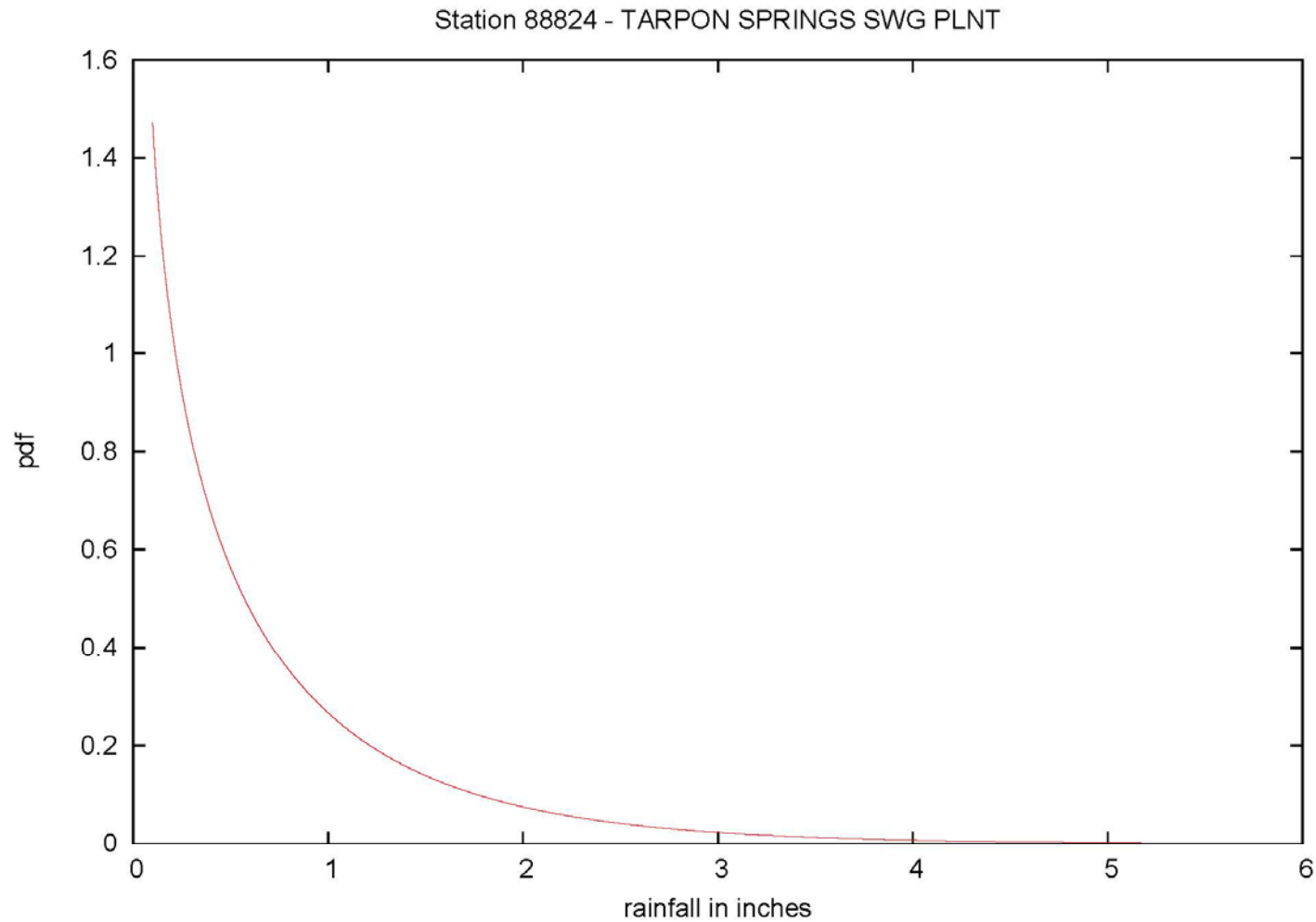
Generalized Gamma pdf

$$f_{\alpha,\beta}(x) = \frac{1}{\Gamma(\alpha)\beta^\alpha} x^{\alpha-1} e^{-\frac{x}{\beta}}$$





Rainfall Events Fitted to a Gamma Distribution





Potential Applied Users

- Water utility managers
- Water management districts
- Stormwater design and control
- Engineering (retention pond design and maintenance)
- Road and other construction
- Agricultural specialists
- Flooding potential outlooks

- Wildcard – human health



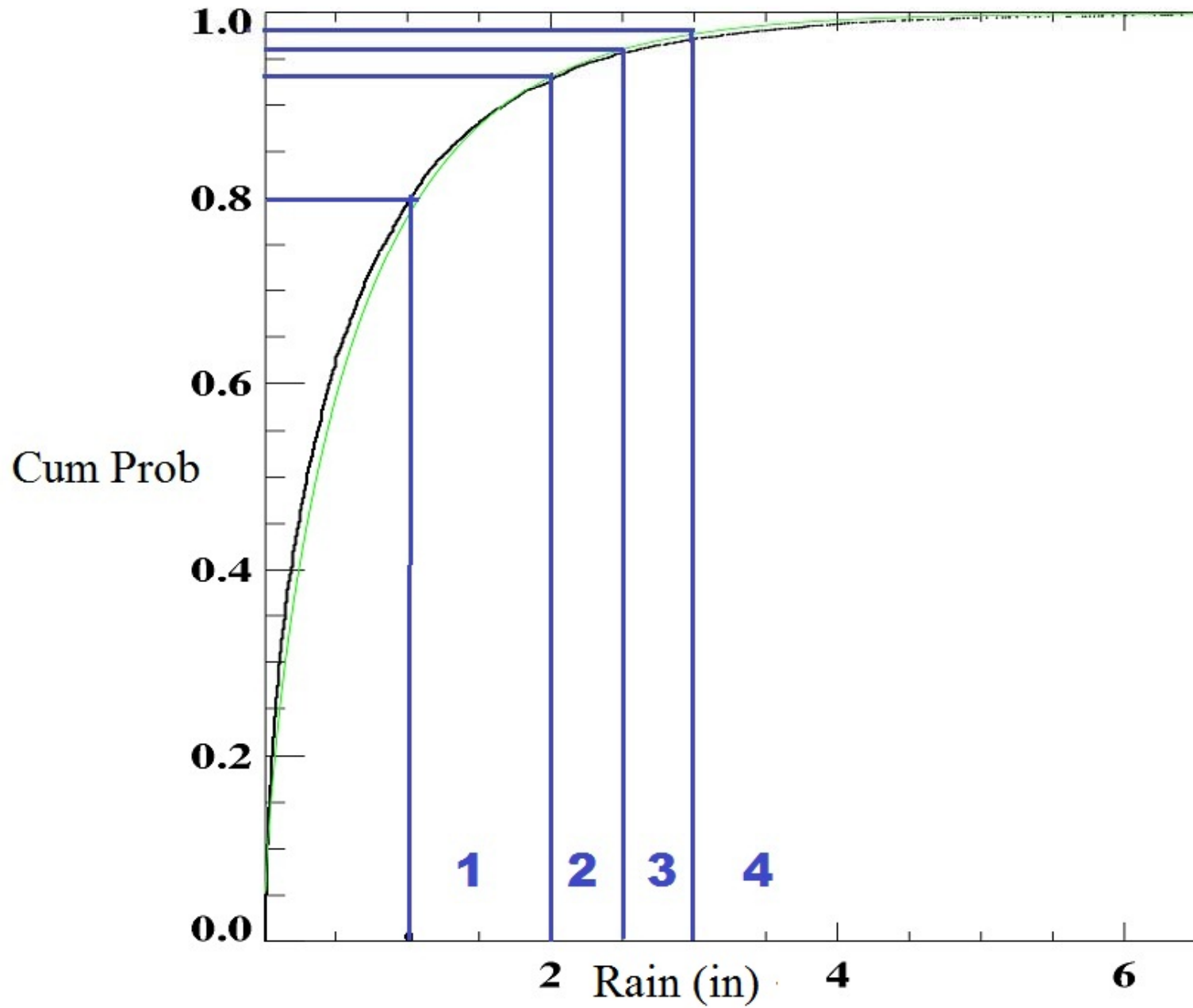


Proposed Scale for Heavy Rainfall

Heavy Rainfall Event (2-day)

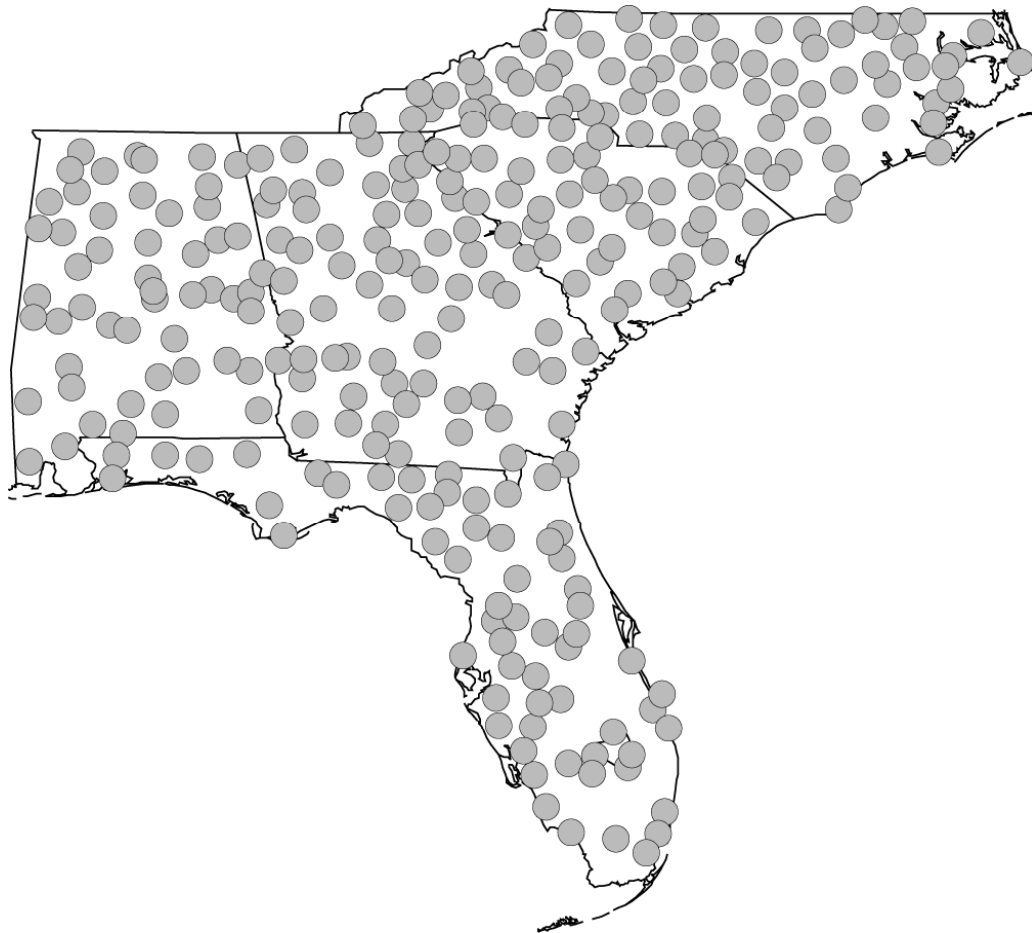
<u>Category</u>	<u>Amount</u>	<u>Probability</u>
R1	1-2 inches	80-88%
R2	2-2.5 inches	88-96%
R3	2.5-3 inches	96-99%
R4	> 3 inches	> 99%







Station Distribution Map



- Heavy rain events based on 2-day totals.
- NWS Cooperative Observers only report once daily, usually midnight-to-midnight.
- Rainfall does not automatically stop at midnight, 2-day totals better describe discrete events.
- In some cases, 3-day totals may be applicable

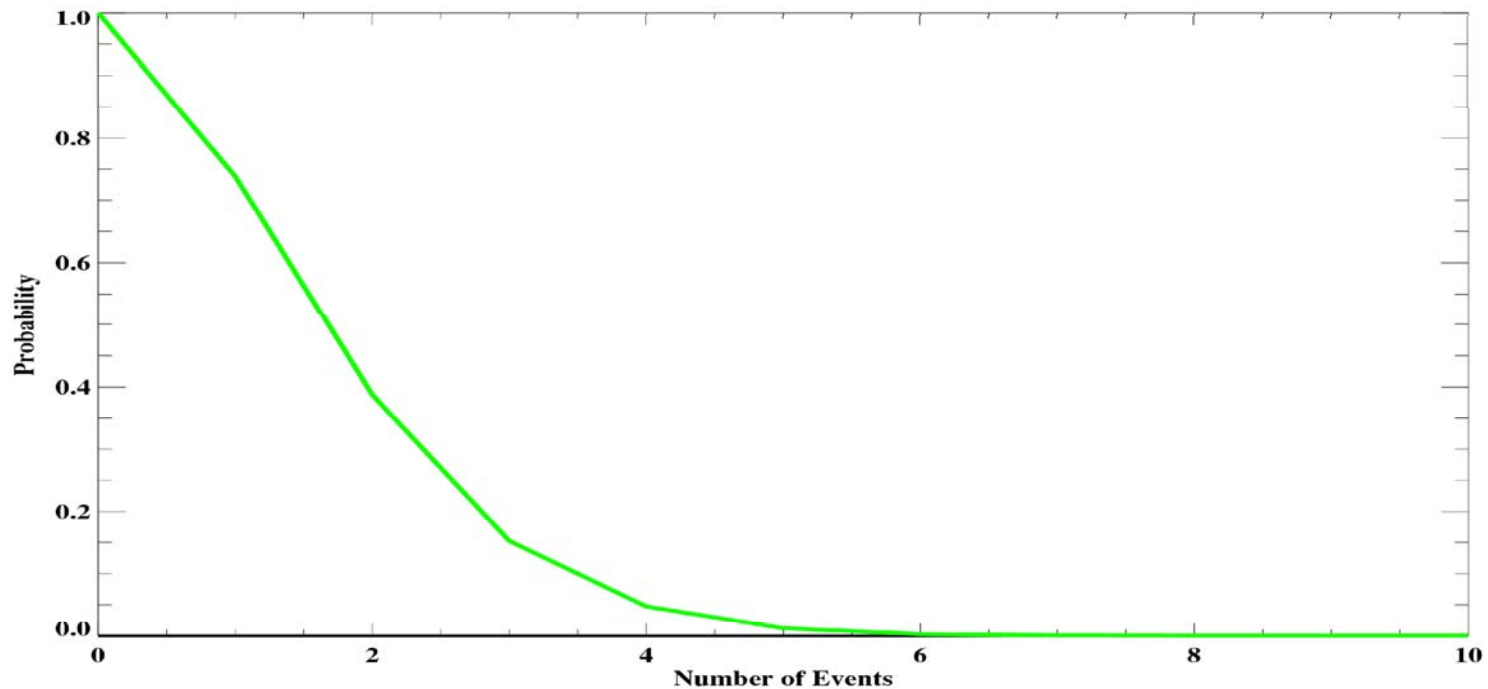




Exceedance Probabilities by Month

*Tarpon Springs, FL
March*

Exceedance Probabilities for Cat 2 Two-day Rain at Tarpon Spgs, FL in Mar



Category 2 Rainfall Event

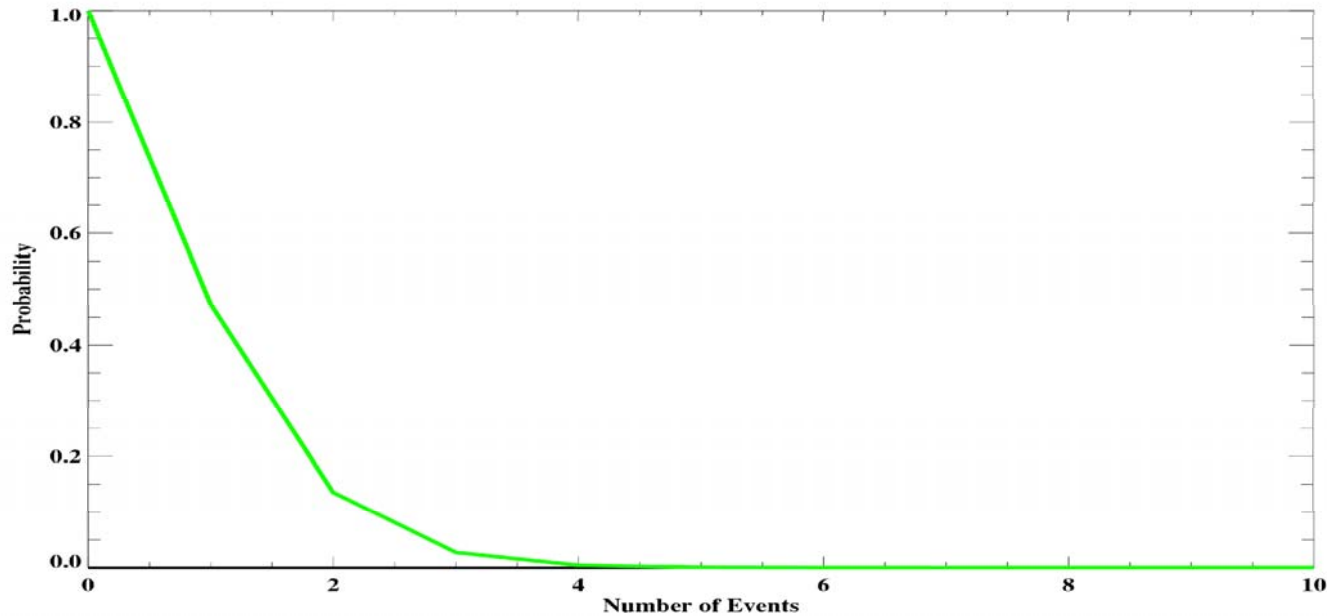




Exceedance Probabilities by Month

*Tarpon Springs, FL
April*

Exceedance Probabilities for Cat 2 Two-day Rain at Tarpon Spgs, FL in Apr



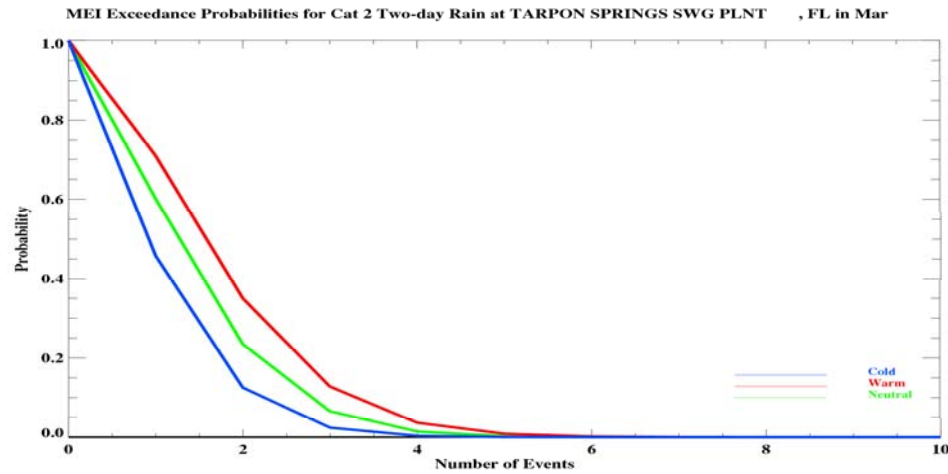
Category 2 Rainfall Event



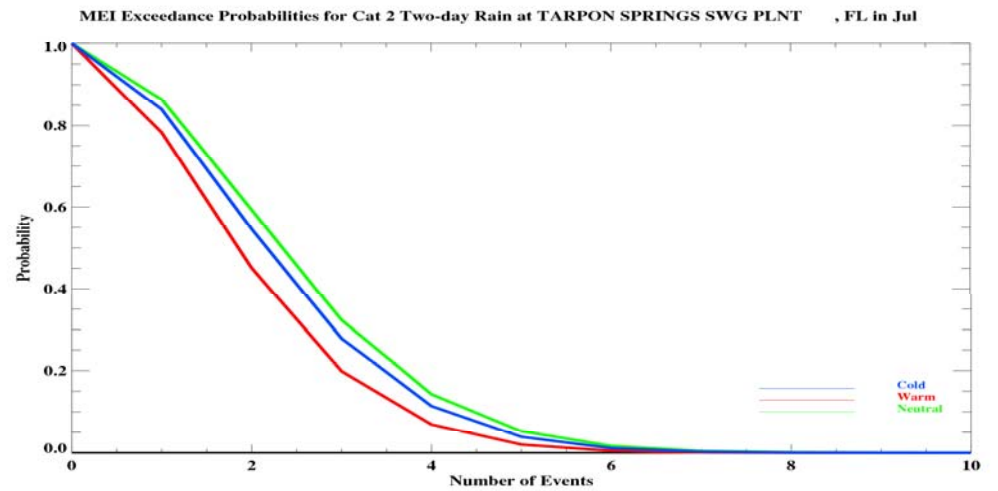


Exceedence Probabilities by ENSO Phase

Tarpon Springs, March



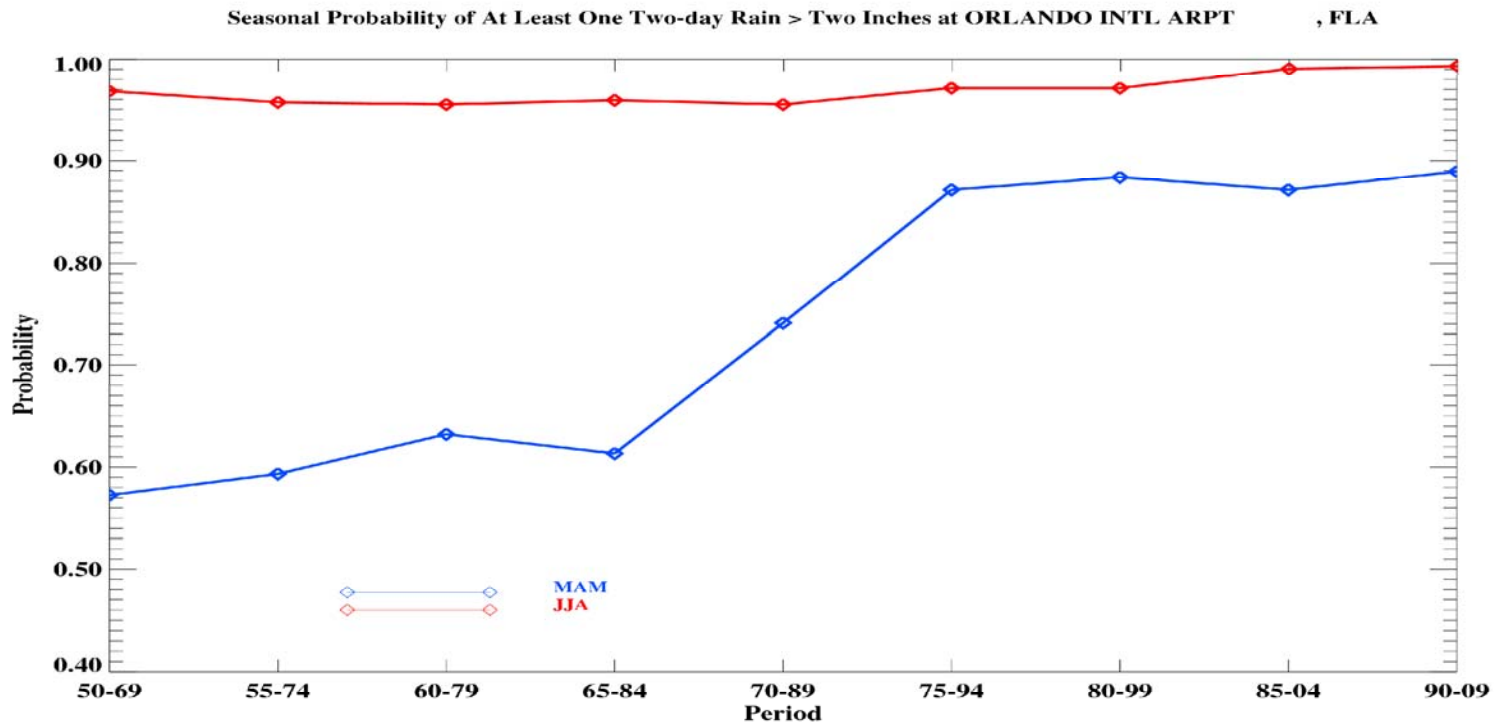
Tarpon Springs, July





Seasonal Probability by 20-year periods

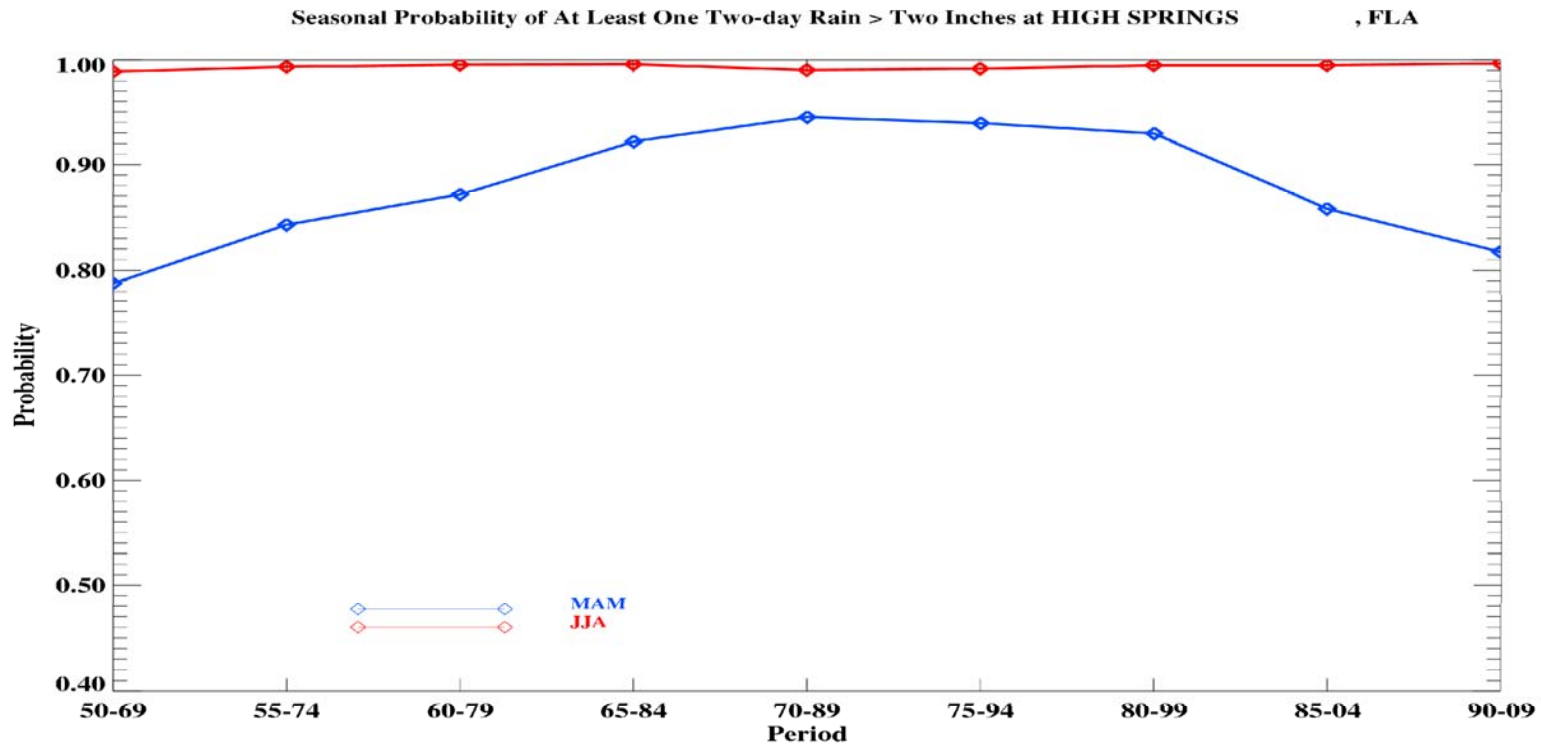
Orlando, FL
Probability of at least one Cat 2 Rainfall Event
(2 inches or greater)

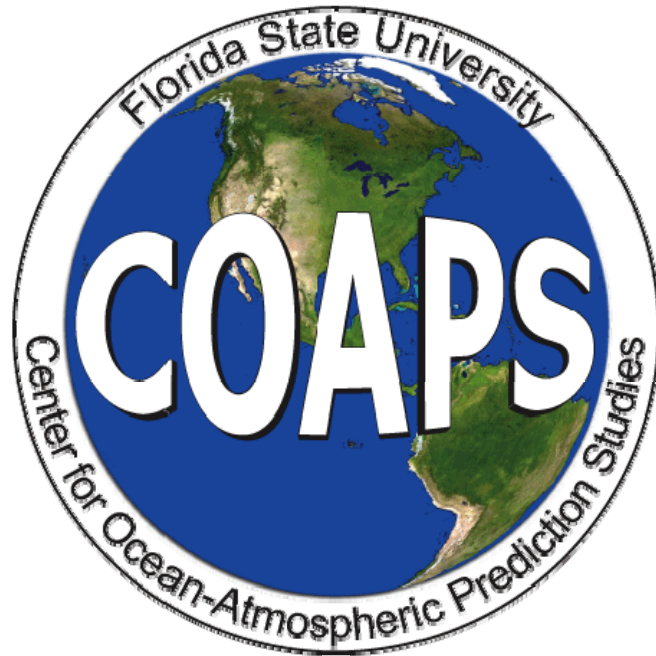




Seasonal Probability by 20-year periods

High Springs, FL
Probability of at least one Cat 2 Rainfall Event
(2 inches or greater)





The End

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