A Five-Year Radar-Based Climatology of Texas Coastal "Streamer" Showers

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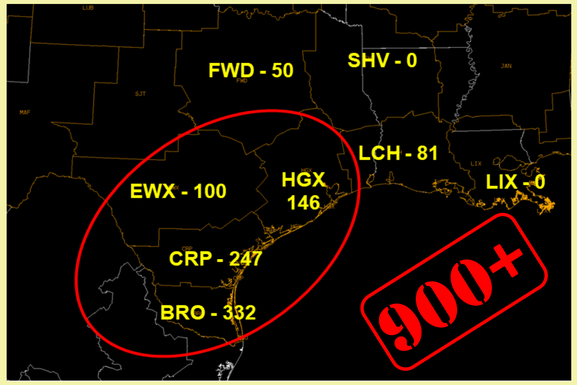
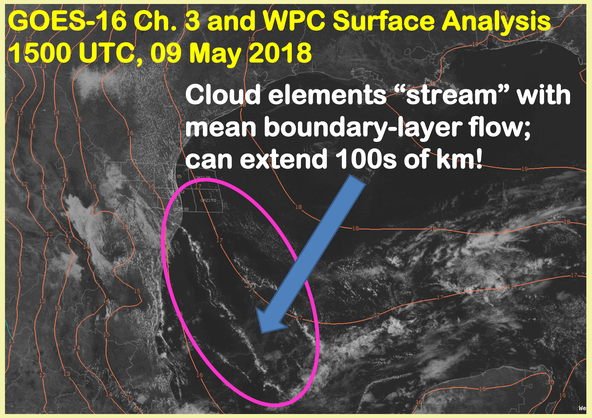
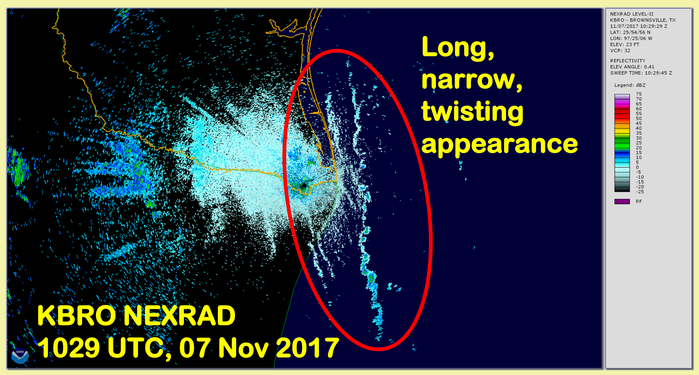
Just What is a "Streamer Shower"?



"Streamer showers" were mentioned in NWS Area Forecast Discussions (AFD's) more than 900* times during 2017, despite the fact that no definition appears in the literature (e. g., *AMS Glossary of Meteorology*). 725 of these occurrences were in AFD's by Texas coastal offices.

* Not necessarily unique occurrences; there were duplications when AFD's were issued with previous text included.





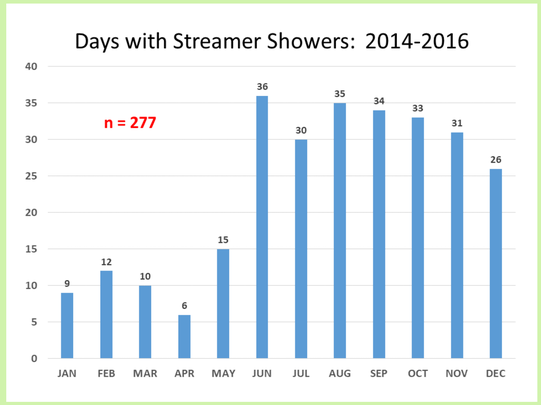
Methodology

A visual examination of daily KBRO WSR-88D (0.5˚ scan) reflectivity imagery was performed for 2014-2016 (2017-2018 in progress), and elements of a morphological definition for streamer showers were developed:

1. Radar reflectivity: At least some portion of the echo ≥ 20dBZ.
2. Aspect ratio of radar echo at least 6:1.
3. Persistence time of at least 30 minutes.
4. Movement of shower elements generally with mean boundary-layer (BL) flow.

Starting/ending times and duration were tallied for each streamer occurrence.

Results



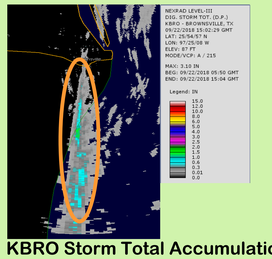
Month	Percent of Days
JAN	10%
FEB	14%
MAR	11%
APR	7%
MAY	16%
JUN	40%
JUL	32%
AUG	38%
SEP	38%
OCT	35%
NOV	34%
DEC	28%
2014-2016	25%

Mean Start Time: 0950 UTC
Median Start Time: 0930 UTC
Start Time Std. Dev.: 5h 13m

Mean Duration: 2h 56m
Median Duration: 2h 00m
Duration Std. Dev.: 2h 37m

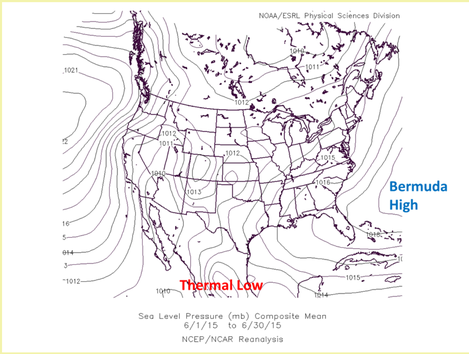
Streamers were found to occur during 3.5% of all hours in the three-year sample.

Streamers can become "enhanced" at times, producing over 1" of rainfall.



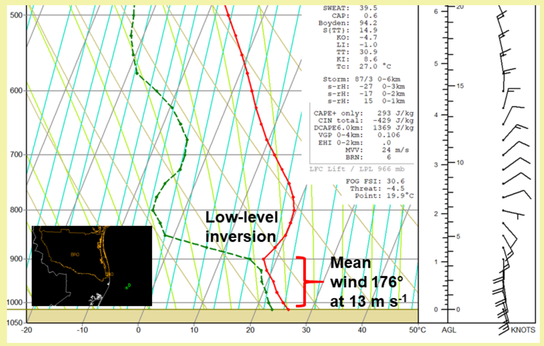
KBRO Storm Total Accumulation
1502 UTC, 22 Sep 2018

Conceptual Model



MSLP Composite for Jun 2015 (19 streamer days); image provided by the NOAA-ESRL Physical Sciences Division

Forecasters sometimes attribute lifting mechanism to warm-air advection in AFD's, but that seems unlikely along Lower Texas coast.



RAP Analysis Sounding: 1300 UTC, 07 Nov 2017

Sheared BL roll convection seems more likely as forcing mechanism.

Steep low-level lapse rates and elevated wind speeds consistent with heat/moisture flux from ocean surface.

Conclusions

- A working definition of *streamer showers* has been used to perform a basic climatology of these features.
- Streamer showers are most common along the Lower Texas coast between the months of June through December (28-40% of days), with a pronounced minimum between January and May.
- Streamers are mainly a nocturnal phenomenon, typically initiating between 0900-1000 UTC.
- Streamers tend to last for 2 to 3 hours (though with a fairly wide variance).