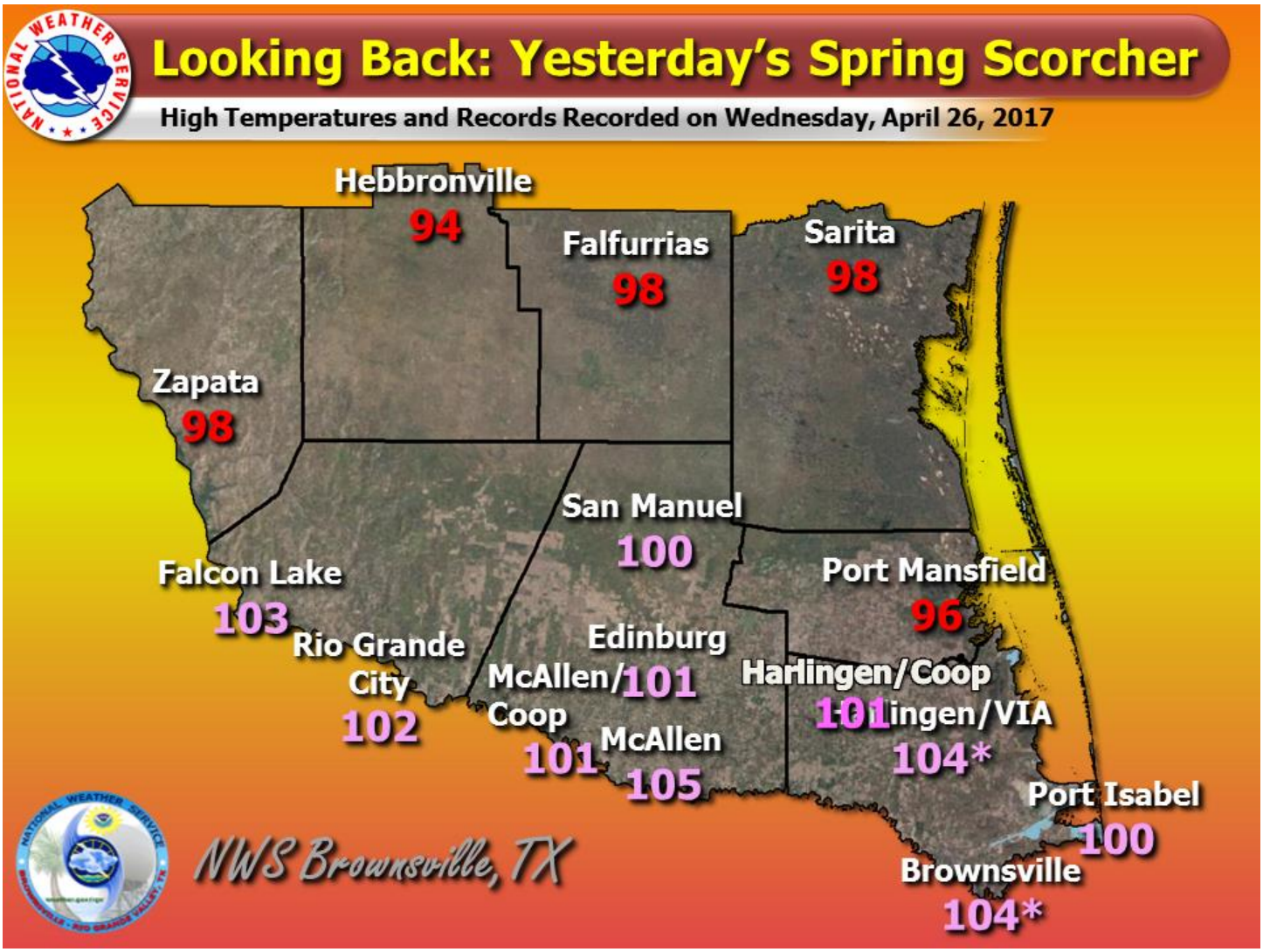
April 26 2017 Blowtorch



Above: Magenta colors=100 degrees or higher. *=New Daily record. For Brownsville, the rare heat was a new April record as well.

Hotter than Hades?

Heat "Spike" Brings Entire RGV Population Above the Century Mark

Overview

Each spring in the Rio Grande Valley, a few "heat spike" events occur, set up by the passage of "dry" low pressure across north Texas, with the geography of the Rio Grande Valley, Rio Grande Plains, and Sierra Madre Oriental playing a big role in generating compressional heating in dry air that downslopes the mountain range and heads quickly across the southern tip of Texas. In most cases, the heat spike will reach the McAllen metro area before dissipating into the more humid air farther east, as the relatively cooler (but larger in area) Gulf of Mexico puts up a stop sign in the form of southeasterly flow enhanced by the sea breeze. On such "typical" days, afternoon temperatures top out just over 100°F across the upper Valley/Rio Grande Plains (Roma, Zapata, Falcon, Rio Grande City) and in the mid to high 90s along U.S. 281 (Falfurrias to McAllen), with Harlingen peaking in the low or mid 90s and Brownsville, influenced by the sea breeze, near 90.

On April 26th, a "heat spike on steroids" pushed clear across the *entire* Rio Grande Valley, with triple digit heat in all areas! A new record was set at Harlingen/Valley International Airport and shattered at Brownsville (by 6 degrees, above). Even Bayview/Port Isabel, just a few miles west of Laguna Madre Bay and the Gulf coast,

reached 100. Farther north across the ranchlands, afternoon low level atmospheric “cooling” kept temperatures from soaring as high, and maxima leveled off just below the century mark.

Pattern Matters

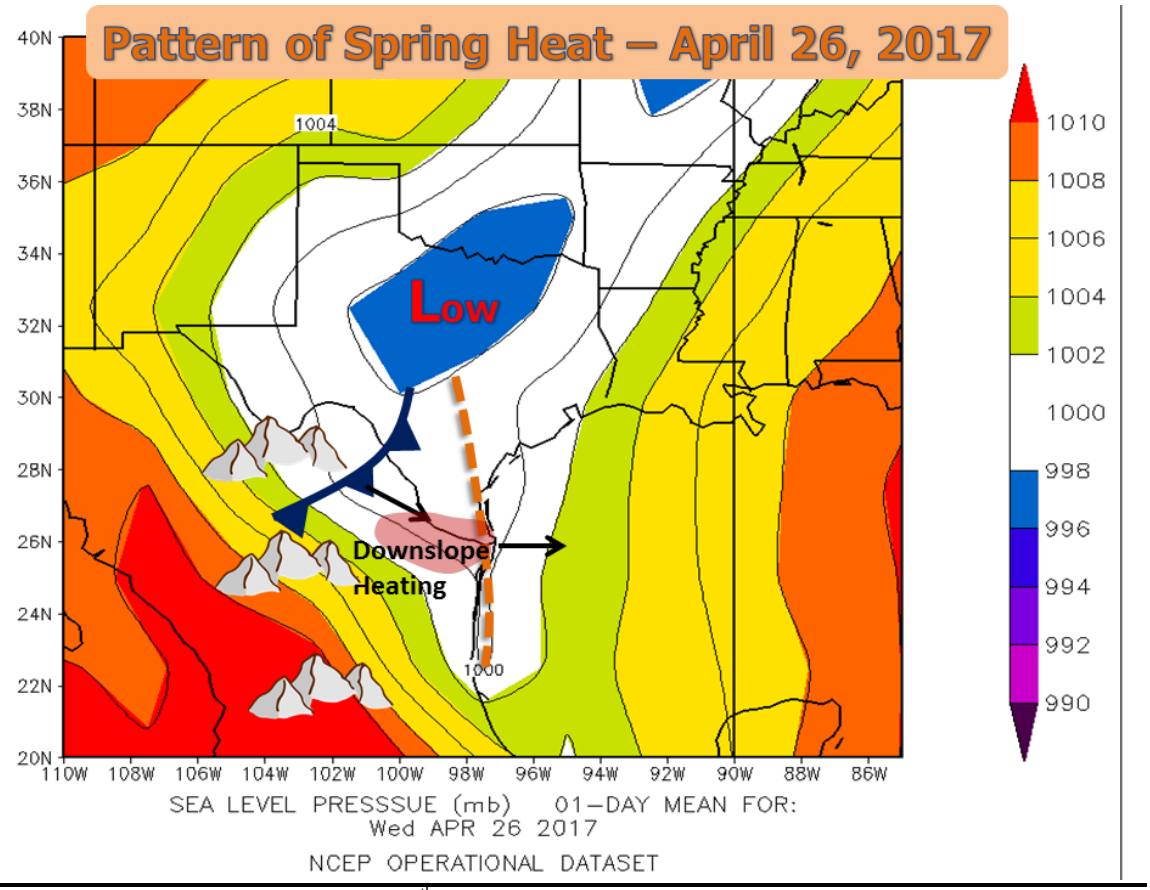
Several factors combined to bring yet another remarkable ‘heat day’ in a year featuring at least one each month since January. This time, an upper level disturbance moved quickly across Oklahoma and Kansas with limited southward extent. To the south of the disturbance, *west to northwest* flow prevailed across the Sierra Madre on through Deep South Texas and northeast Mexico, ensuring no mid to high level moisture was available to assist moistening the entire atmospheric column. Southeast of the upper level disturbance laid a relatively strong surface cyclone, centered over north central Texas. West to northwest flow also covered the lower levels of the atmosphere, which was already well above average with temperatures at around 5,000 feet above the ground running near 80°F along and just south of the Rio Grande! With nothing but dry air surging down the front side of the Sierra Madre, the full potential of temperature rise toward sea level was realized and the predicted maximum temperature of 105°F was realized in the lower and mid Valley. The surface heating impacted surface pressures across most of the Valley as well, extending the north central Texas low pressure center to the Valley by mid-afternoon.

Other Impacts

Fortunately, the drying air mass kept heat index, or “feels like” temperatures, at or even a hair below the actual blast-furnace temperatures (for late April, 15 to 20 degrees above average). However, the same drying came with gusty northwest winds, frequently above 30 mph in many areas. Combined with relative humidity that bottomed out between 15 and 20 percent along and west of US 77/IH 69E for several hours during the afternoon, the threat for rapid to even explosive wildfire spread was great. As of this writing, there were no reports of any significant wildfires in the Rio Grande Valley or Rio Grande Plains.

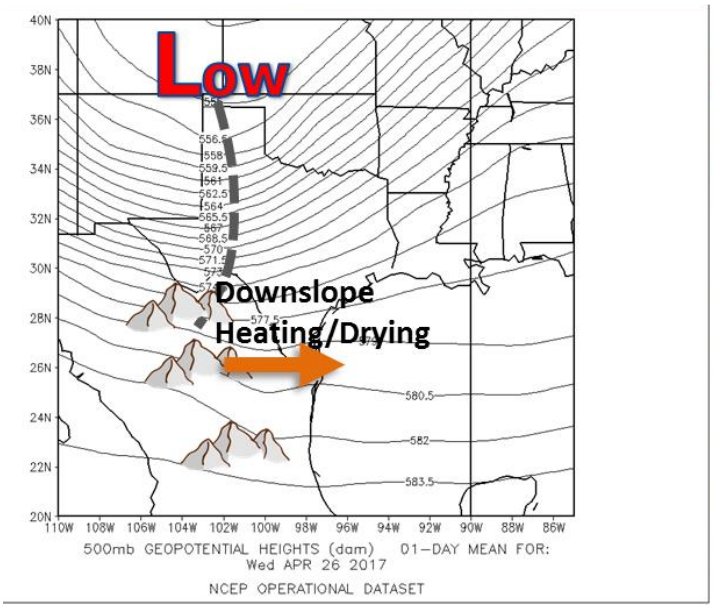
Epilogue

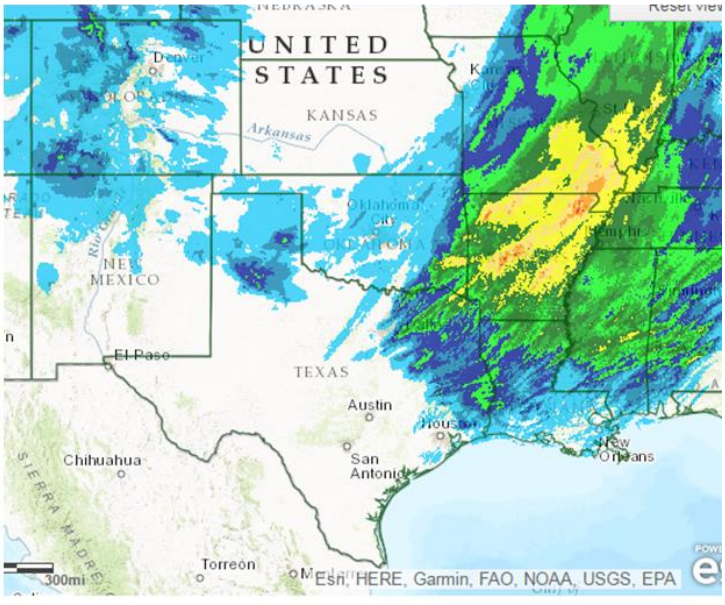
A front – in name only – followed the heat spike but only “cooled” temperatures back into the 90s for most areas west of US 77/IH 69E on Thursday, April 27th. April 28th and especially the 29th were set to return triple digit heat to the mid and Upper Valley, with the 100°F values edging toward the coast by Saturday afternoon. A stronger front would ease temperatures down a bit more on April 30th, but the recent heat surge virtually ensured that, for yet another month in 2017, April average temperatures would nestle among the top ten hottest all-time, some 4 to 5 degrees above the 1981-2010 normal.



Above: Surface pressure pattern (mean) on April 26th. Dryline (orange dashed line) briefly moved off the coast, allowing all of the RGV to push over 100 degrees (red shaded area). A weak "cold" front eventually oozed through overnight, bringing slightly lower but still nearly 10 degree above average temperatures on April 27th.

The Hot and The Dry of It





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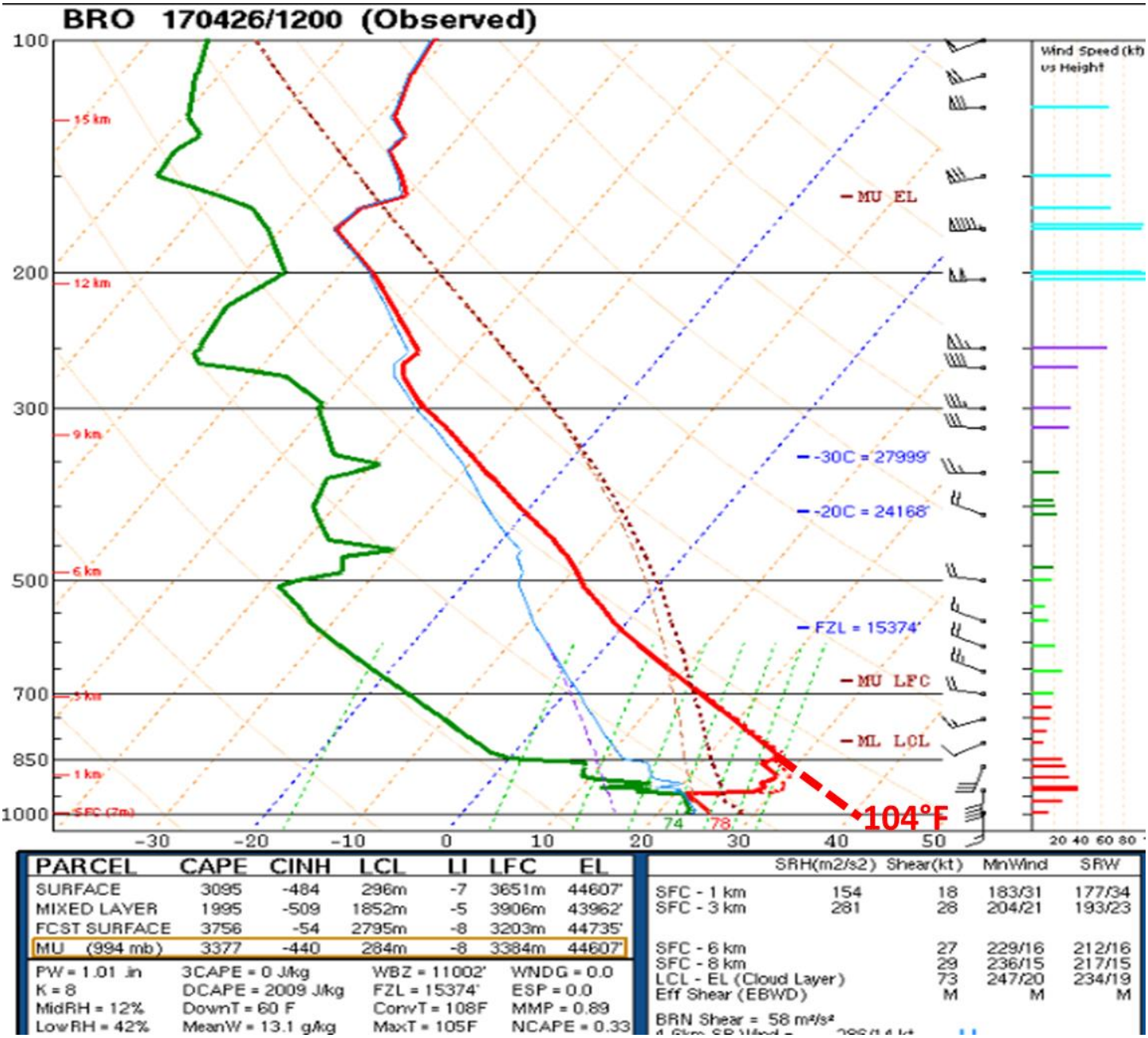
Above: Quick moving upper level disturbance was unable to tap tropical moisture from the Pacific, which left most of Texas dry (right). Heavy, flooding rains impacted Arkansas and southeast Missouri, courtesy of lifting energy near the upper level low and Gulf moisture which flowed ahead of it.



PARCEL	CAPE	CINH	LCL	LI	LFC	EL
SURFACE	3095	-484	296m	-7	3651m	44607'
MIXED LAYER	1995	-509	1852m	-5	3906m	43962'
FCST SURFACE	3756	-54	2795m	-8	3203m	44735'
MU (994 mb)	3377	-440	284m	-8	3384m	44607'

PW = 1.01 in	3CAPE = 0 J/kg	WBZ = 11002'	WNDG = 0.0
K = 8	DCAPE = 2009 J/kg	FZL = 15374'	ESP = 0.0
MidRH = 12%	DownT = 60 F	ConvT = 108F	MMP = 0.89
LowRH = 42%	MeanW = 13.1 g/kg	MaxT = 105F	NCAPE = 0.33

	SRH(m2/s2)	Shear(kt)	MnWind	SRW
SFC - 1 km	154	18	183/31	177/34
SFC - 3 km	281	28	204/21	193/23
SFC - 6 km		27	229/16	212/16
SFC - 8 km		29	236/15	217/15
LCL - EL (Cloud Layer)		73	247/20	234/19
Eff Shear (EBWD)		M	M	M

BRN Shear = 58 m²/s²

Above: Soundings didn't lie on April 26! Just knowing that full mixing (known as dry adiabatic mixing), red dashed line, would produce temperatures of 104°F by peak heating (3 or 4 PM) could make anybody an expert forecast at 7 AM that morning. In reality, all Lower Valley points along/west of US 281 reached 103 to 105 that afternoon – a nearly perfect outcome.