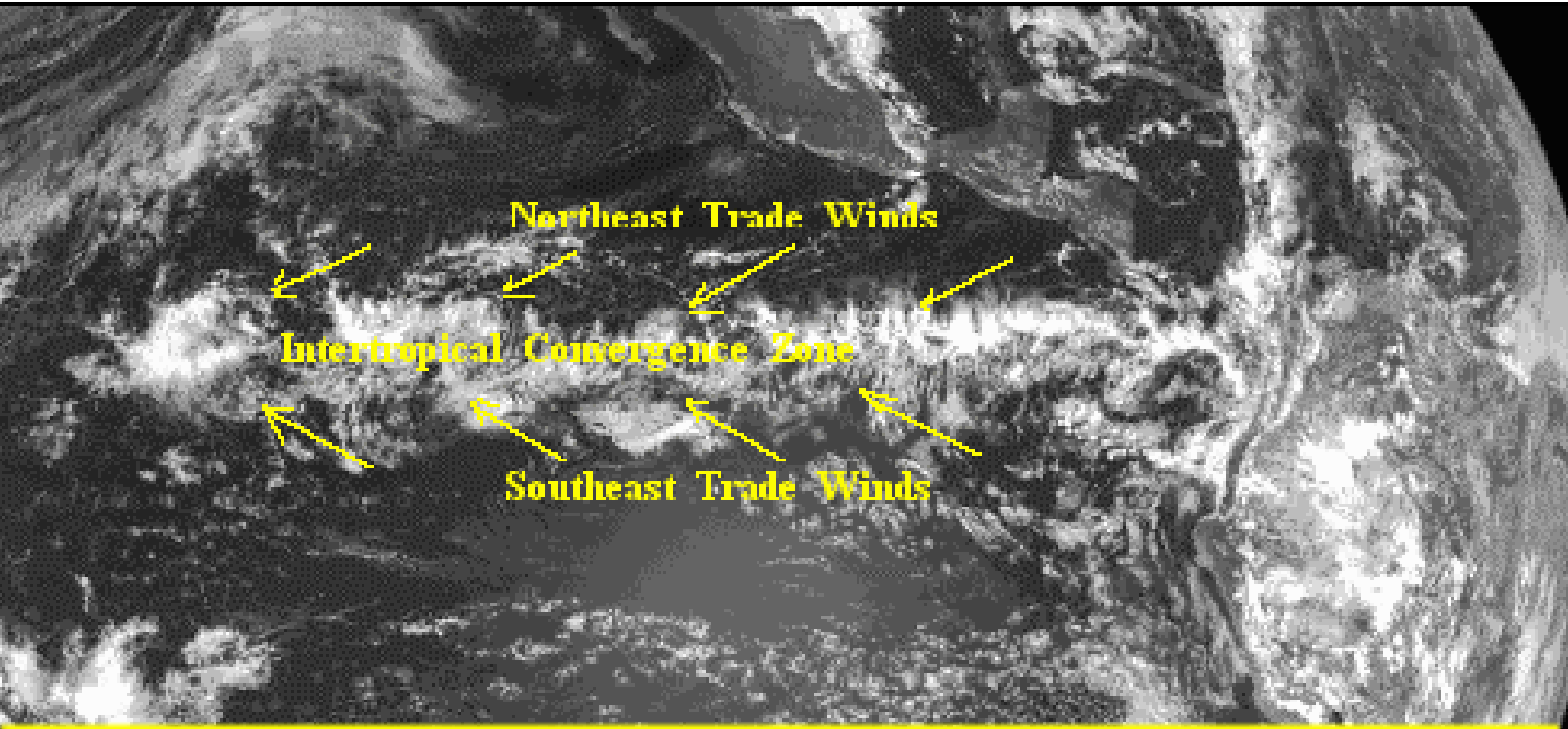
Seasonal, Annual and other controls on Rainfall and Drought in the Chihuahuan Desert of New Mexico



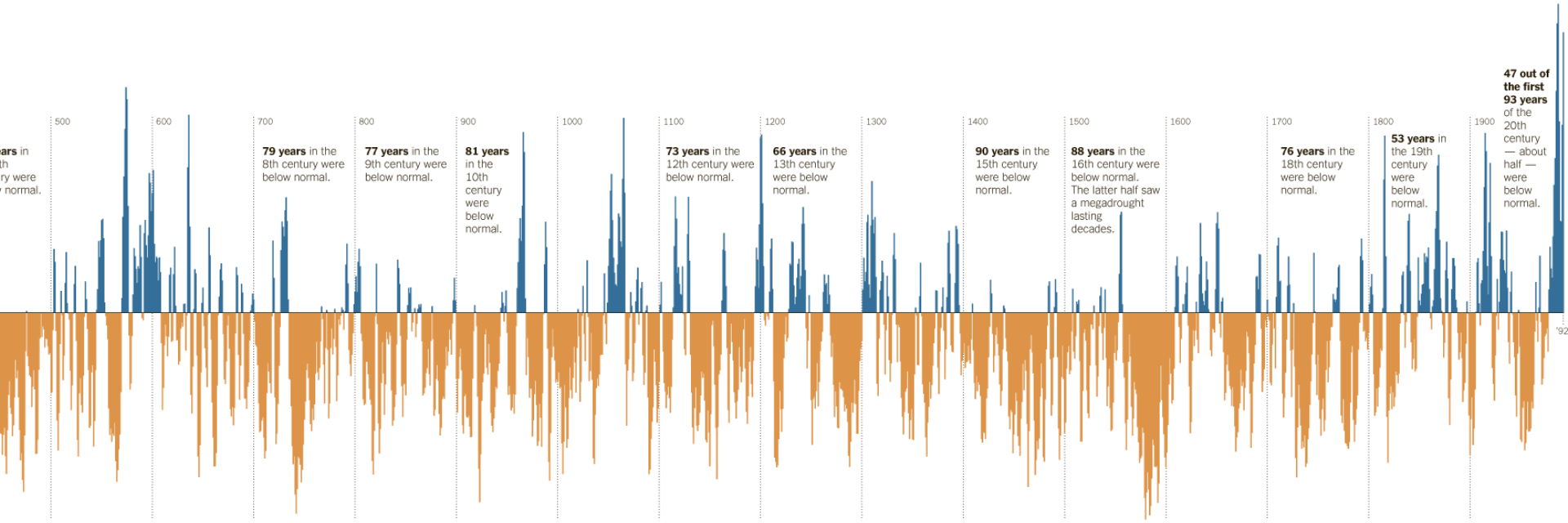
Bob Endlich

bendlich@msn.com

Weather, Climate, and Climate Change What the Data Tell Us

24 September 2019

Seasonal, Annual, and other controls on rainfall and drought in the Chihuahuan Desert of far West Texas and New Mexico



Outline

How Geography of El Paso-Las Cruces-Alamogordo area fits into global and local climate controls

Storms, Storminess, and Climate Change

The Subtropical Ridge

North American Monsoon

El Nino, La Nina, ENSO-Neutral

The Pacific Decadal Oscillation:
The 60-years-long weather feature many mistook for human-caused CO2-fueled “global warming”

Geography, Weather, and Climate

We're far from the moderating influences of large water bodies.

700 miles straight-line distance

Interiors of large continents -- large differences in winter-to-summer temperatures

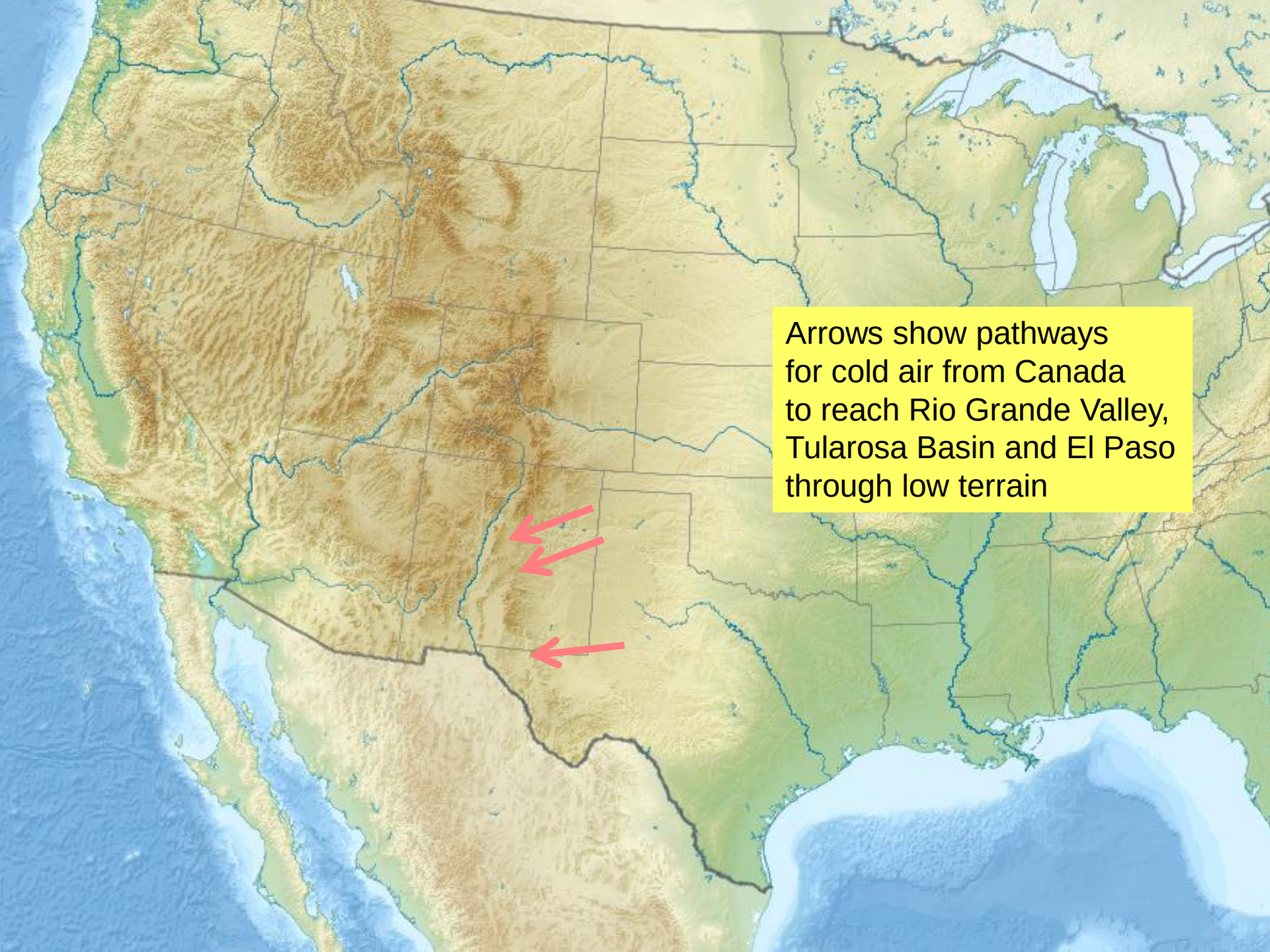
We're in the Basin and Range Province -- one high mountain range to our East.

sub-Polar Air Masses frequent as "back-door" cold fronts

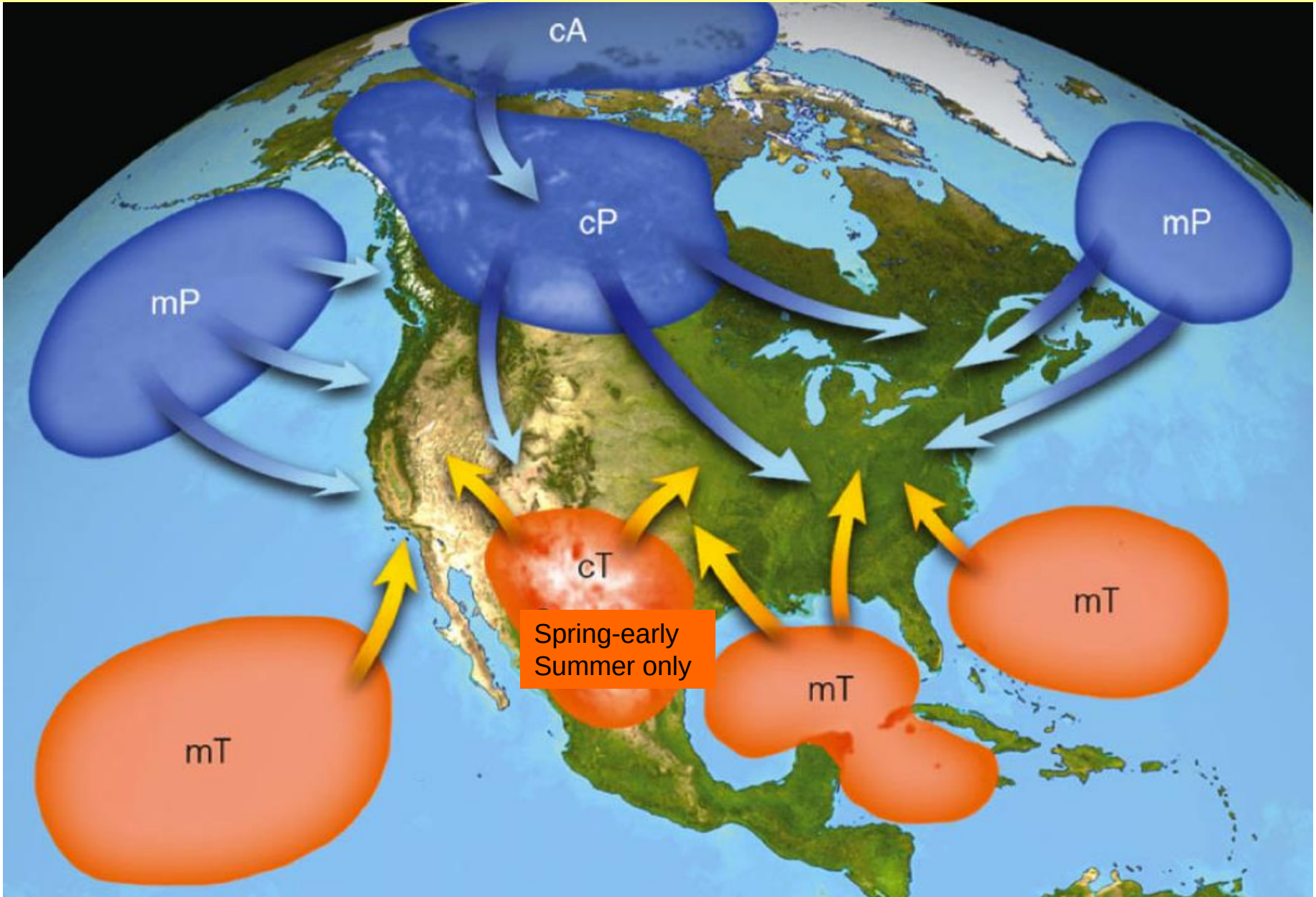
Arctic Air Masses occasionally arrive here: Feb 2011

Our Area = source region for hot, dry air Continental Air masses, especially March-June

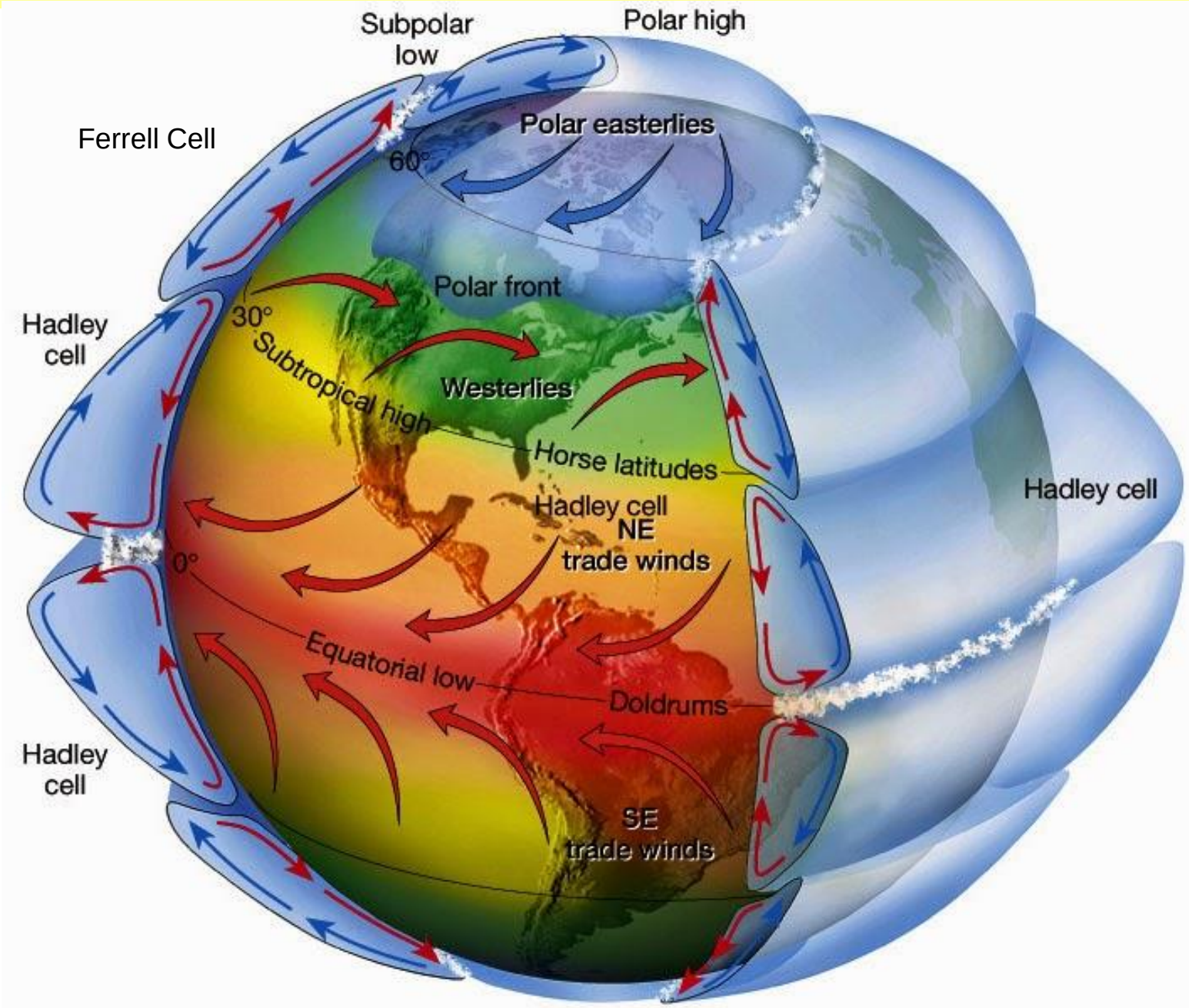

730 miles
700 miles

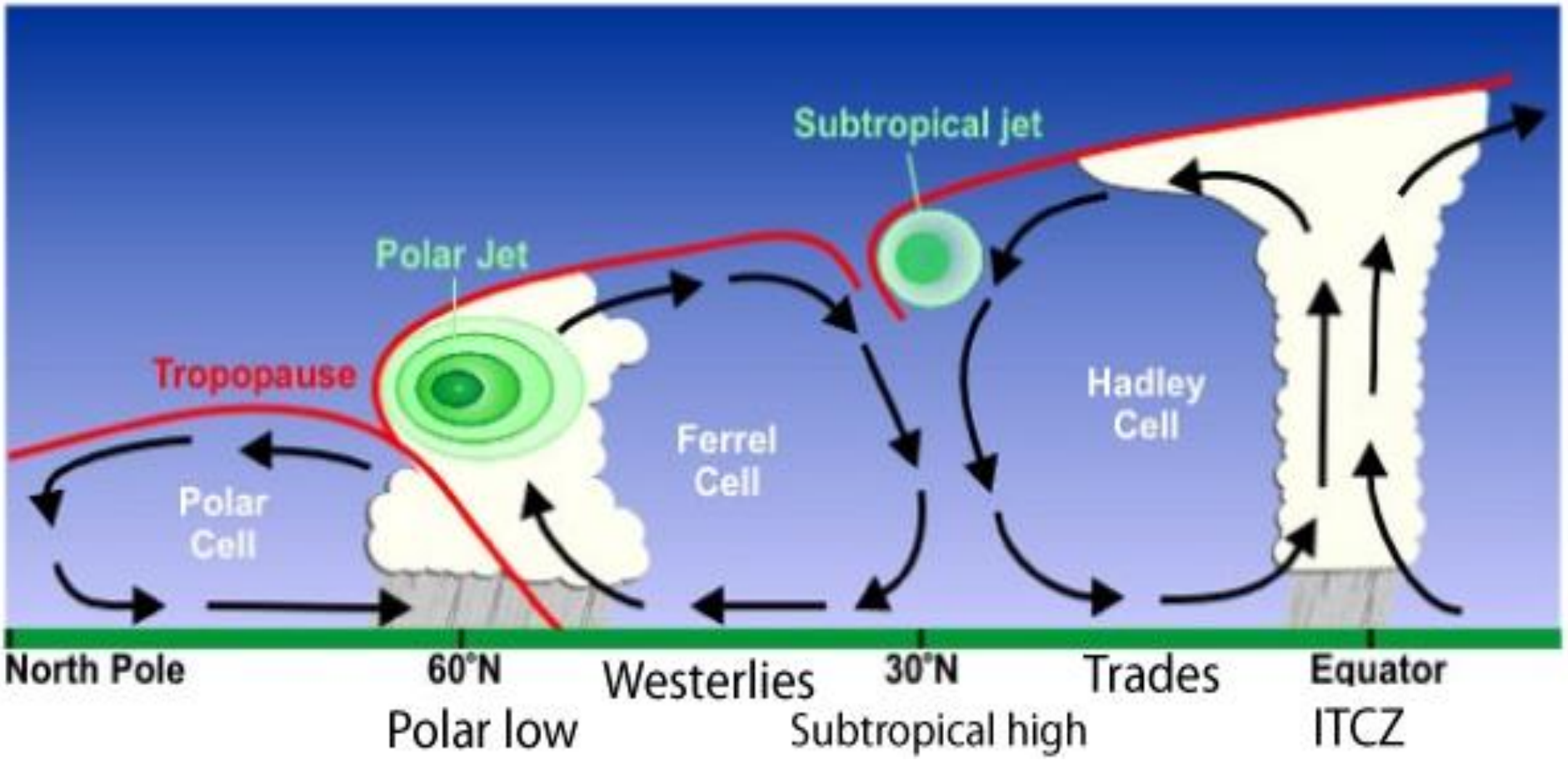

Arrows show pathways
for cold air from Canada
to reach Rio Grande Valley,
Tularosa Basin and El Paso
through low terrain

Air Masses, source regions, movement patterns. Sometimes Arctic air reaches El Paso, Tularosa Basin. A = Arctic mT = maritime Tropical
cP = Continental Sub Polar mP = Maritime Sub Polar cT = Continental Tropical



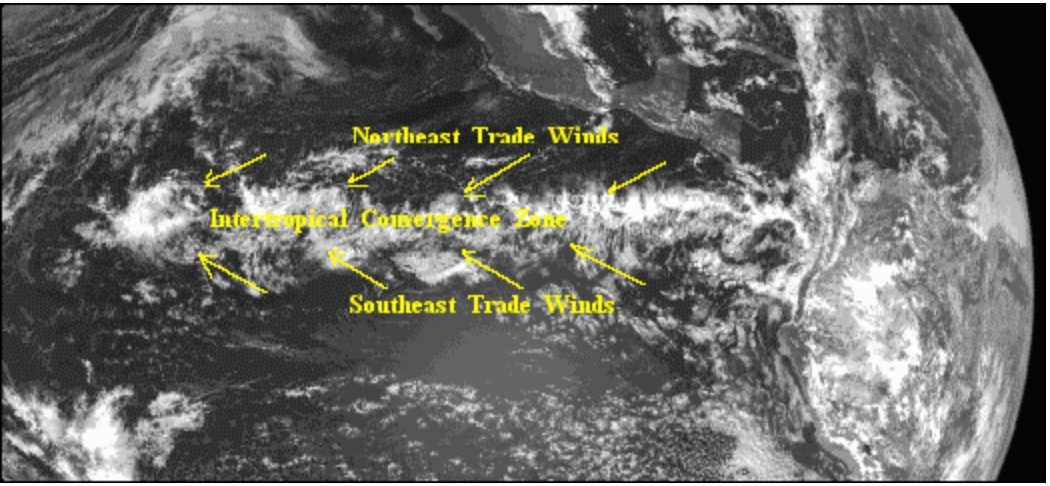
http://1.bp.blogspot.com/tDTpvWrModo/U2XoP6s57XI/AAAAAAAAA7o/r6Ik0N5VHk8/s1600/Hadley+cells+2_ux1_eiu_edu.jpg

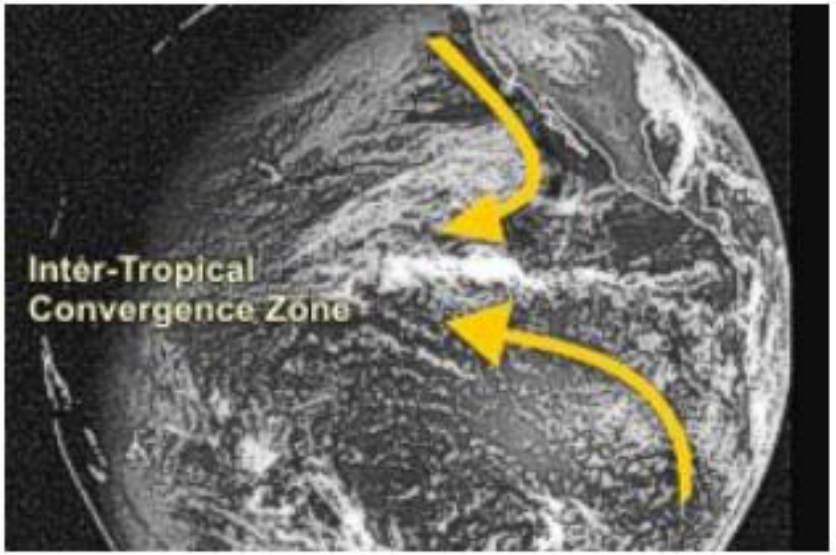




http://globalsailingweather.com/globalpatterns.php

http://ggweather.com/enso/itcz.gif

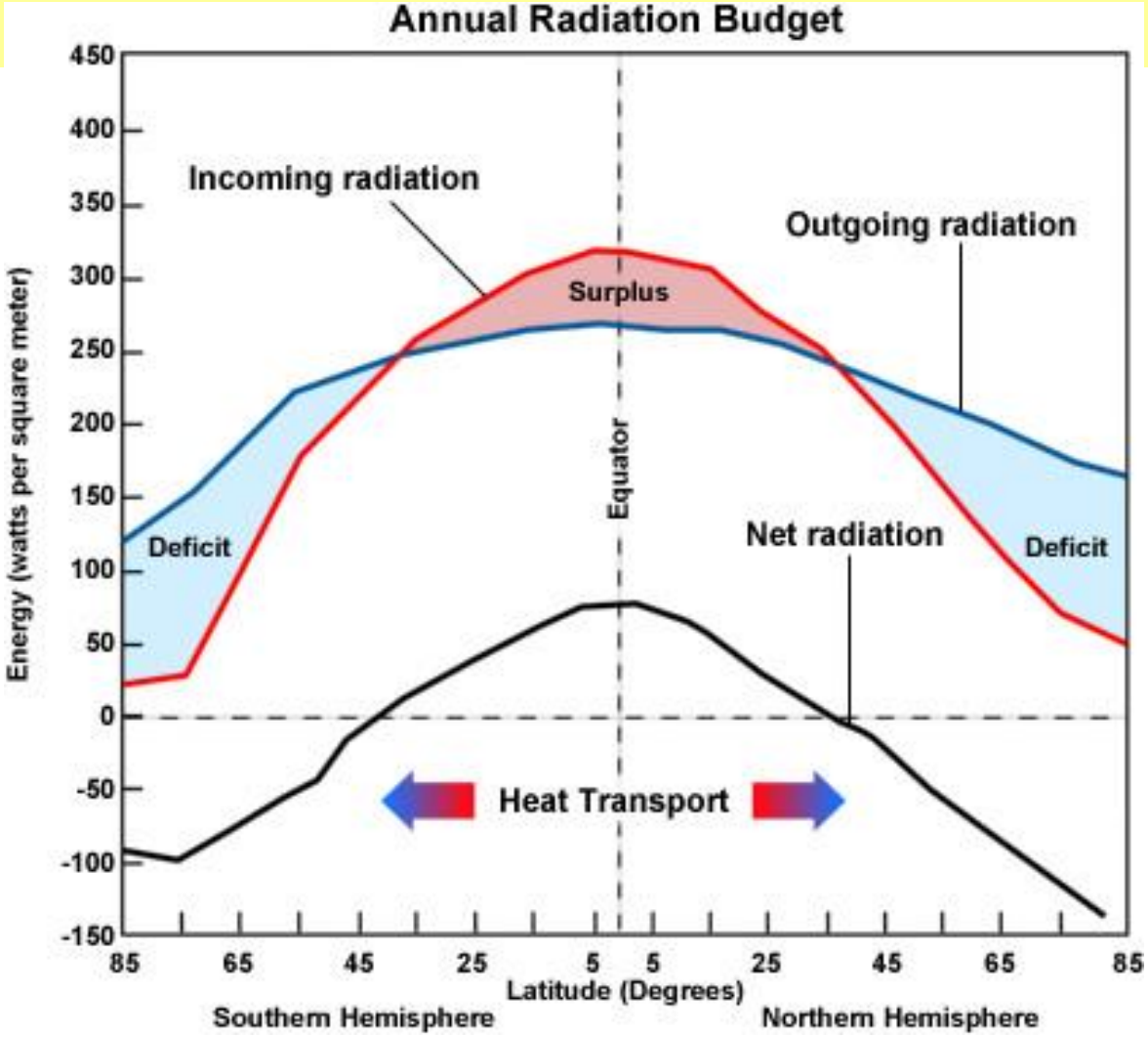




The location of the Inter-Tropical Convergence Zone is usually readily seen as a line of cumulus clouds in the tropics. This is the location where northeast winds in the Northern Hemisphere converge with the southeast winds from the Southern Hemisphere.

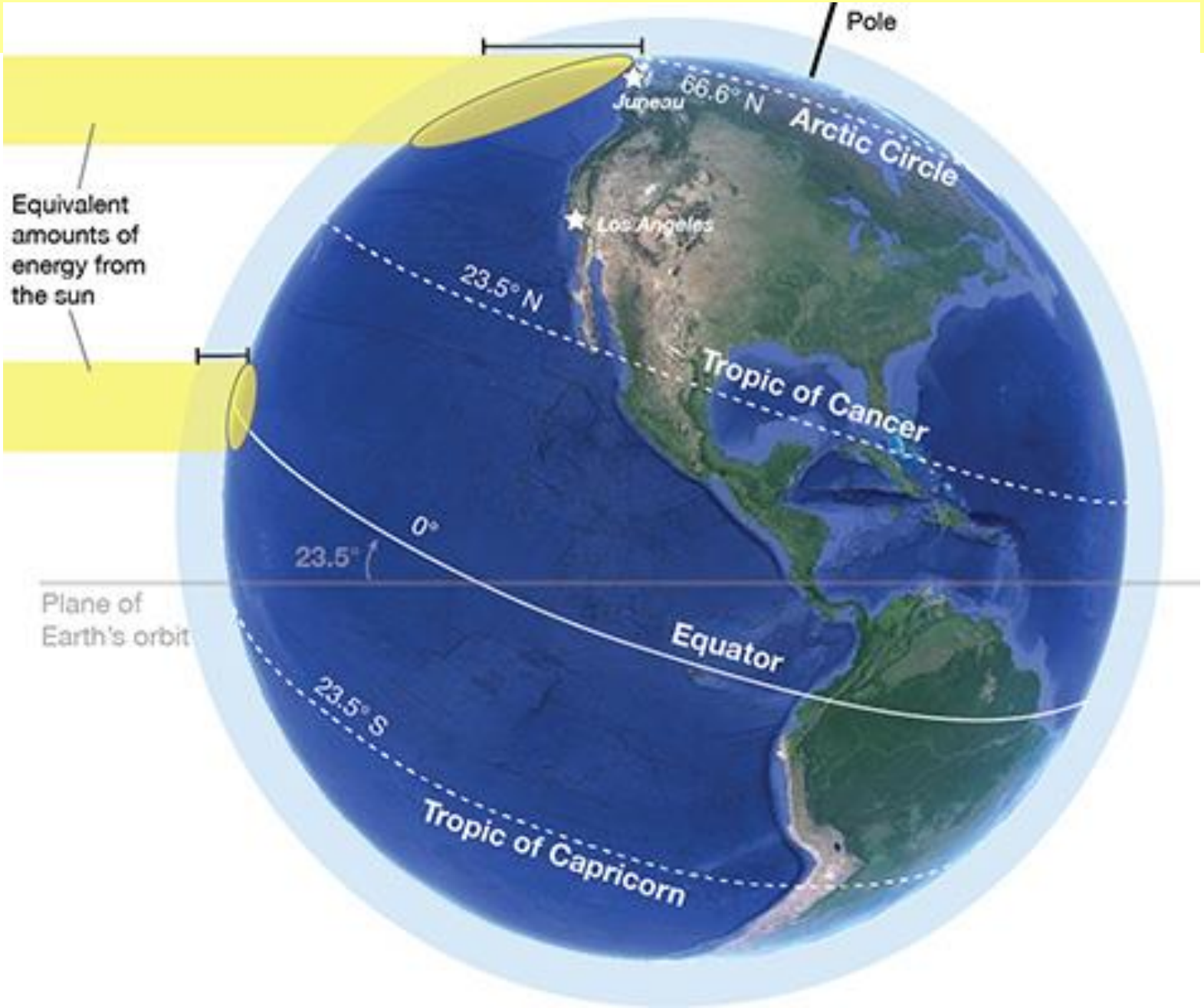
http://www.srh.noaa.gov/jetstream/tropics/itcz.html

http://www.visionlearning.com/en/library/Earth-Science/6/Factors-that-Control-Regional-Climate/255



Incoming radiation, (insolation), and outgoing radiation vary with latitude.
Tropics receive more solar radiation than they emit, creating an energy surplus.
Polar regions emit more than they receive. Imbalance causes storms.
A Cooler Planet is stormier. Warmer Planet has fewer strong storms.

http://www.visionlearning.com/en/library/Earth-Science/6/Factors-that-Control-Regional-Climate/255



Midlatitude Cyclones

- Life Cycle
  - Cyclogenesis
    - Birth of midlatitude cyclone
  - Occlusion
    - Death of midlatitude cyclone

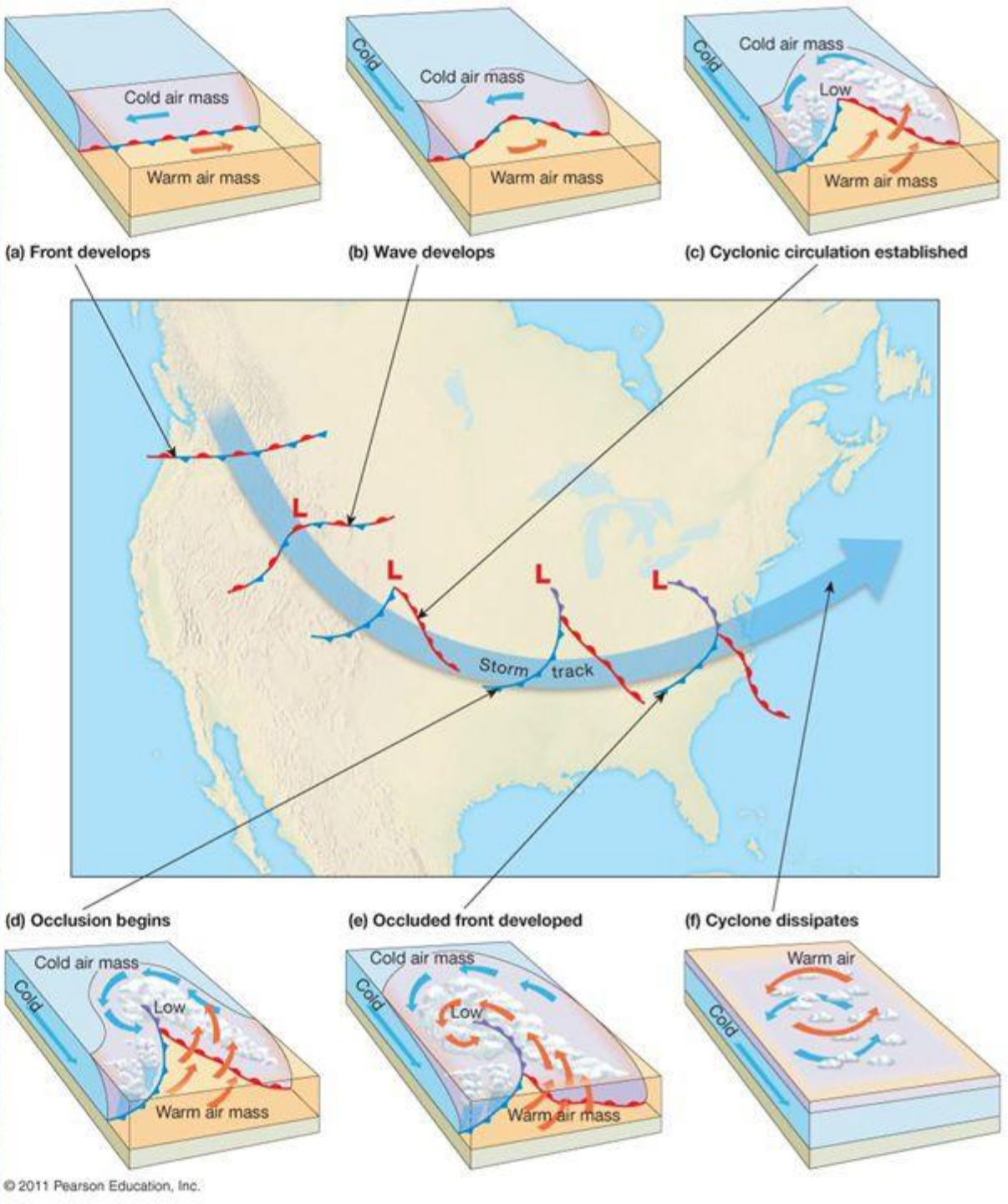
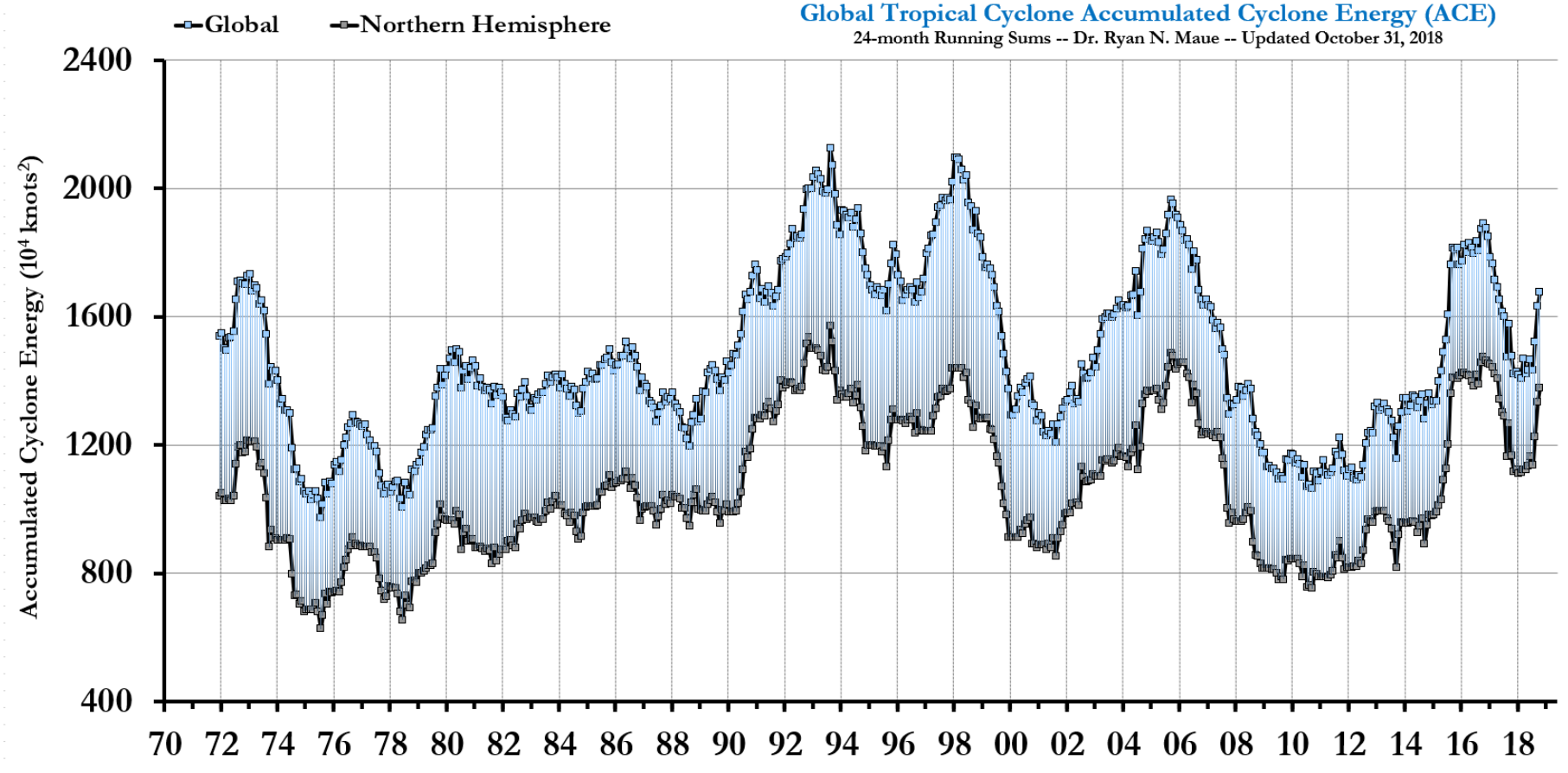


Figure 7-9

Brief sidebar on Tornadoes and the National Climate Assessment statement that Extreme Weather is increasing.

Last week we showed data about history of hurricane enegetics:

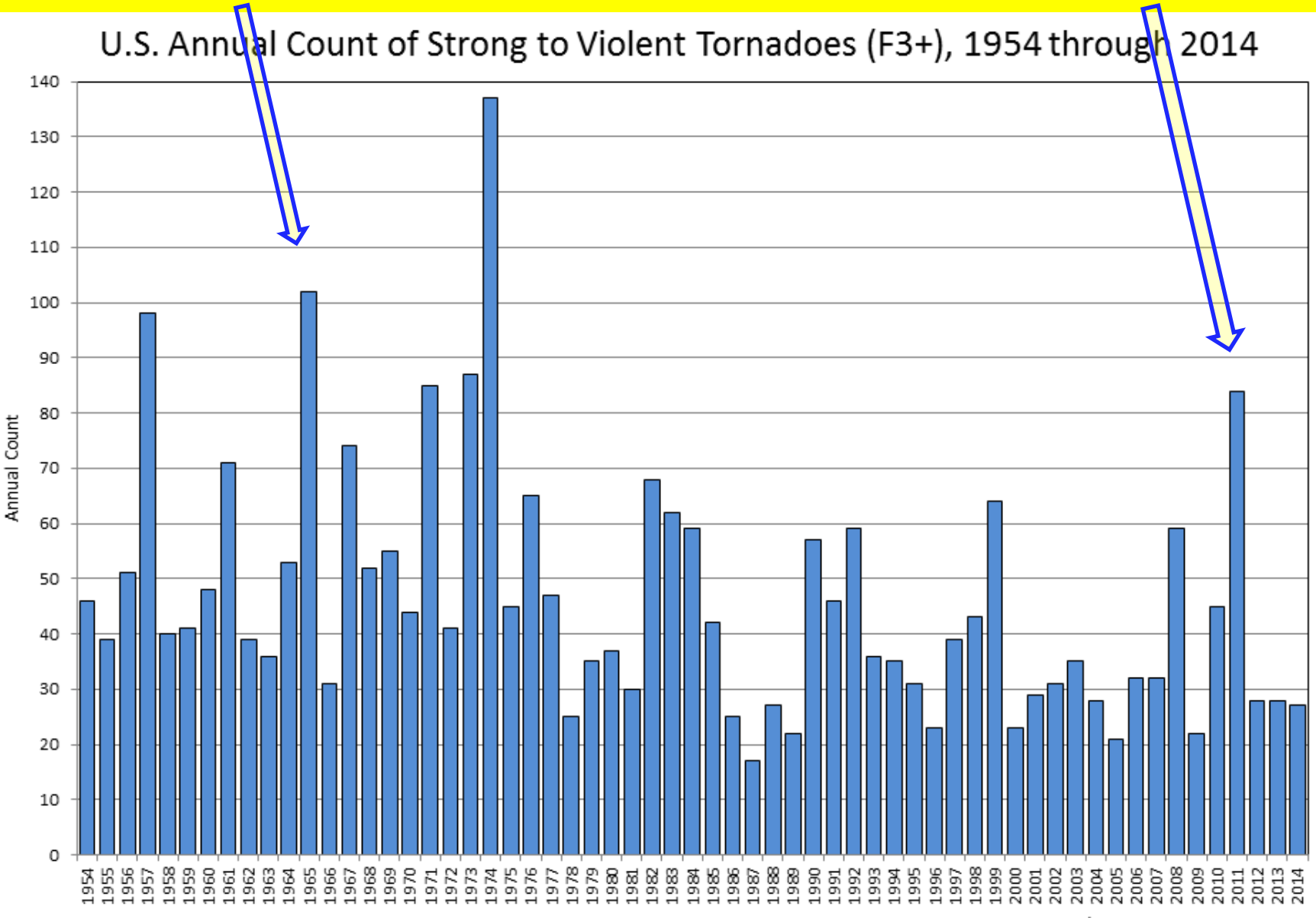


Now a brief foray into tornado history

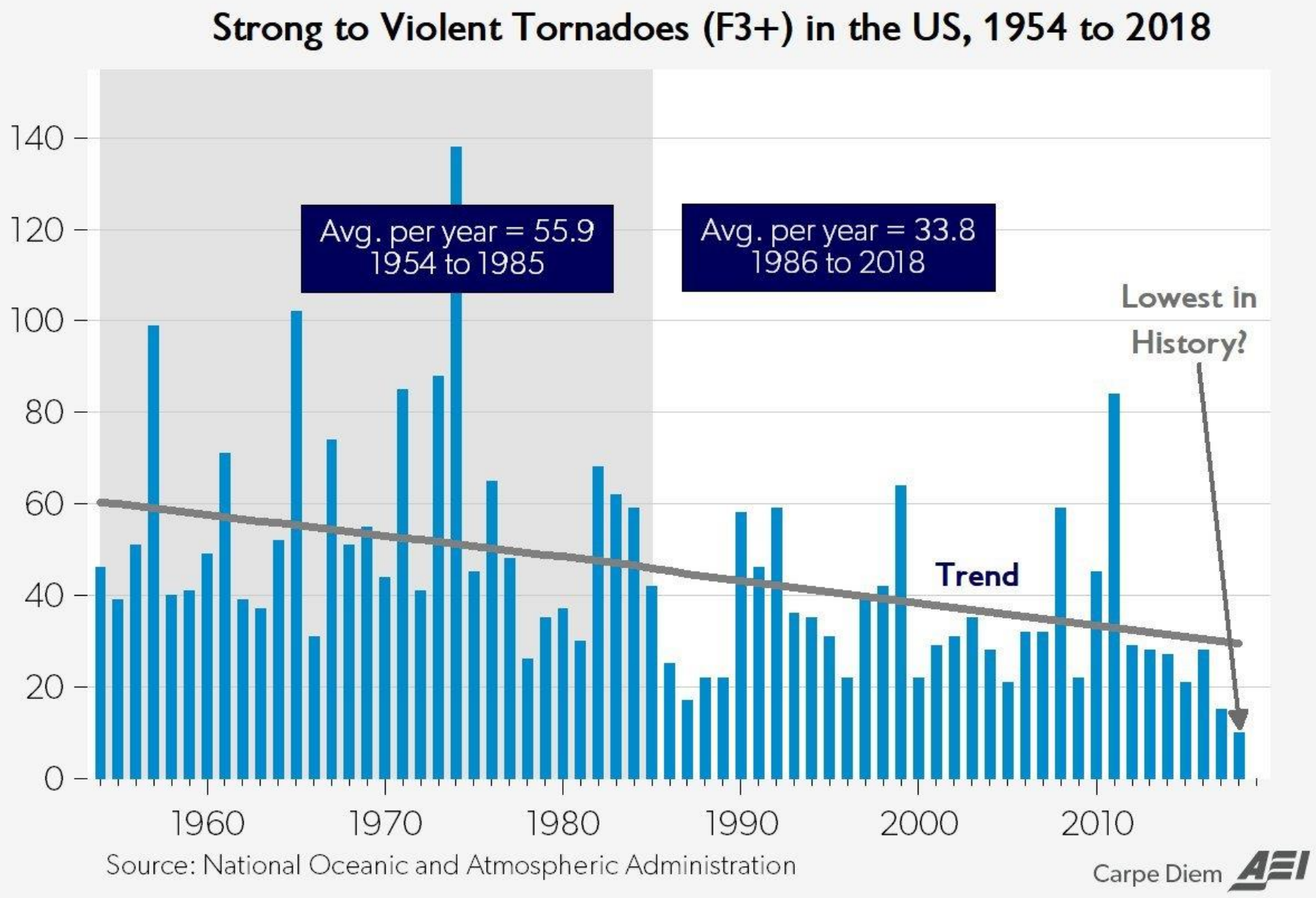
http://www1.ncdc.noaa.gov/pub/data/cmb/images/tornado/clim/EF3-EF5.png

Cooling from 1954-1977; then warming.

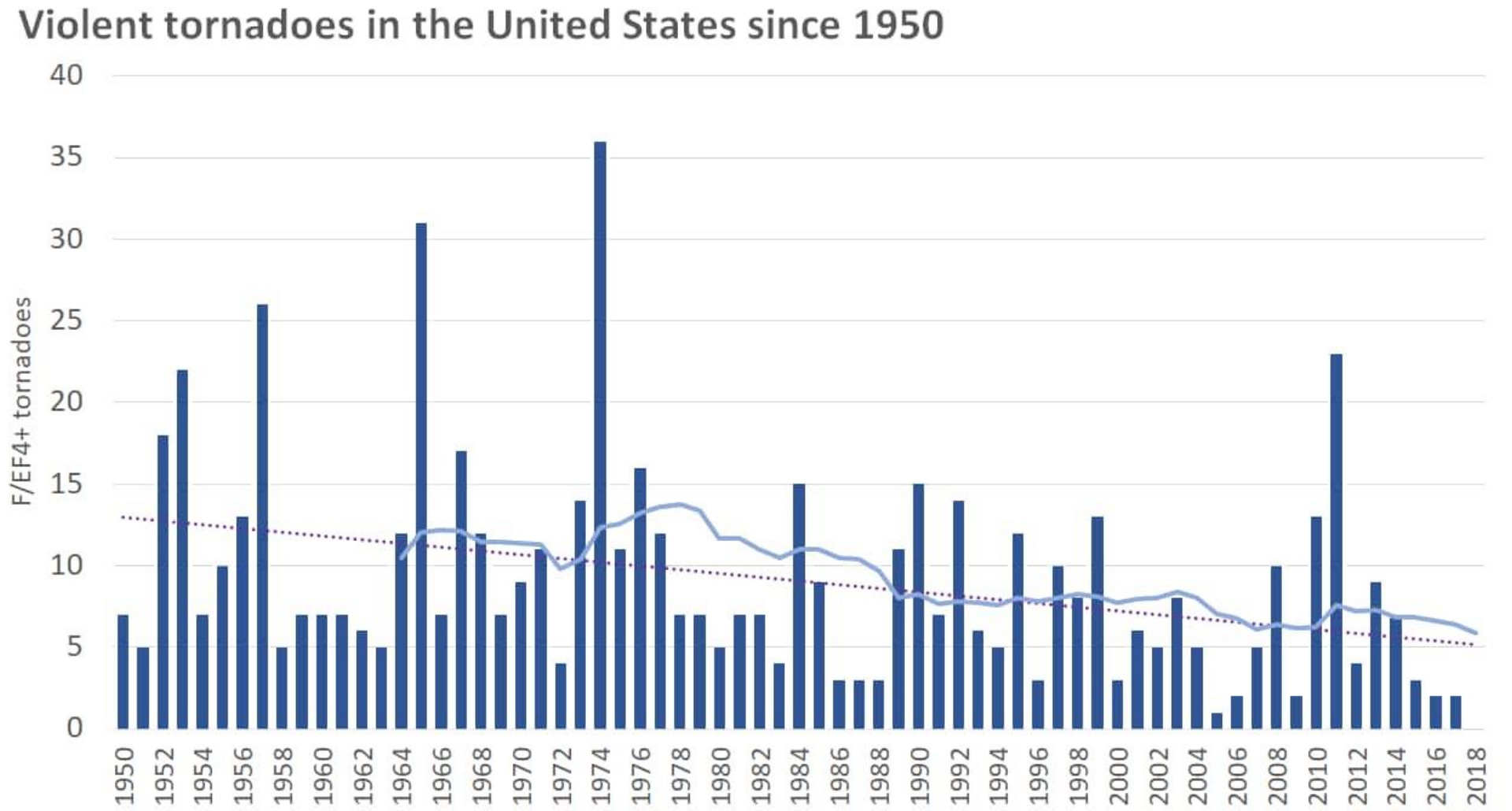
Feb 2011, Arctic blast followed by violent spring tornadoes Joplin, MO, Tuscaloosa, AL



https://wattsupwiththat.com/2018/10/24/2018-u-s-tornadoes-on-track-to-be-lowest-ever-noaas-temperature-trends-blow-a-hole-in-climate-correlation/



https://www.washingtonpost.com/weather/2018/12/26/will-be-first-year-with-no-violent-tornadoes-united-states/



Annual violent tornado numbers in modern history. The purple dashed line is a linear trend; blue line, a 15-year average.
Data from the Storm Prediction Center. (Ian Livingston/The Washington Post)

Perhaps Mother Nature herself is laughing at the climate alarmists.
A month after the National Climate Assessment Vol 2 was released, the day after Thanksgiving, 2018, this story was published in USA Today

https://www.usatoday.com/story/news/nation/2018/12/28/tornadoes-set-record-lows-2018-only-10-deaths-us/2431360002/

2018 was an all-time record quiet year for tornadoes in the U.S.

Doyle Rice, USA TODAY Published 1:47 p.m. ET Dec. 28, 2018 | Updated

Several tornadoes hit Texas on Halloween night, Oct. 31, 2018.
(Photo: AP)

"Both the number of Americans killed by tornadoes and the number of violent tornadoes in the U.S.
set record lows that have stood for decades.
<underlining added>

Tornadoes only killed 10 Americans in 2018, the fewest since unofficial records began in 1875 during the administration of President Ulysses S. Grant.

The previous record low year for tornado deaths was 1910, when 12 people died, according to data from
NOAA's National Severe Storms Laboratory."

Progression of Seasons
El Paso, Las Cruces, Alamogordo

Winter:
Nominally Dry, with light winds; Morning drainage winds down the Rio Grande Valley and Tularosa Basin; upslope winds from the valley towards the mountains in the afternoons.

During El Nino years, "Winter Wet" prevails-- extensive periods of snow remains on the mountains. 1997-98 El Nino: plentiful snow in Organ, Sacramento Mts.

Spring: Afternoons have the brisk winds from the southwest. On days with severe weather to the east, in Tornado Alley, strong dry southwesterly winds cause blowing sand and dust.

June-early July. Hottest Month; only a few days with southwesterly afternoon winds. Fire season; the strong sun dries out vegetation. Dry thunderstorms exacerbate fire danger.

~4 July to ~12 September: Summer Monsoon: Surface winds from southeast with over half annual rainfall in typically PM thunderstorms .

Fall: Frequent fine days with light winds, minimum cloudiness and visibilities often over 100 miles.

http://www.weather.gov/epz/elpwindrosedata

NATIONAL WEATHER SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

HOME FORECAST PAST WEATHER SAFETY INFORMATION EDUCATION NEWS SEARCH

ELP windrose

Weather.gov > El Paso, TX > ELP windrose

El Paso, T
Weather Forecast Offic

Current Hazards Current Conditions Radar Forecasts Rivers and Lakes
Climate and Past Weather Local Programs

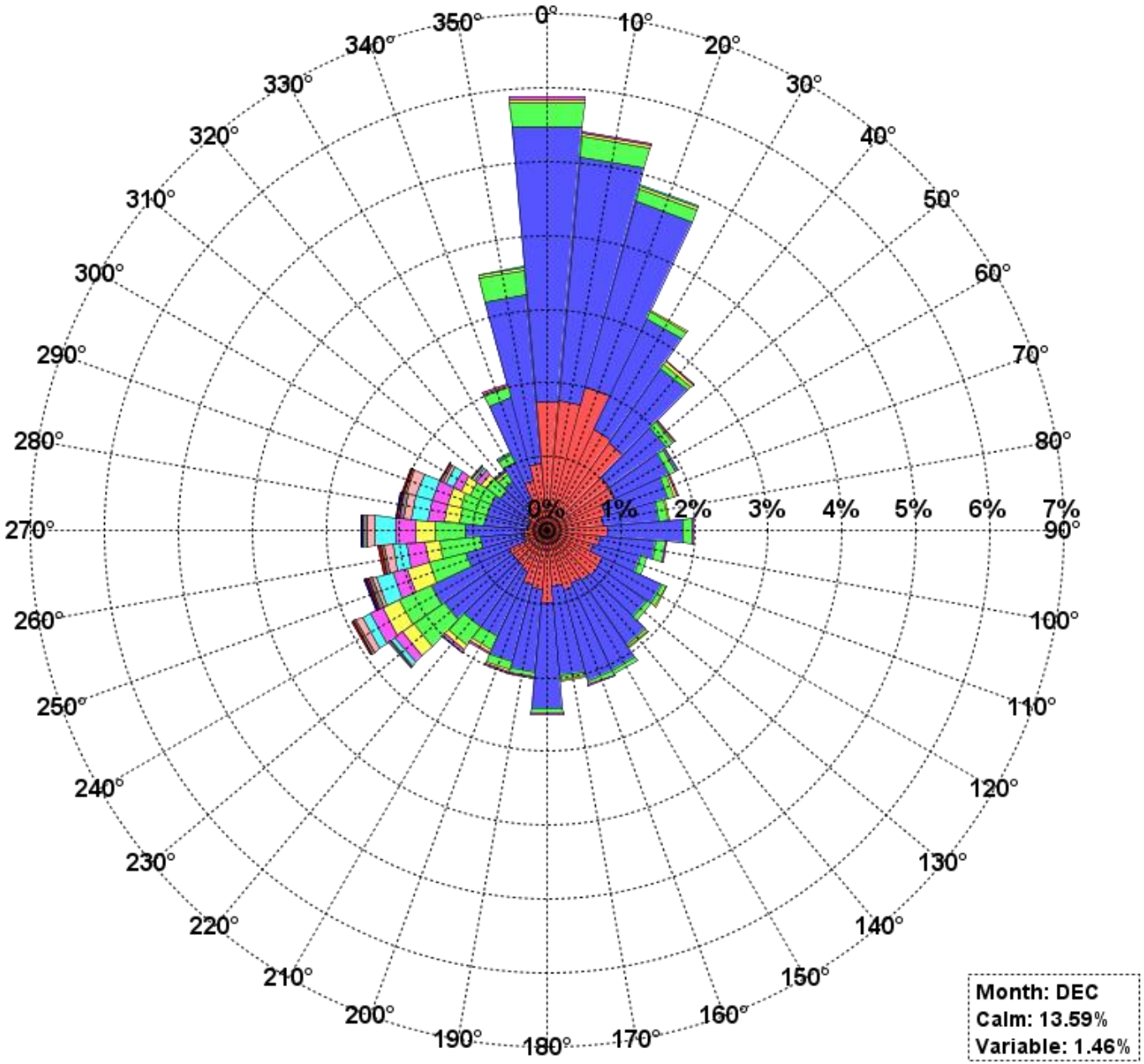
El Paso Wind Rose Data

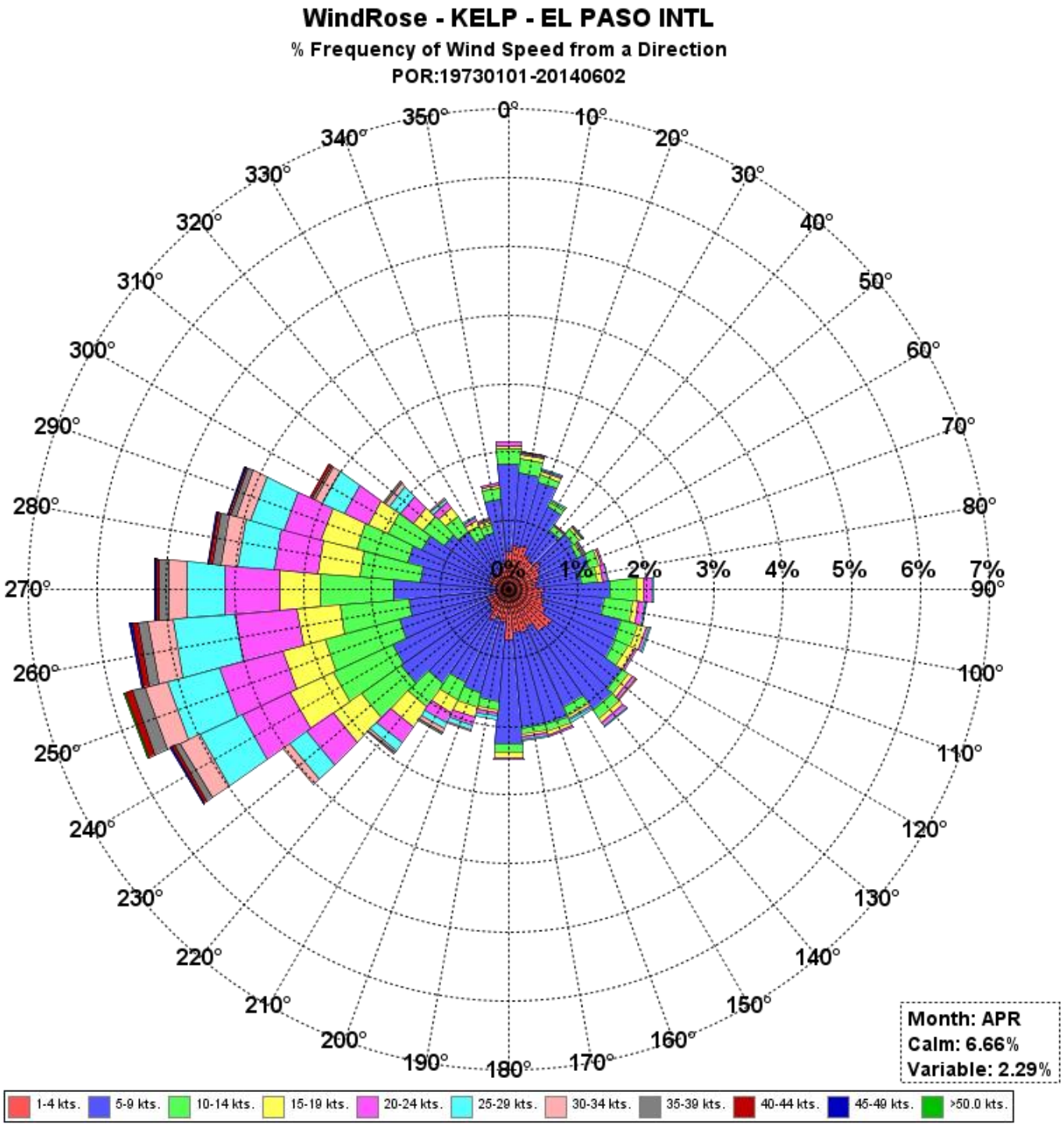
https://www.tceq.state.tx.us/assets/public/compliance/monops/air/windroses/elpjan.gif	Wind roses can be used to graphically depict the predominant transport direction of an area's winds. Air quality is often correlated with the dominant transport direction of the wind. Wind roses provide the best information regarding the percentage of time the direction(s) and speed(s) associated with a certain air quality can be expected over a long period of time. The following data was collected 01-01-1973 - 06-02-2014 at the El Paso International Airport.

WindRose - KELP - EL PASO INTL

% Frequency of Wind Speed from a Direction

POR:19730101-20140602

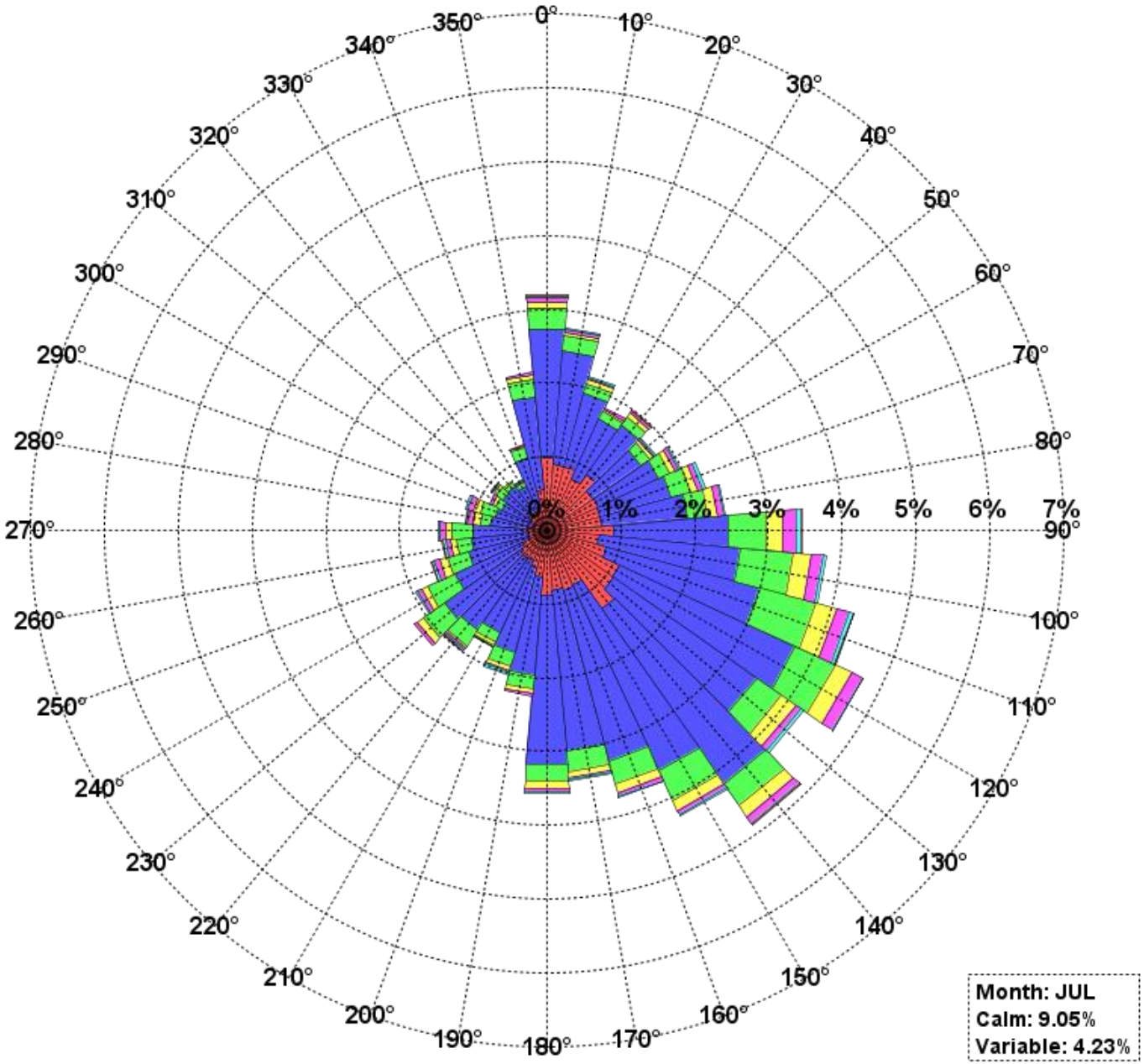



WindRose - KELP - EL PASO INTL
% Frequency of Wind Speed from a Direction
POR:19730101-20140602
0°
10°
20°
30°
40°
50°
60°
70°
80°
90°
100°
110°
120°
130°
140°
150°
160°
170°
180°
190°
200°
210°
220°
230°
240°
250°
260°
270°
280°
290°
300°
310°
320°
330°
340°
350°
0%
1%
2%
3%
4%
5%
6%
7%
Month: APR
Calm: 6.66%
Variable: 2.29%
1-4 kts.
5-9 kts.
10-14 kts.
15-19 kts.
20-24 kts.
25-29 kts.
30-34 kts.
35-39 kts.
40-44 kts.
45-49 kts.
>50.0 kts.

WindRose - KELP - EL PASO INTL

% Frequency of Wind Speed from a Direction

POR:19730101-20140602



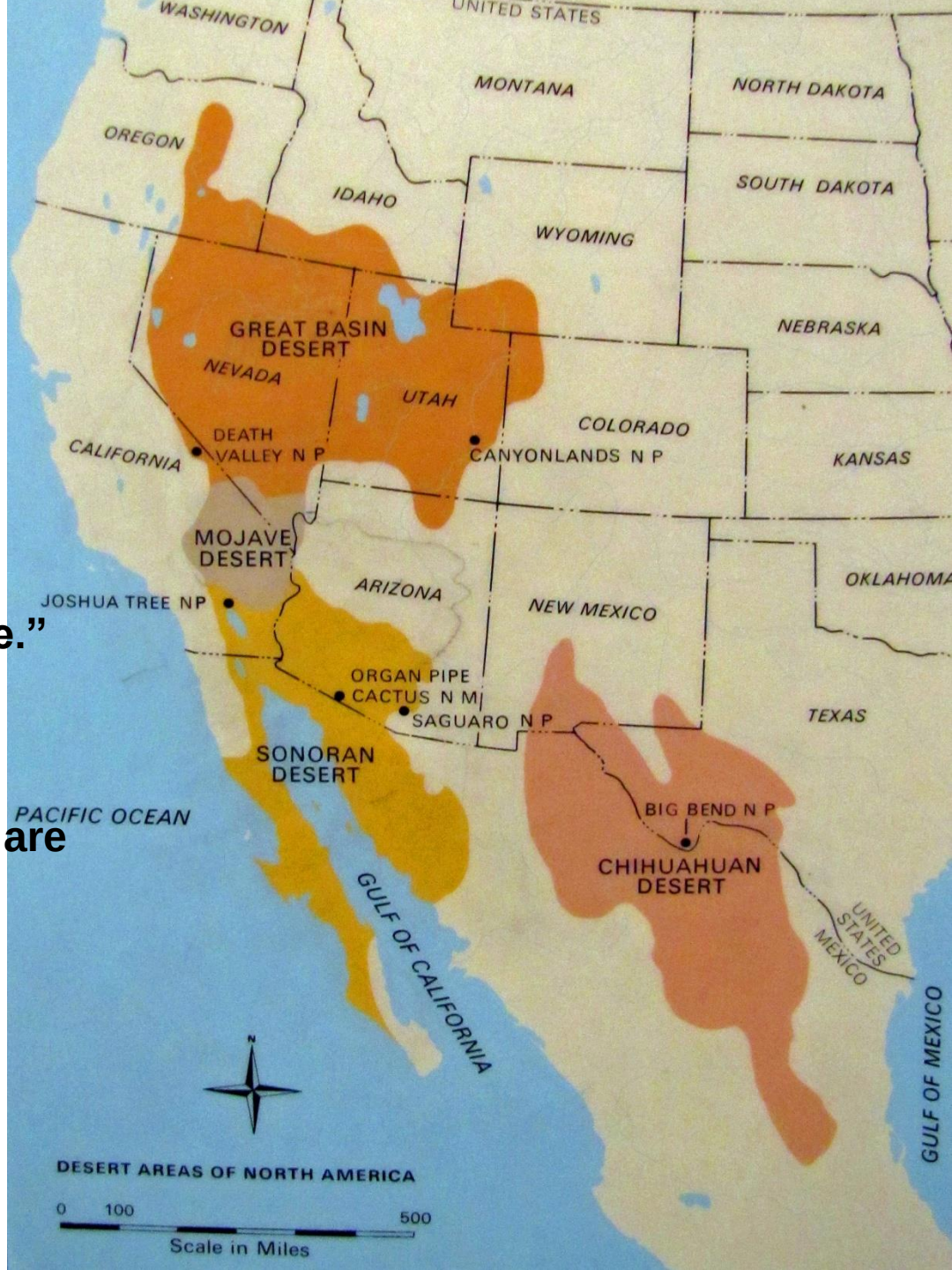
Drought in the West:

***Desert*: defined by Wikipedia**

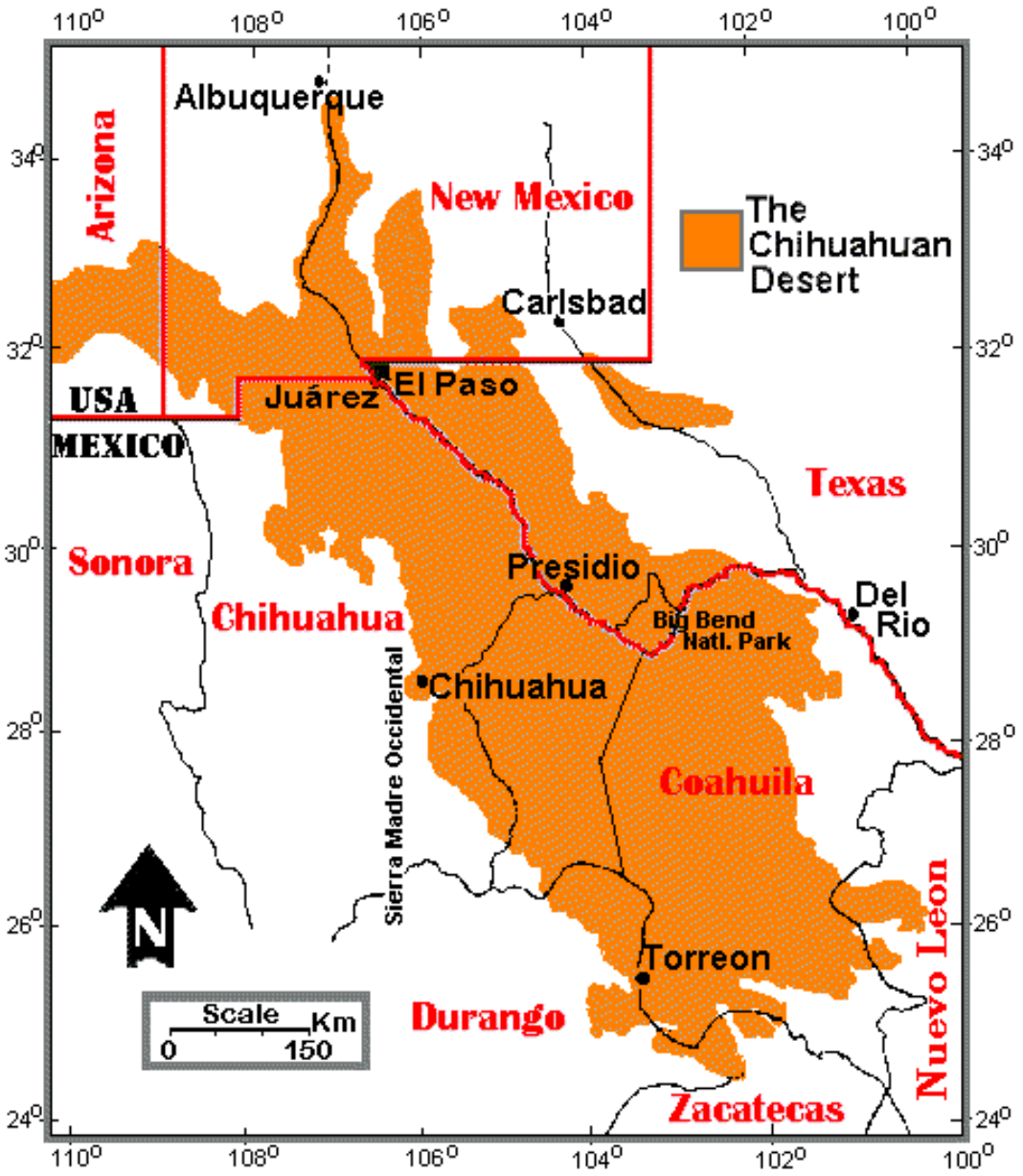
"a barren area of land where little precipitation occurs and consequently living conditions are hostile for plant and animal life."

Sound familiar?

El Paso, Las Cruces, Alamogordo are in the Chihuahuan Desert, so droughts are common.



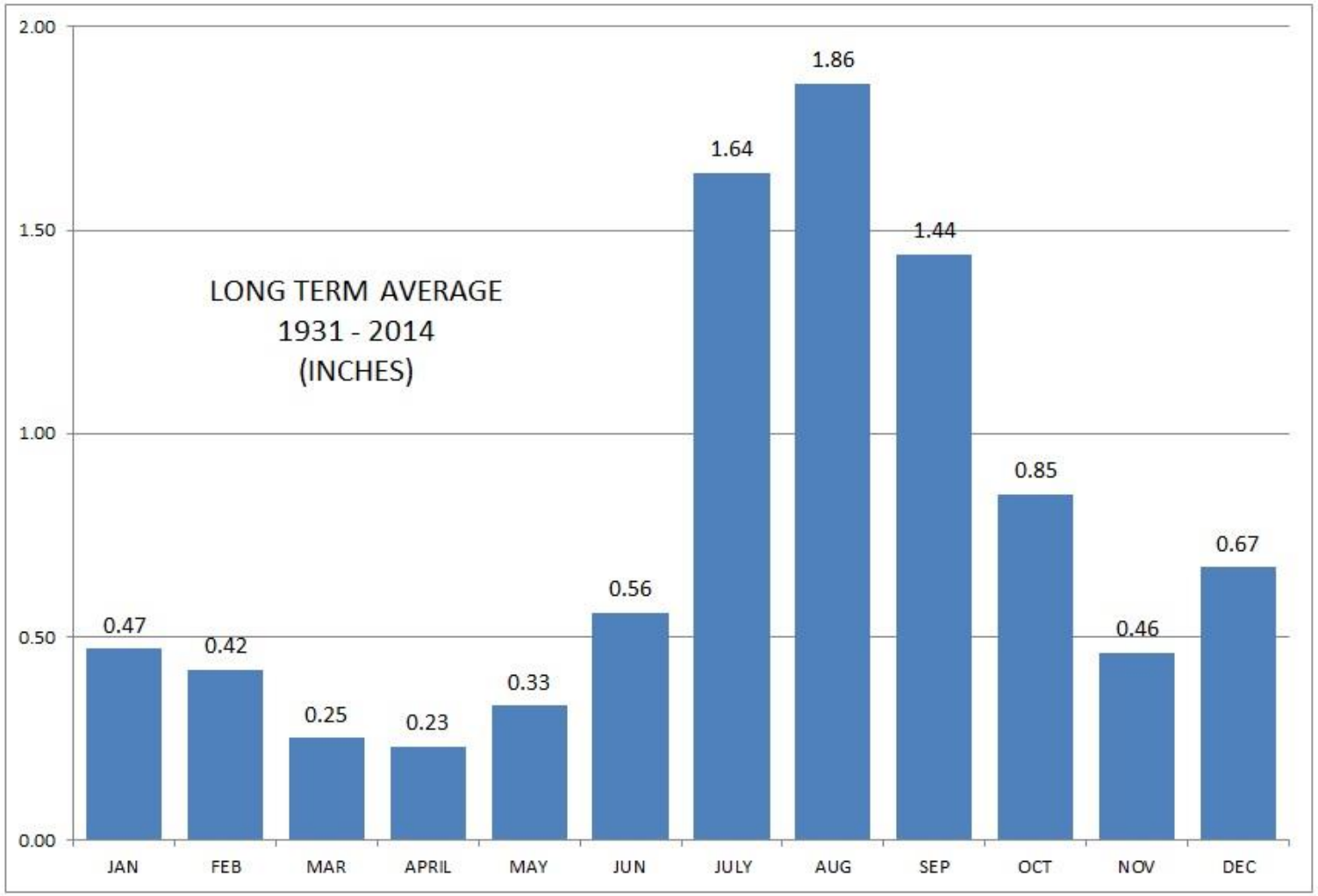
http://museum.utep.edu/chih/chihdes.htm



Chihuahuan Desert Region. After an original map by R. Schmidt (1979).

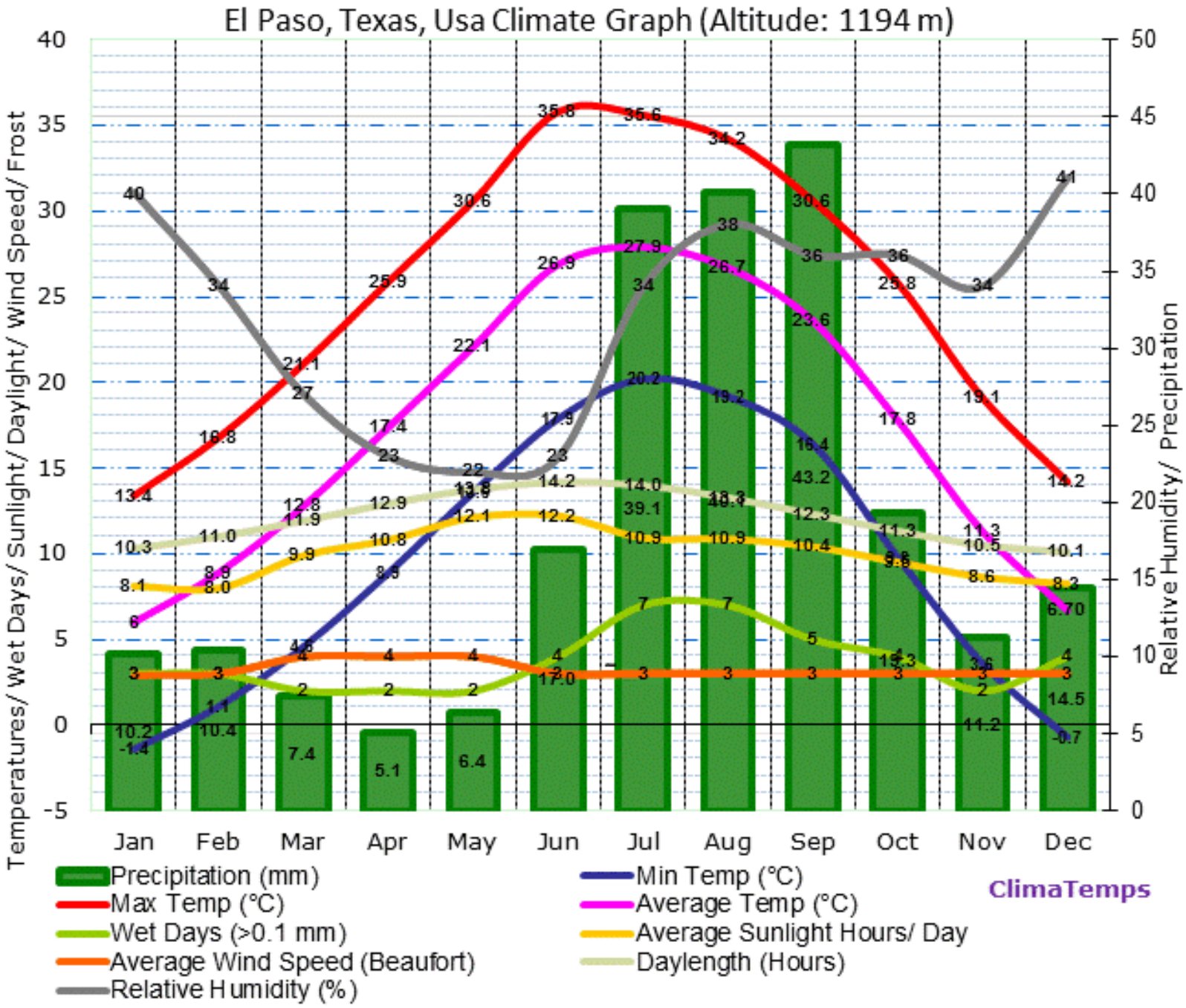
http://chihuahuansc.nmsu.edu/climate.html

Monthly distribution of rainfall in Southern New Mexico.

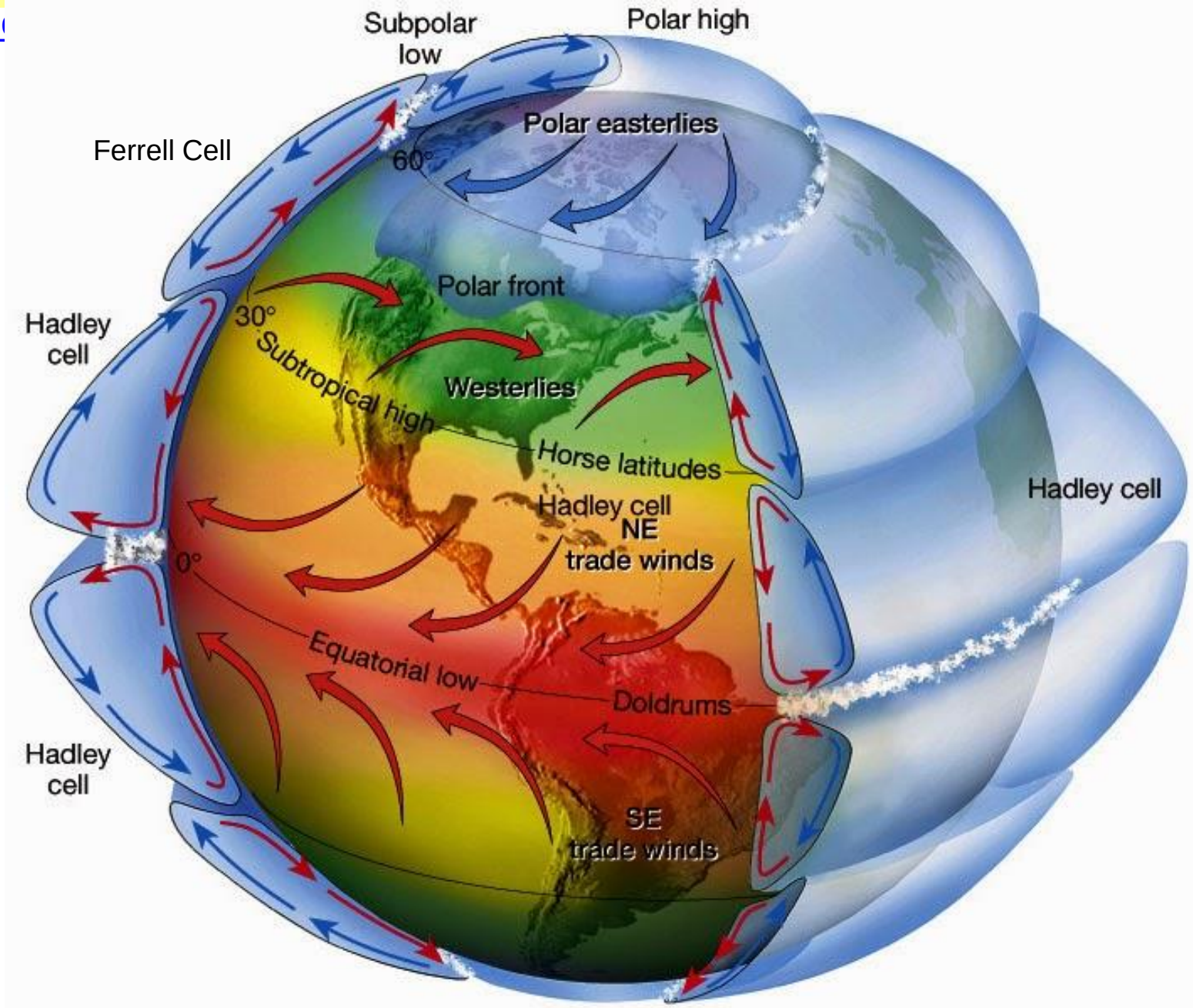


Annual Rainfall = 9.17 inches

http://www.el-paso.climatemps.com/



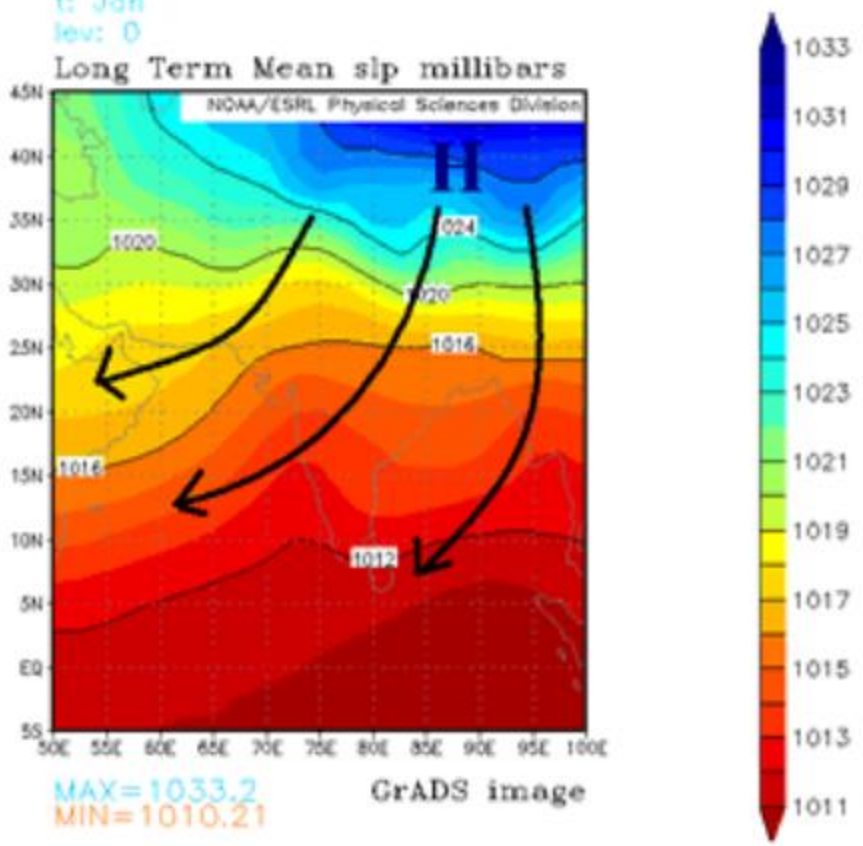
http://1.bp.blogspot.com/-tDTpvWrModo/U2XoP6s57XI/AAAAAAAAA7o/r6Ik0N5VHk8/s1600/Hadley+c



http://www.wrh.noaa.gov/twc/monsoon/monsoon_whatis.pdf

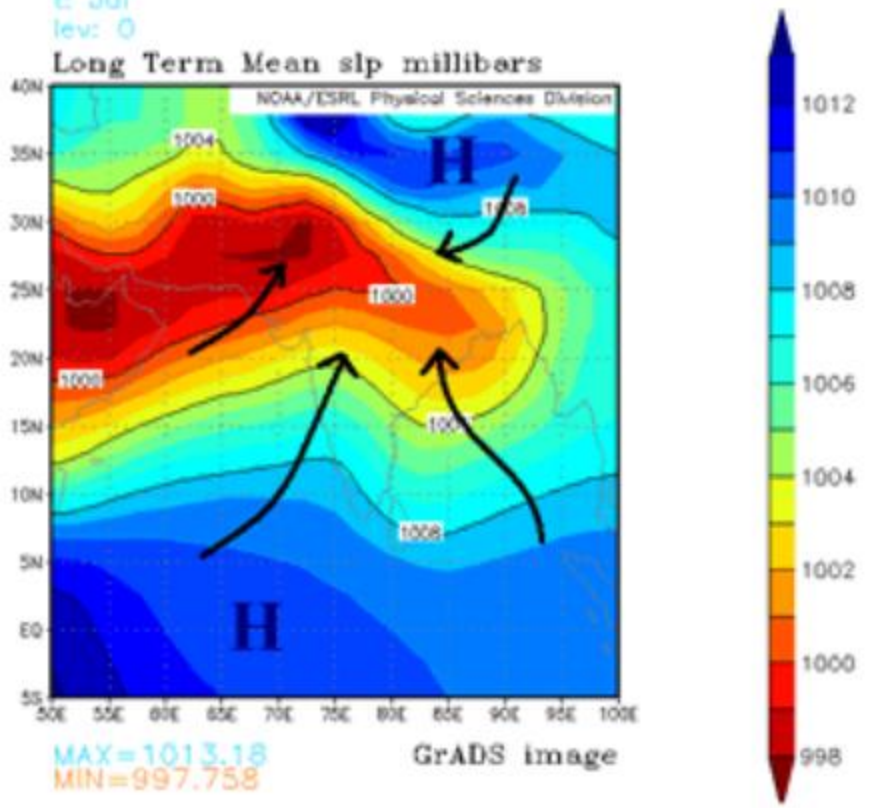
Classic definition of "monsoon" from Arabic, meaning "season," or "seasonal wind"

WINTER : Cold High Pressure over Asia



Graphic 1: Mean seal level pressure and near surface flow over India, January (dry season)

SUMMER: Land Heating => Low pressu



Graphic 2: Mean sea level pressure and near surface flow over India, July (monsoon season)

http://www.wrh.noaa.gov/twc/monsoon/monsoon_whatis.pdf

Classic definition of "monsoon" from Arabic, meaning "season" or "seasonal wind"

WINTER: Jet Stream over Asia

SWA

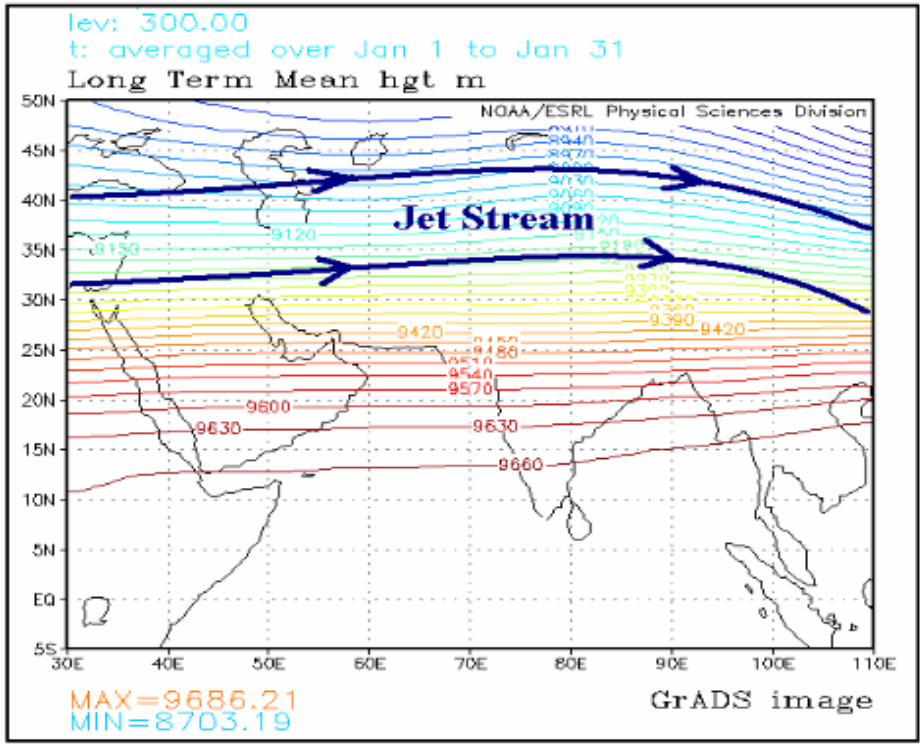
Westerly winds dominate

weakened.

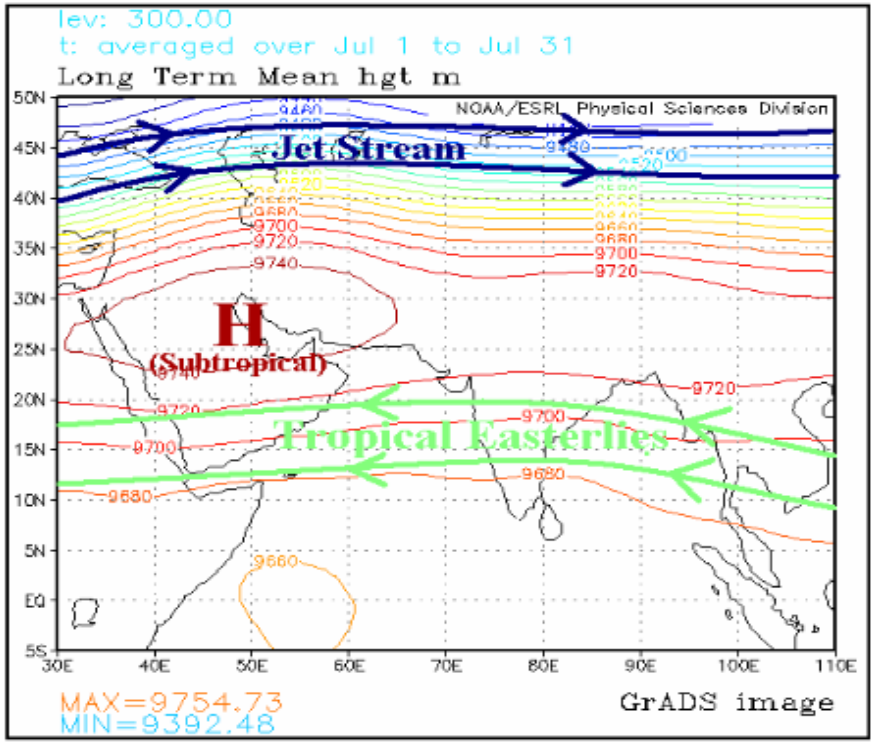
SUMMER: Subtropical Ridge moves over

Jet Stream has migrated to north;

Easterly winds (Green) dominate SEA



Graphic 3: 300mb (jet stream level) flow over south Asia, January (dry season)



Graphic 4: 300mb (jet stream level) flow over south Asia, July (monsoon season)

Sub-Tropical Ridge

Sub-Tropical Ridge—feature which causes the Sun Belt, deserts around the world.

Also called: Bermuda High, Hawaiian High, Bermuda-Azores High

High pressure: descending air - sunny skies - less rainfall-- "Sun Belt"

Follows the Sun: Stronger in Summer; Strongest after Summer Solstice.

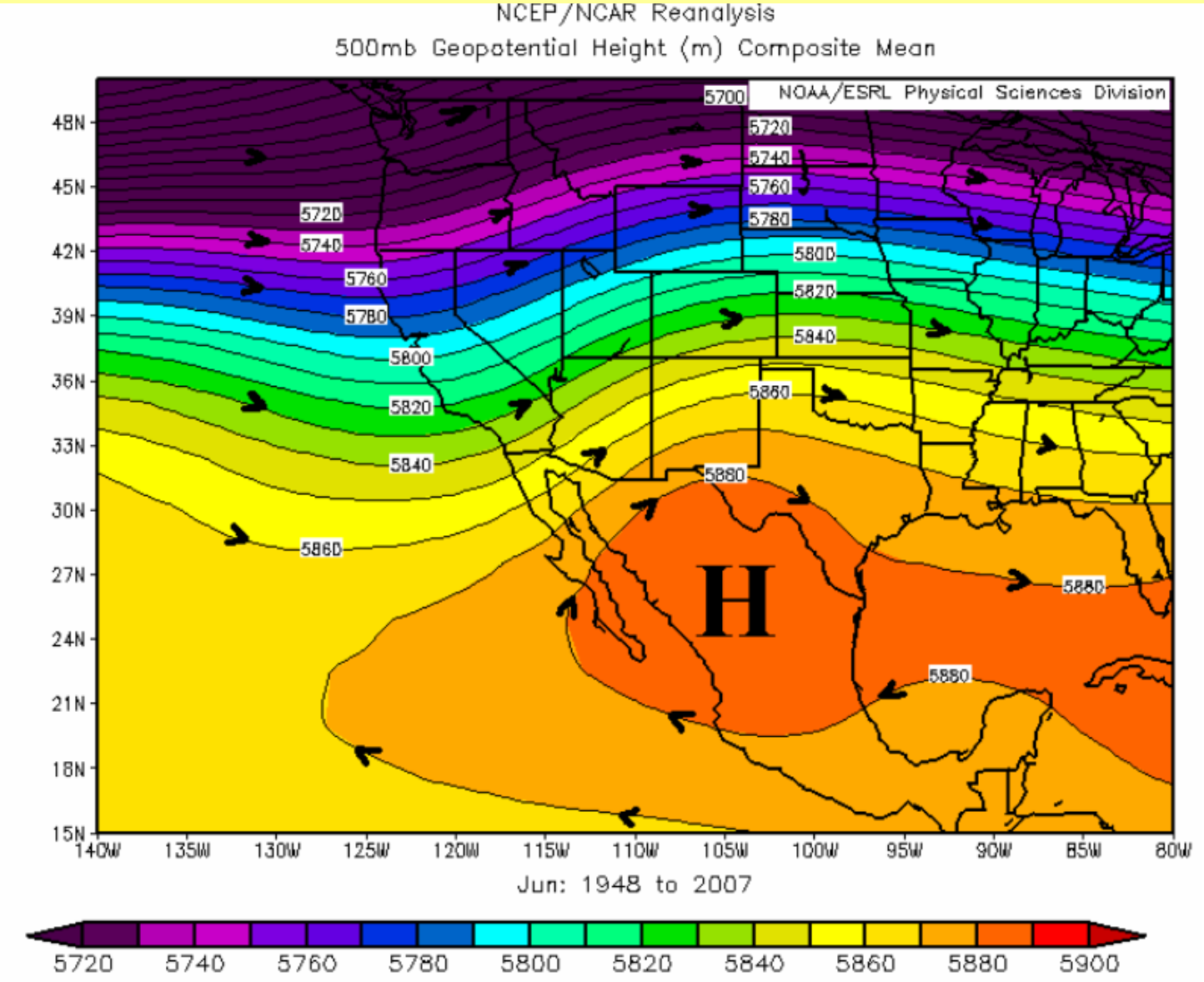
June: Centered Monterey-Saltillo Mexico, moving north

July: Strongest. center near Santa Fe, north into So. Colorado
Southeast winds in most of Texas, NM, AZ

Brings moisture from Gulf of Mexico. Dominates weather in AZ, NM
ELP, ABQ, TUS, PHX, GBN , YUM , FLG

http://www.wrh.noaa.gov/twc/monsoon/monsoon_NA.pdf

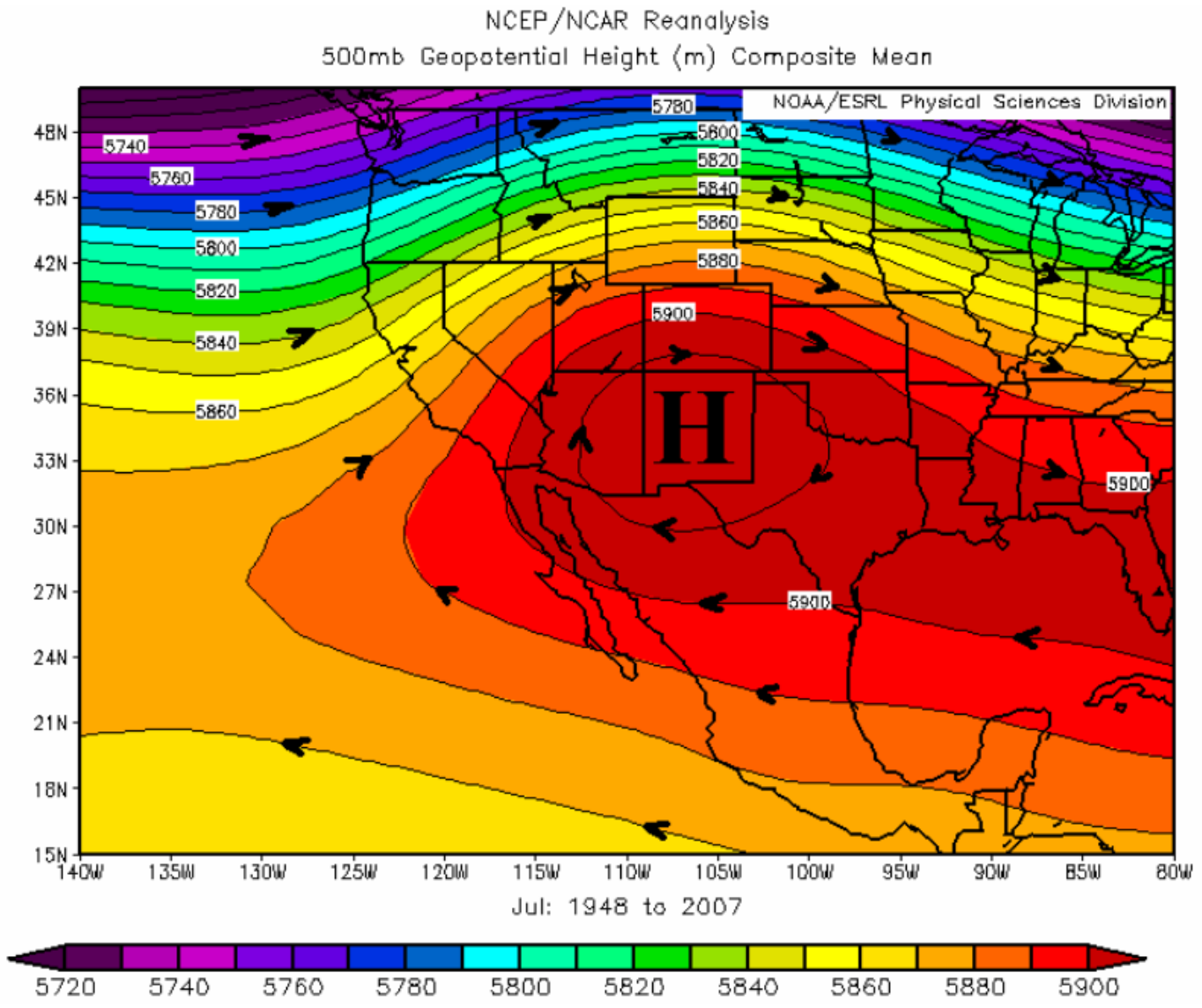
North American Monsoon-June



Graphic 2: Mean 500mb height pattern, June. Subtropical high is strengthening over northern Mexico

http://www.wrh.noaa.gov/twc/monsoon/monsoon_NA.pdf

North American Monsoon-July

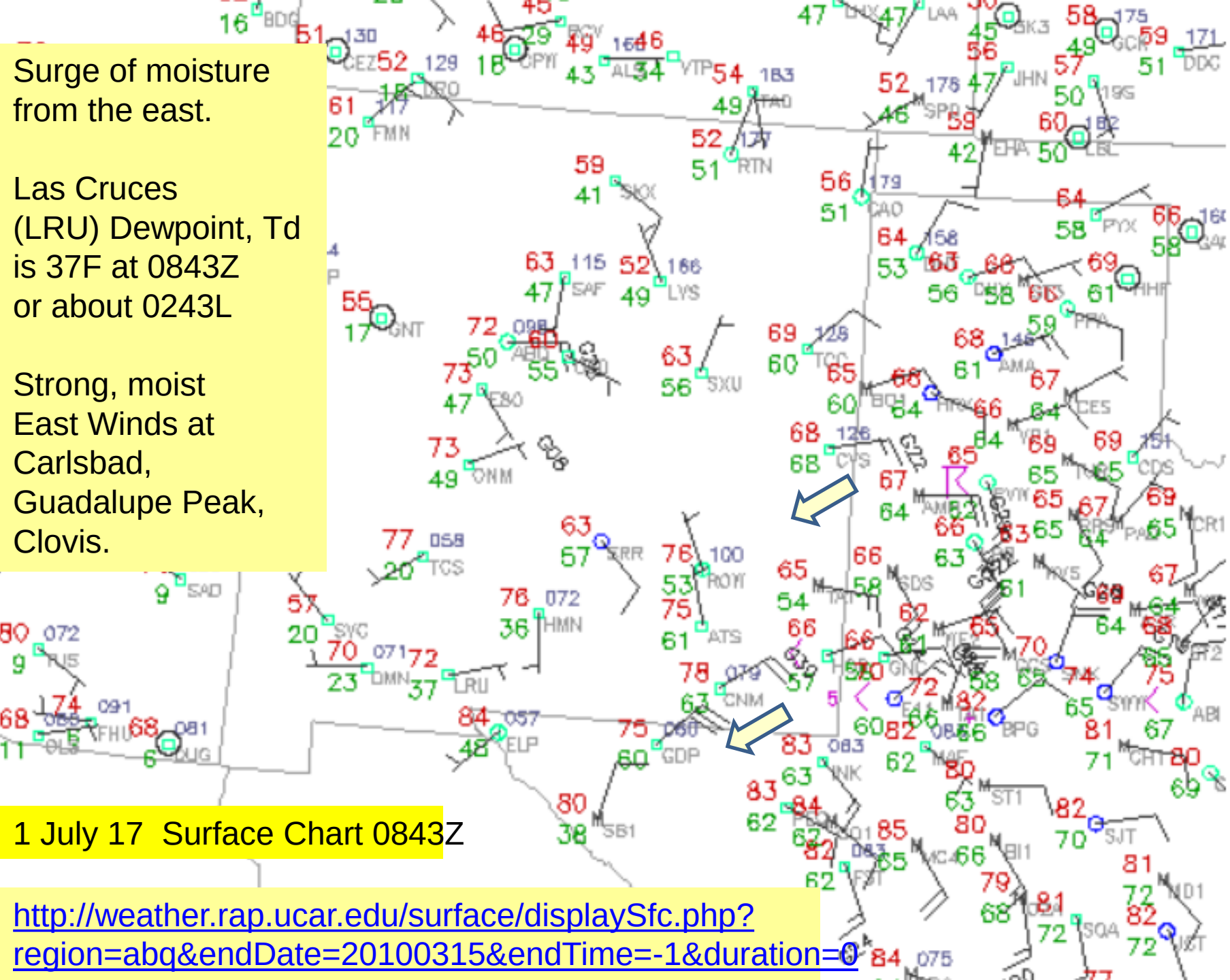


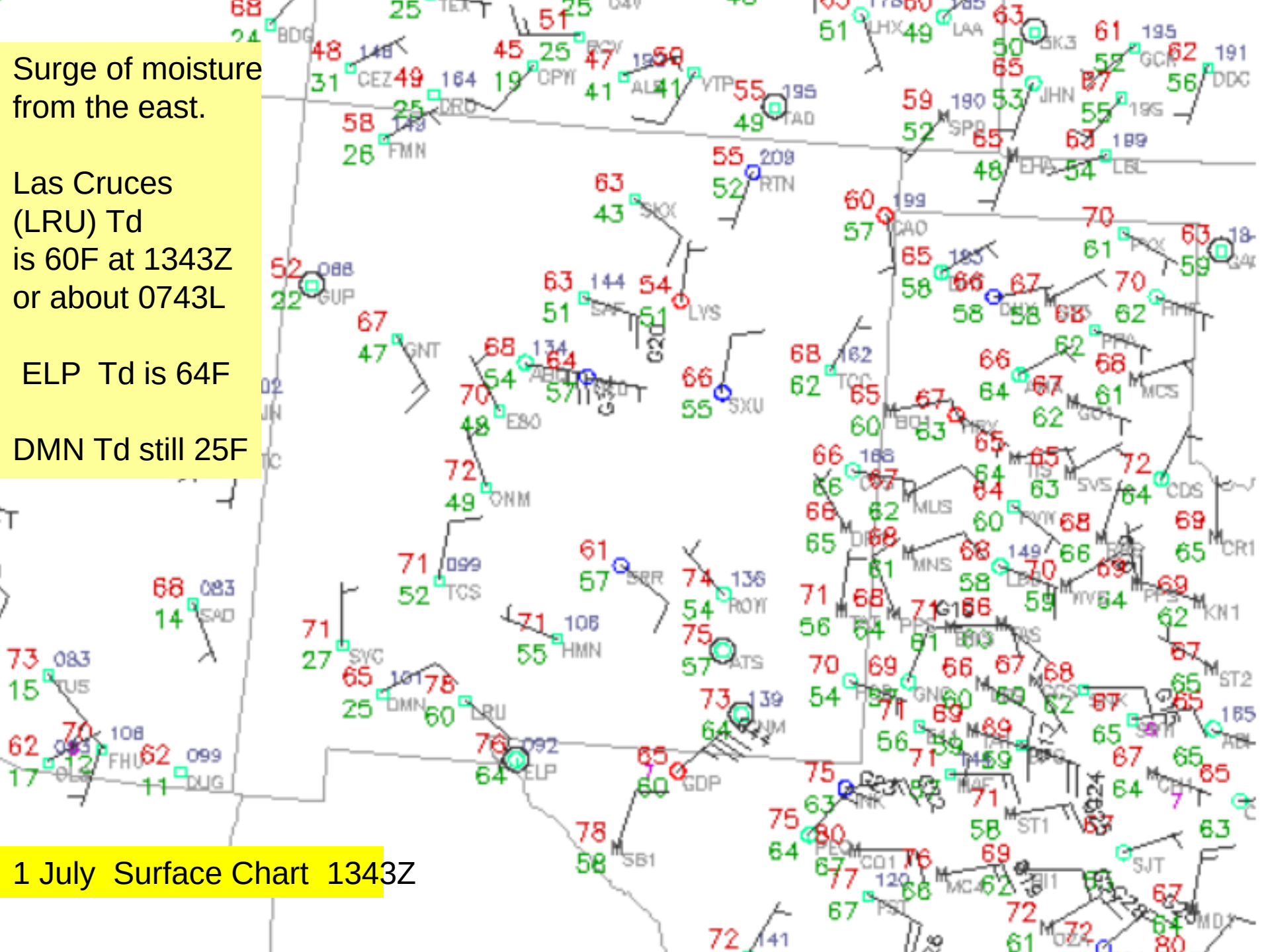
Graphic 3: Mean 500mb height pattern, July. Subtropical high is near maximum seasonal strength over New Mexico.

http://www.wrh.noaa.gov/twc/monsoon/monsoon_NA.pdf

North American Monsoon

Graphic 1: Moisture sources for the North American Monsoon.


Surge of moisture from the east.
Las Cruces (LRU) Dewpoint, Td is 37F at 0843Z or about 0243L
Strong, moist East Winds at Carlsbad, Guadalupe Peak, Clovis.
1 July 17 Surface Chart 0843Z
http://weather.rap.ucar.edu/surface/displaySfc.php?region=abq&endDate=20100315&endTime=-1&duration=0


Surge of moisture from the east.
Las Cruces (LRU) Td is 60F at 1343Z or about 0743L
ELP Td is 64F
DMN Td still 25F
1 July Surface Chart 1343Z

Monsoon Characteristics

“Monsoon” – from Arabic meaning season or seasonal wind.
Pronounced Wind shift in the Arabian Sea:
Dry Northeast monsoon off India, to Wet Southwest Monsoon onto India.

North American Monsoon in far West Texas and New Mexico:

Westerlies especially strong, dry spring westerlies….light in June…

and become moist easterlies from ~ 4 July to about 12 September.

Characteristics:

Dewpoints go above 55F (Onset defined by NWS as Td>55F for 3 days)

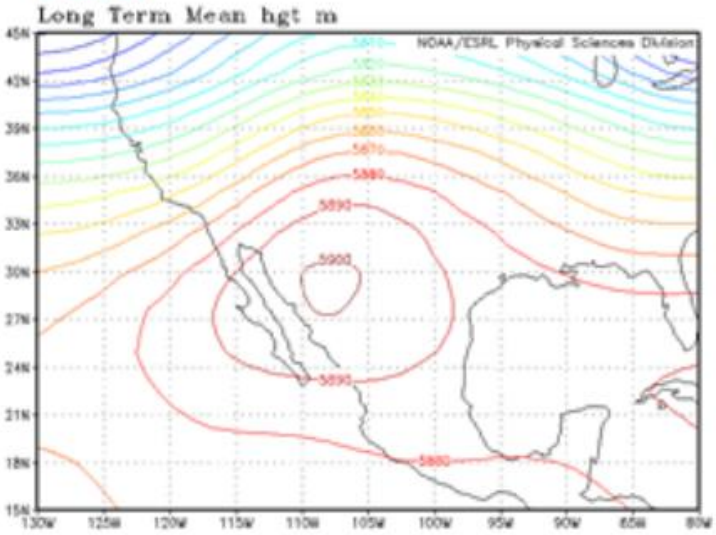
Precipitable Water goes above 1 inch.

Our Evaporational Coolers are less effective

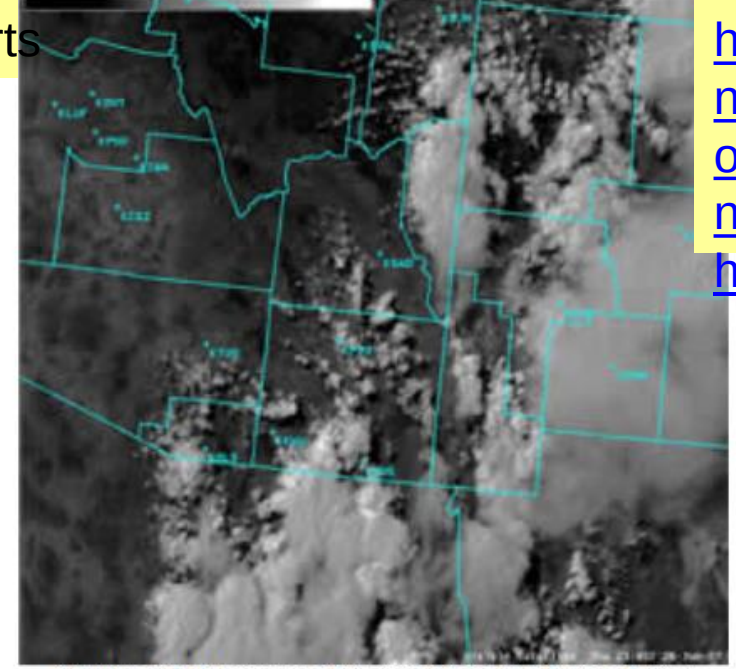
“Monsoon” refers to the pattern; rain comes from showers and thunderstorms

Monsoon progression charts

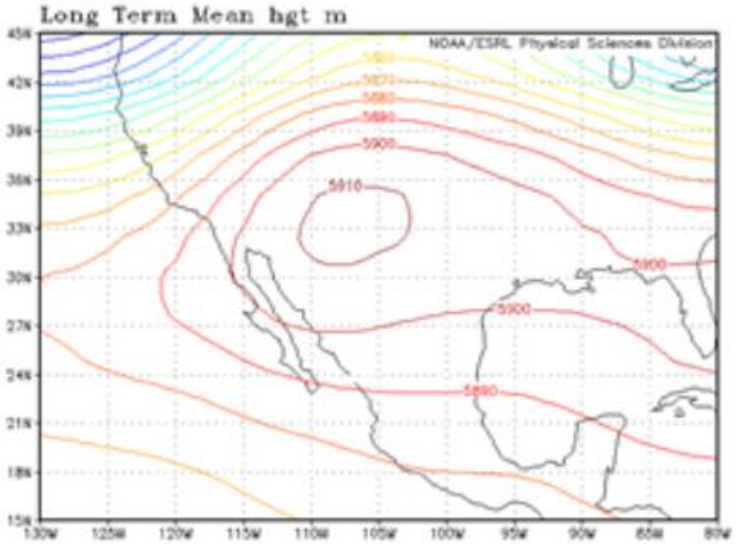
https://www.wrh.noaa.gov/twc/monsoon/monsoon_progression.php



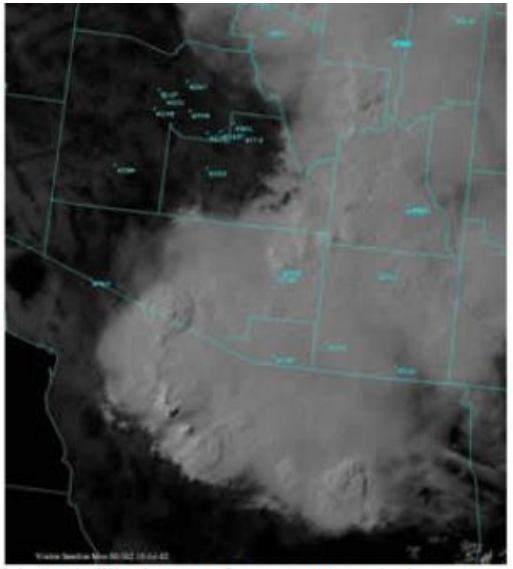
Mean 500mb heights, June 25 (monsoon ramp up)



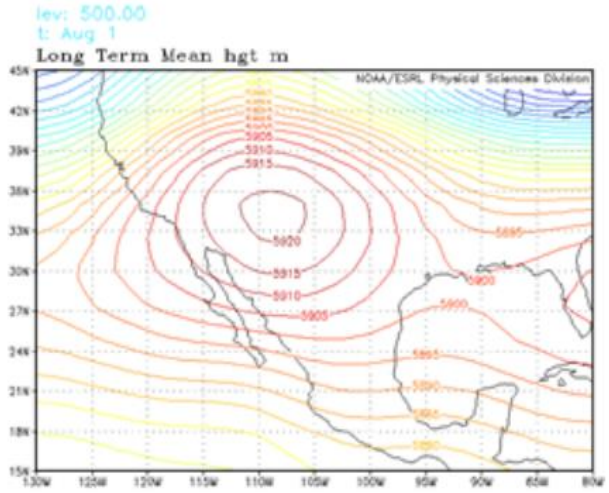
Visible satellite image of isolated thunderstorms during monsoon ramp-up, June 28, 2007



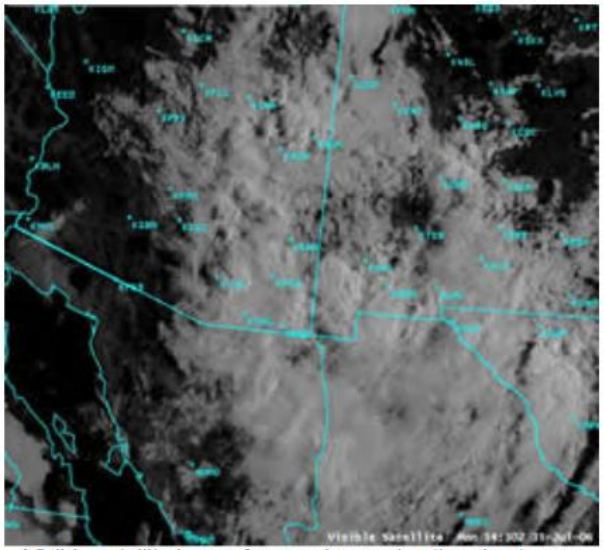
Mean 500mb heights, July 10 (monsoon onset)



Visible satellite image from an onset phase severe thunderstorm outbreak over southeast Arizona, July 14, 2002.



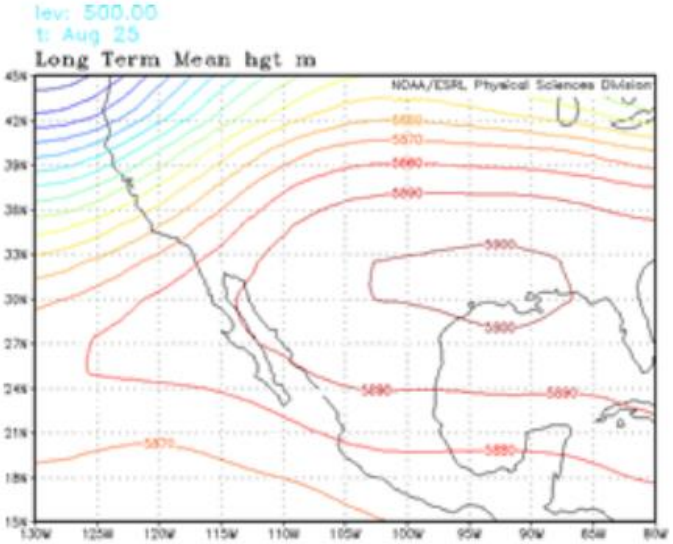
Mean 500mb height, August 1 (monsoon peak)



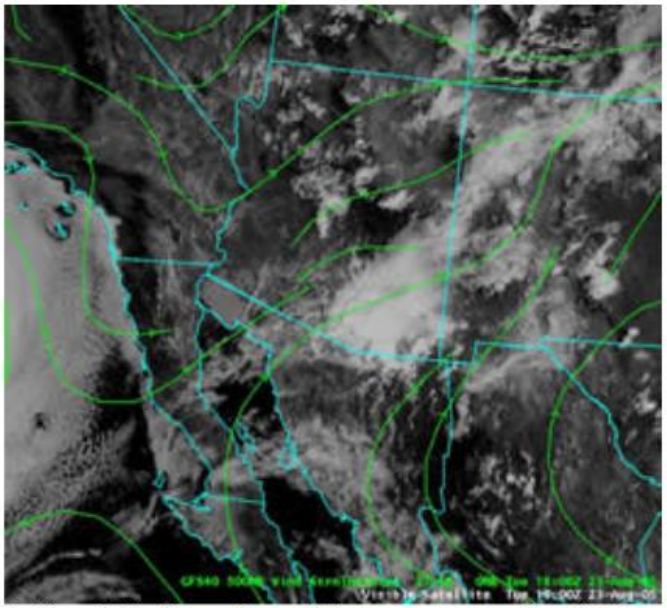
Visible satellite image from early morning thunderstorms, 0730am MST July 31, 2006, during the peak of the 2006 monsoon. Many of these thunderstorms produced 1-2 inches of rain per hour.

Monsoon progression charts

https://www.wrh.noaa.gov/twc/monsoon/monsoon_progression.php

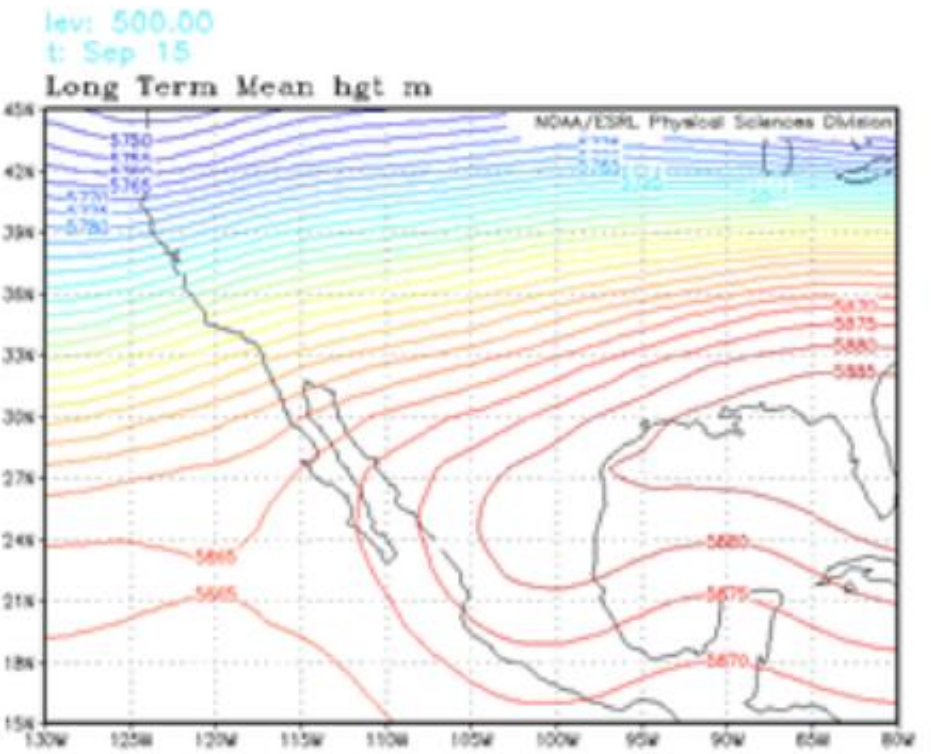


Mean 500mb height, August 25 (late monsoon)

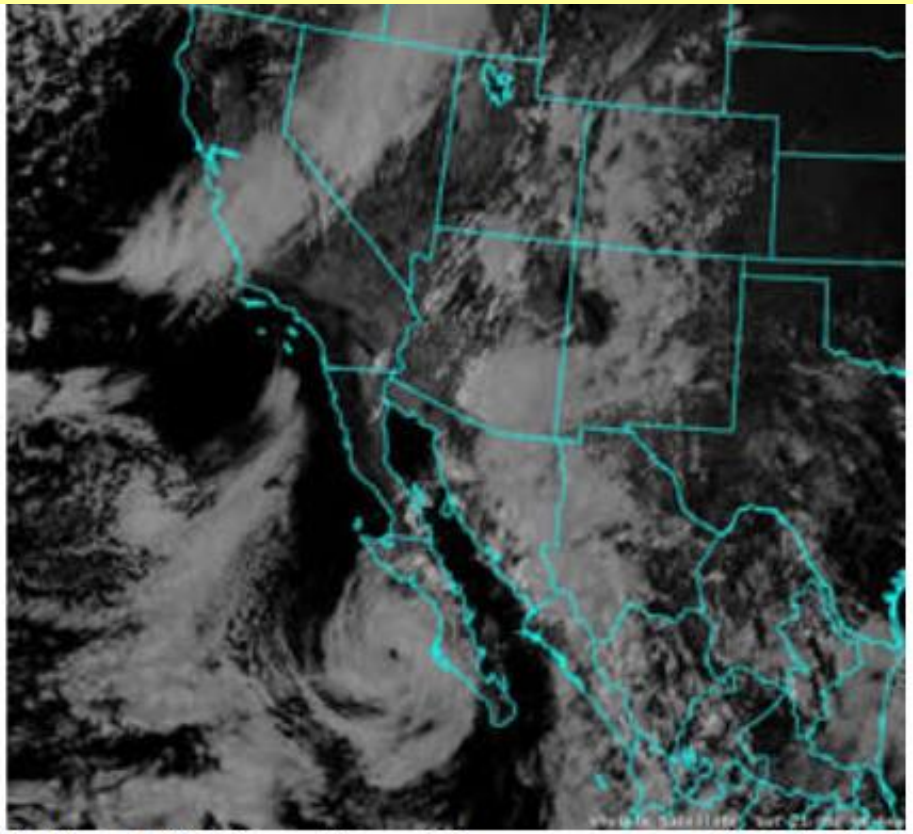


Visible satellite image from a late season severe thunderstorm and flash flood event, August 23, 2005. Note southwest flow aloft and weak trough near the lower Colorado River.

http://www.wrh.noaa.gov/twc/monsoon/monsoon_progression.pdf



Mean 500mb height, August 25 (late monsoon)



Visible satellite image from a late season severe thunderstorm and flash flood event, August 23, 2005. Note southwest flow aloft and weak trough near the lower Colorado River.

National Weather Service

A Year's Worth of lightning data in Five Minutes

https://youtu.be/JzRTIqP0Xdw

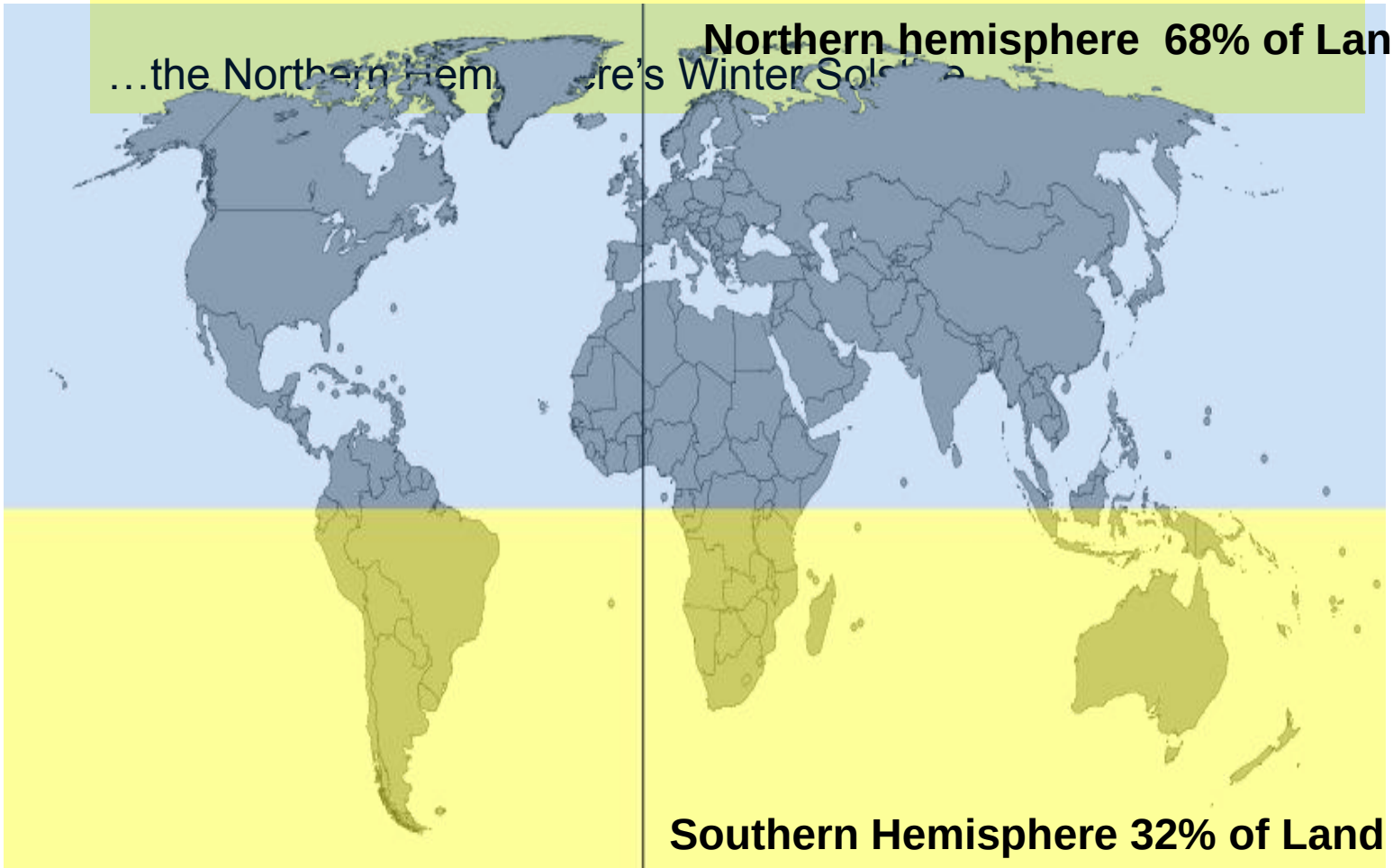
The variability of the monsoon rainfall in Tucson is from driest, 1.59” to wettest, 13.84,” or 12.25 inches.

In El Paso, the variability of the monsoon rainfall is from driest 0.23” to wettest, 15.28,” or 15.05 inches.

Origins of the name, *El Niño*

El Niño was originally recognized by fishermen off the coast of South America as the appearance of **unusually warm water in the Pacific Ocean**, occurring near the beginning of the year. El Niño means *The Little Boy* or *Christ child* in Spanish. This name was used for the tendency of the phenomenon to arrive around Christmas…

…the Northern Hemisphere's Winter Solstice



Northern hemisphere 68% of Land Area

Southern Hemisphere 32% of Land Area

IMPORTANT POINT!

WATER TEMPERATURE OF OCEAN OFFSHORE NORTH AMERICA DETERMINES RAINFALL/DROUGHT in (especially) Western North Ameri

What determines that water temperature?

A Multi-year weather pattern called EL NINO

El Nino Southern Oscillation "ENSO"

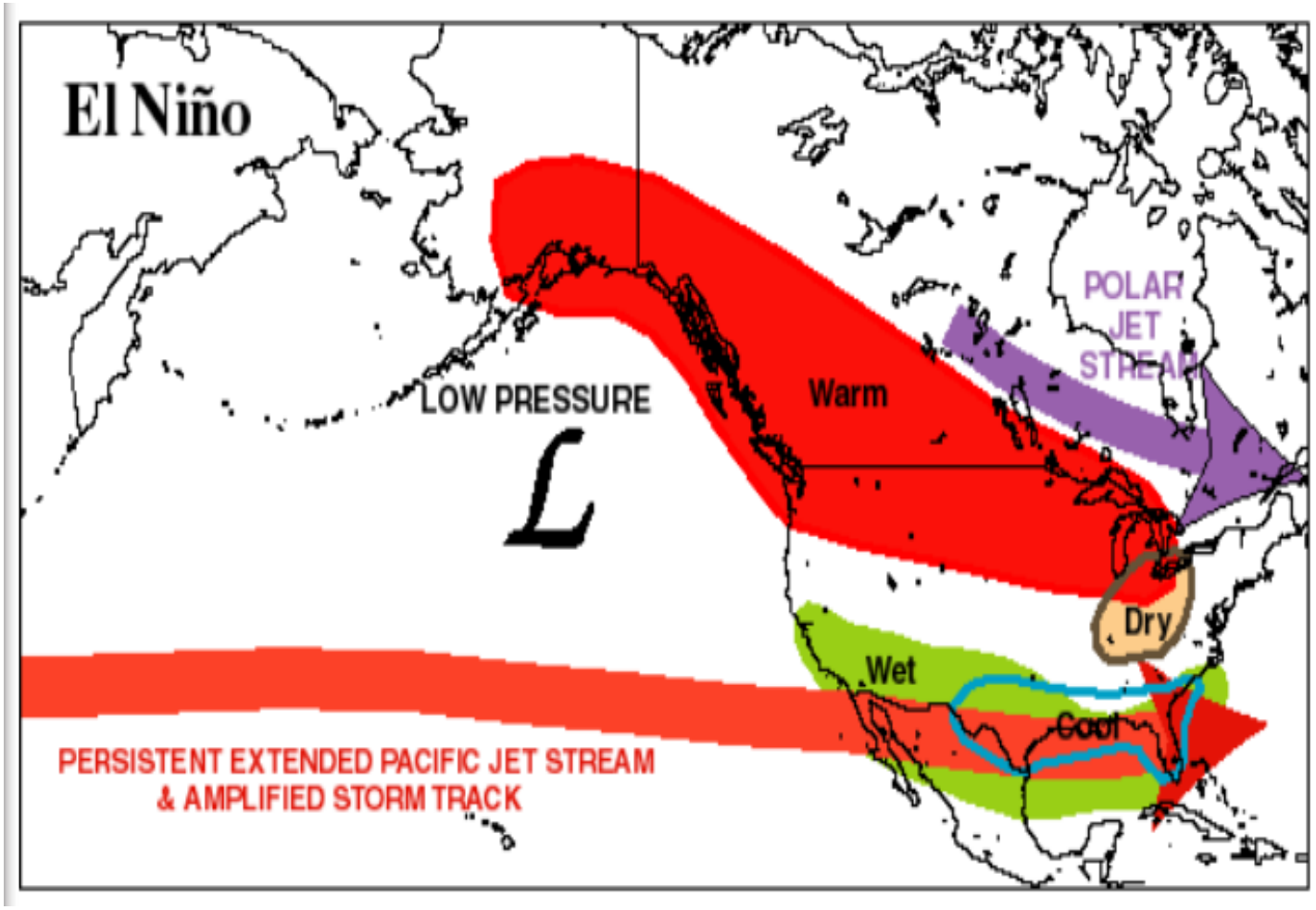
Later, we'll study a 60-year pattern

PACIFIC DECADAL OSCILLATION or "PDO"

30 years MORE EL NINOS, and
30 years FEWER EL NINOS.

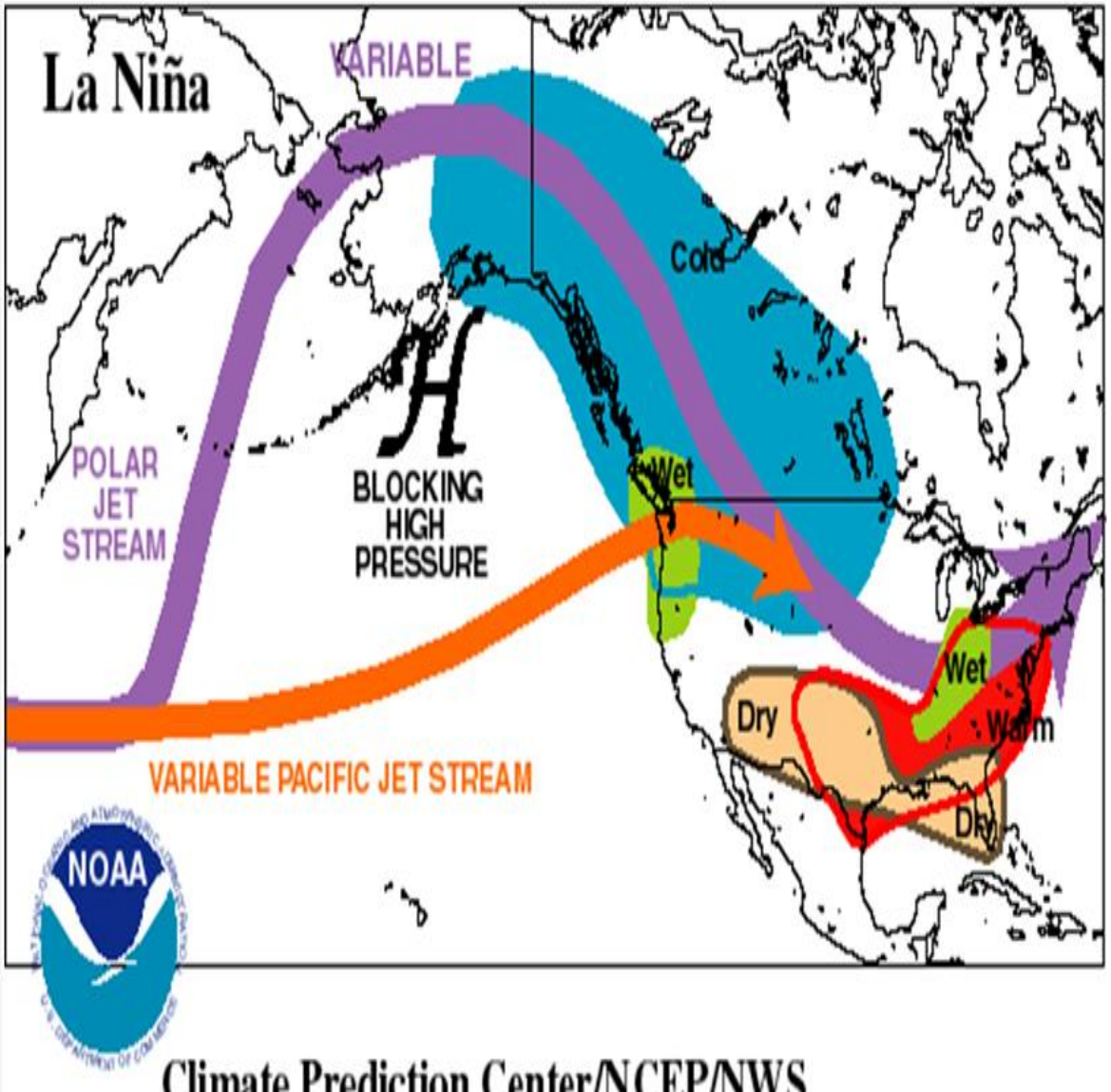
El Nino pattern: Brings wet from California to New Mexico to East Coast

http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensocycle

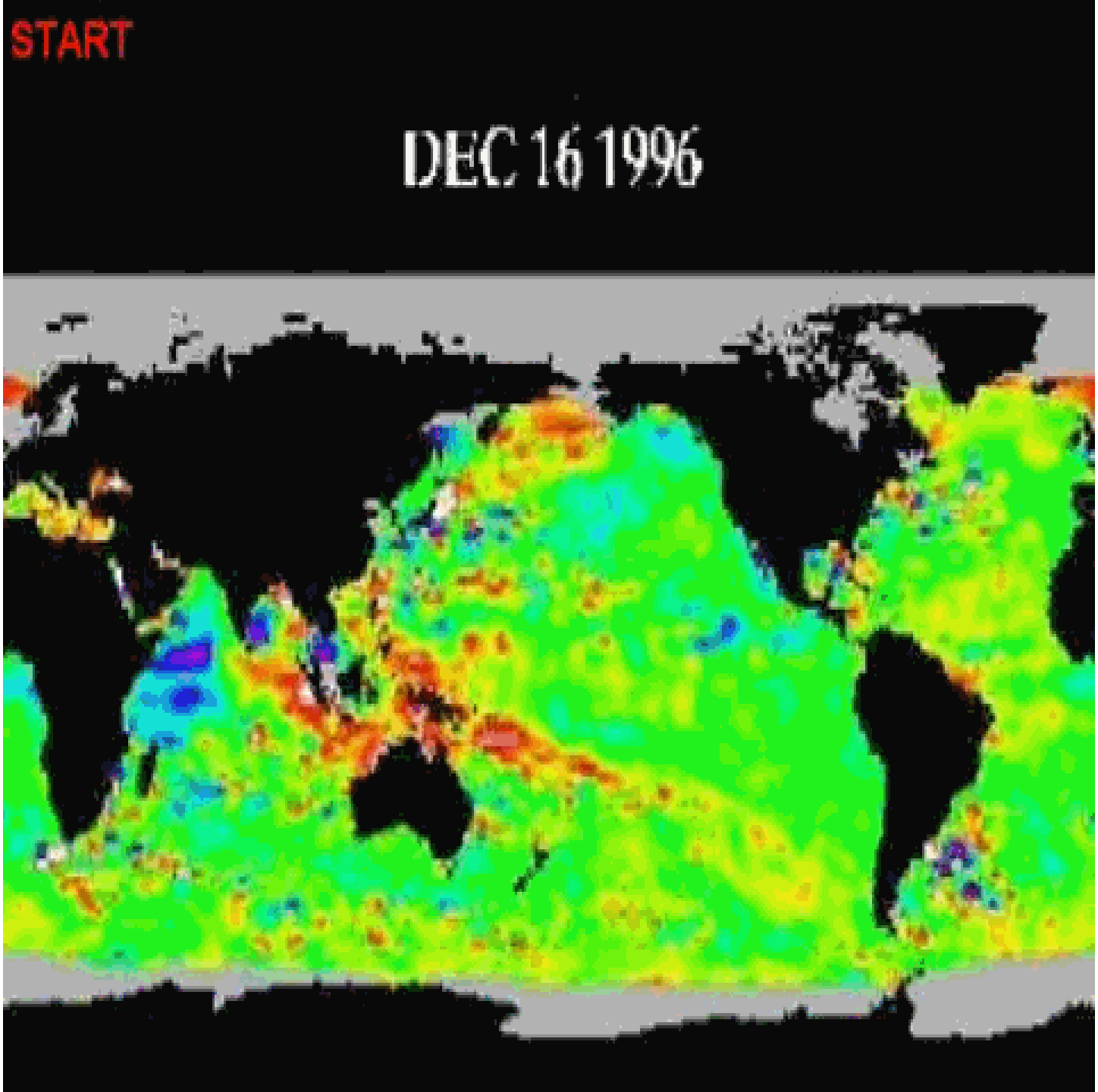


La Nina pattern, brings dry/drought from Arizona to Florida

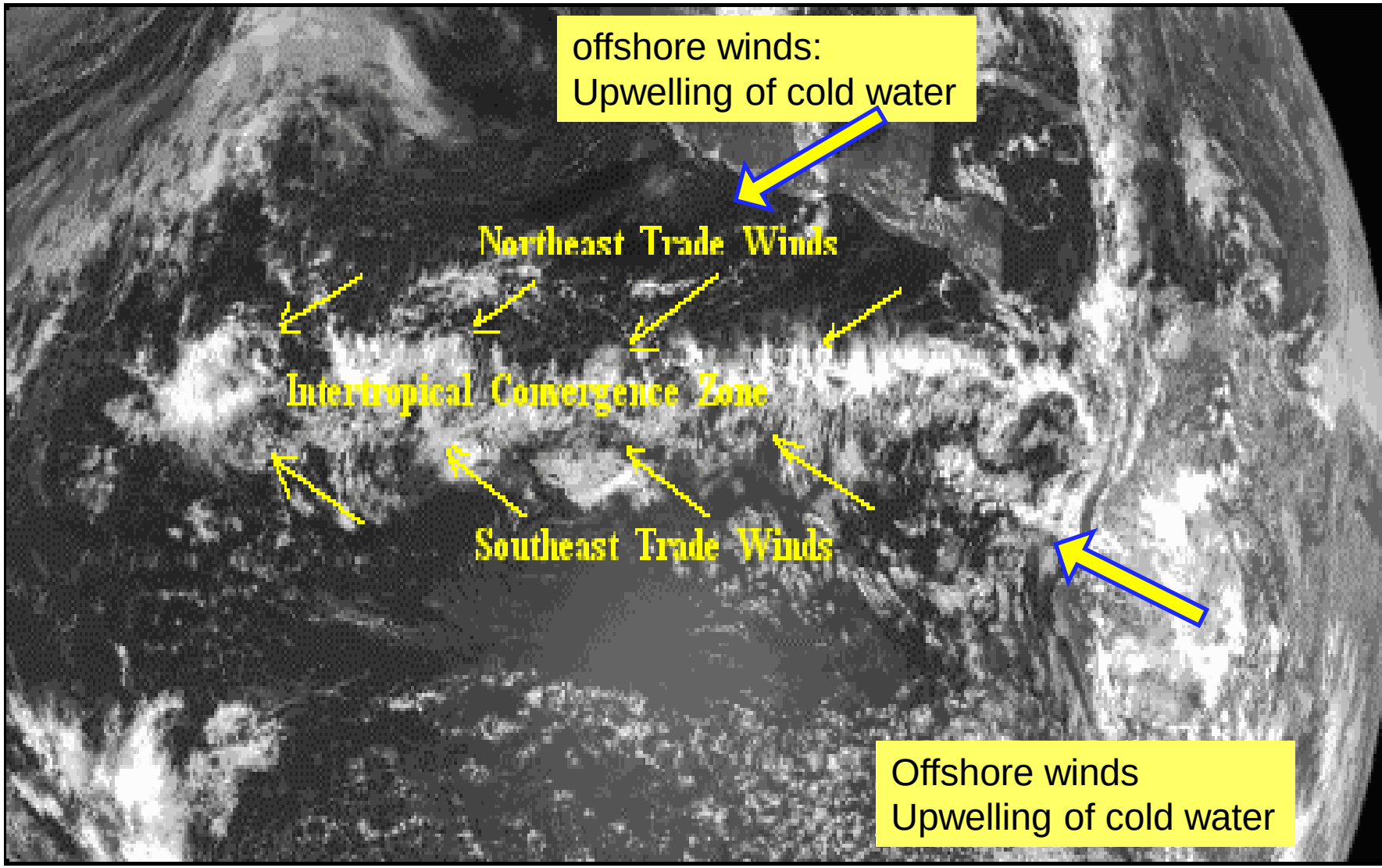
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensocycle



Next graphics show animations of El Nino, and then La Nina

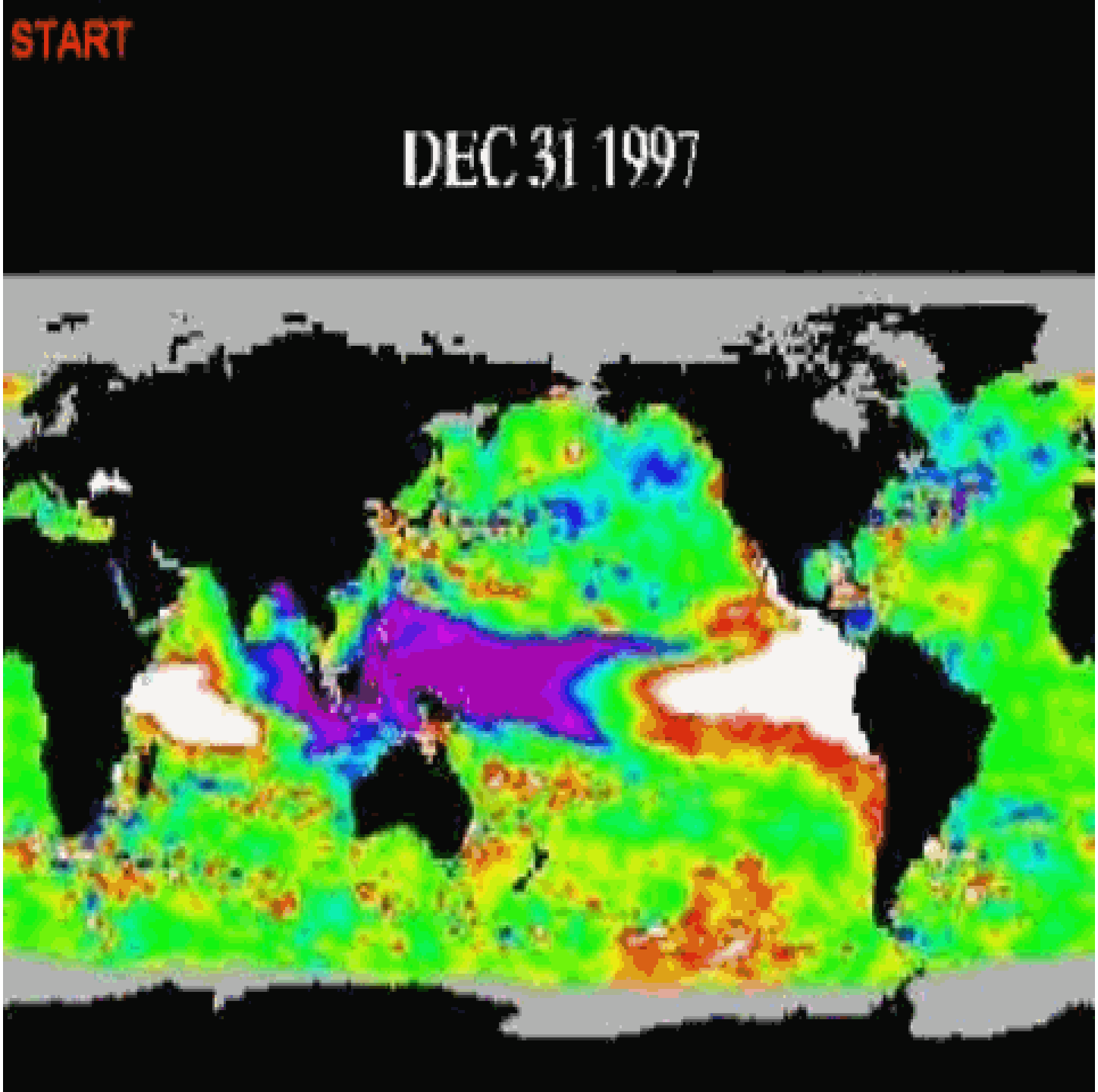

START
DEC 16 1996

The Northeasterly Trade Winds are very prevalent, stronger in La Nina y
Visitors to Hawaii usually encounter the steady from the northeast Trade

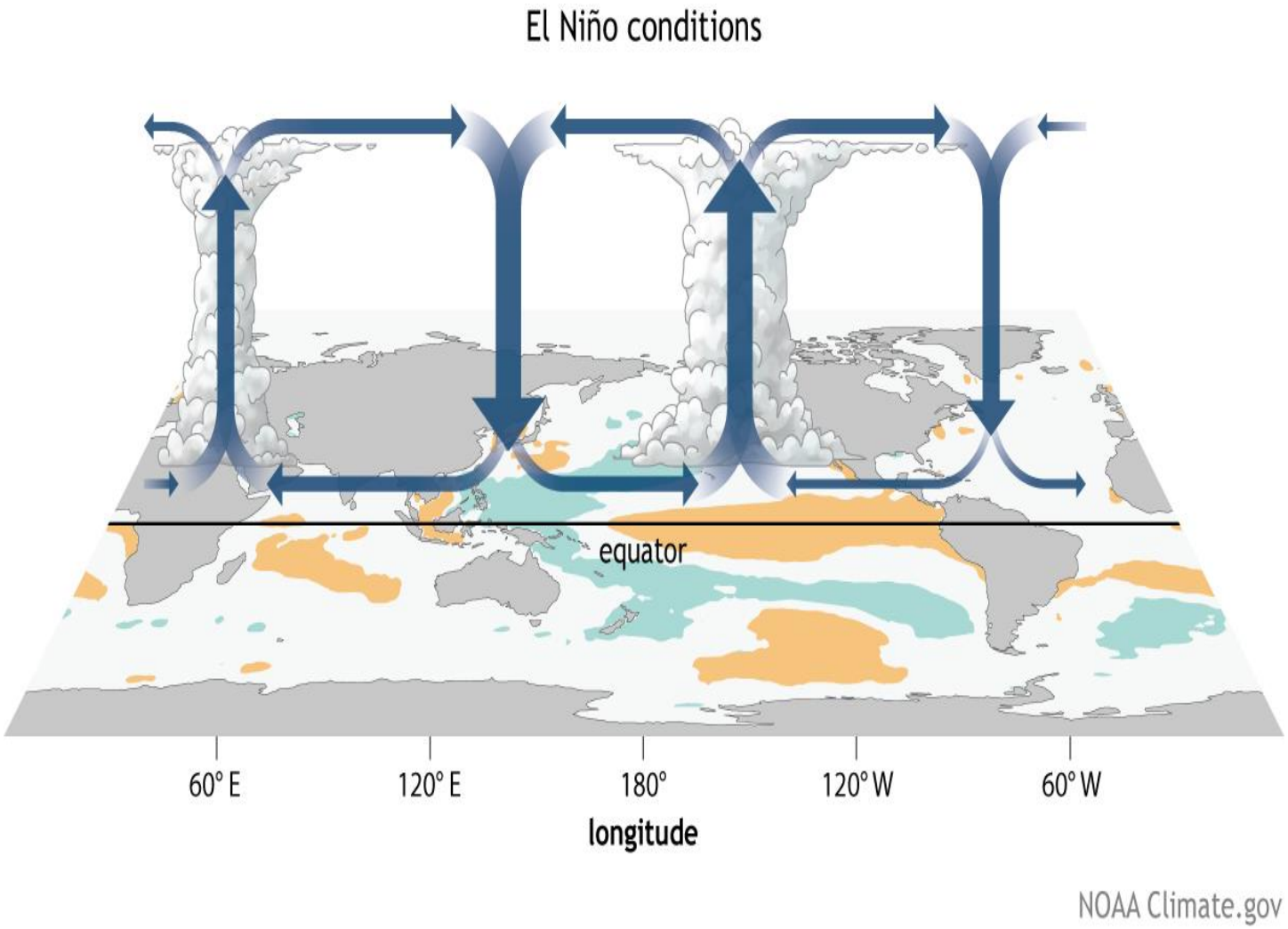


Animation of La Nina beginning on 31 Jan 1998

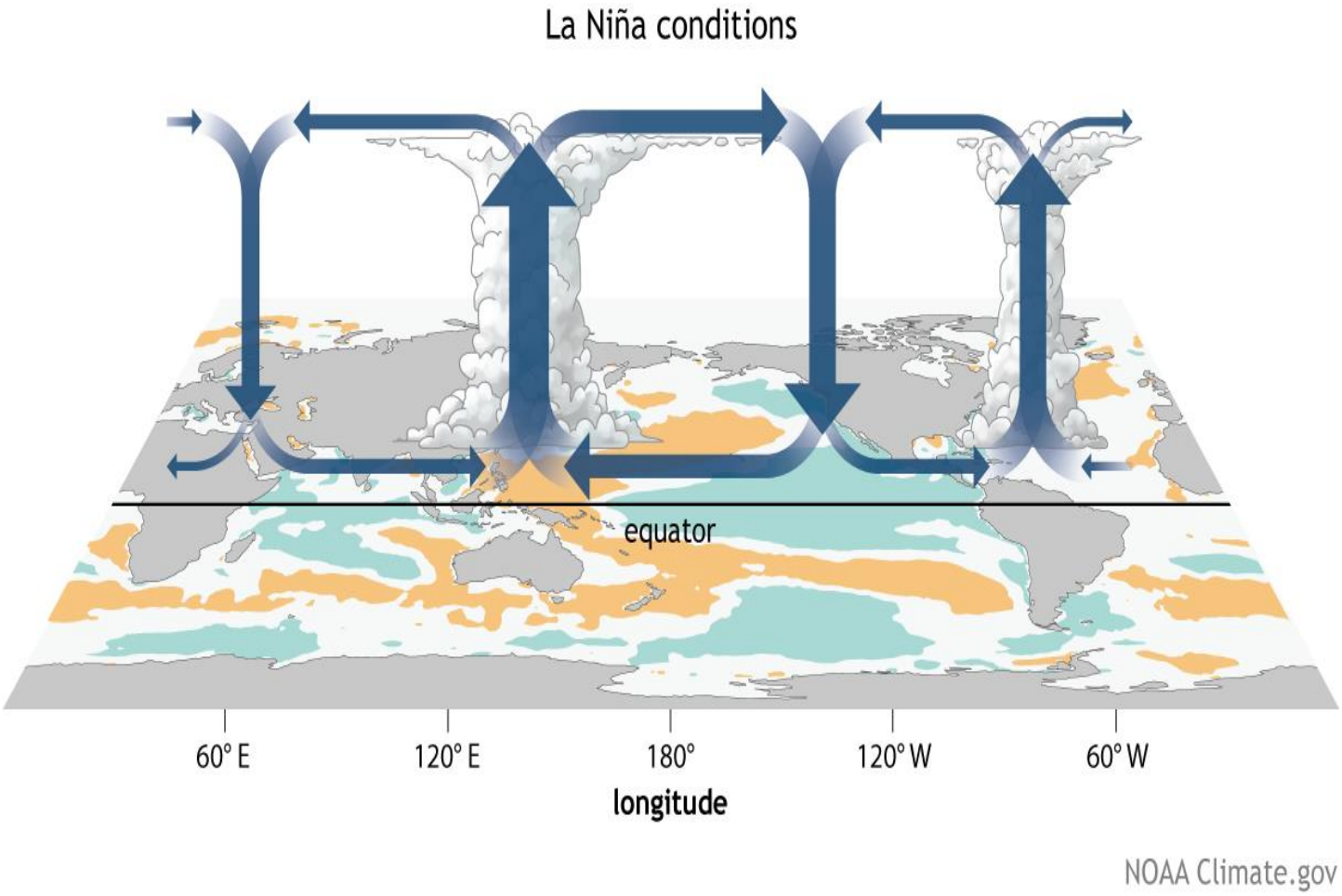
https://bobtisdale.files.wordpress.com/2012/06/animation-3-1.g


START
DEC 31 1997

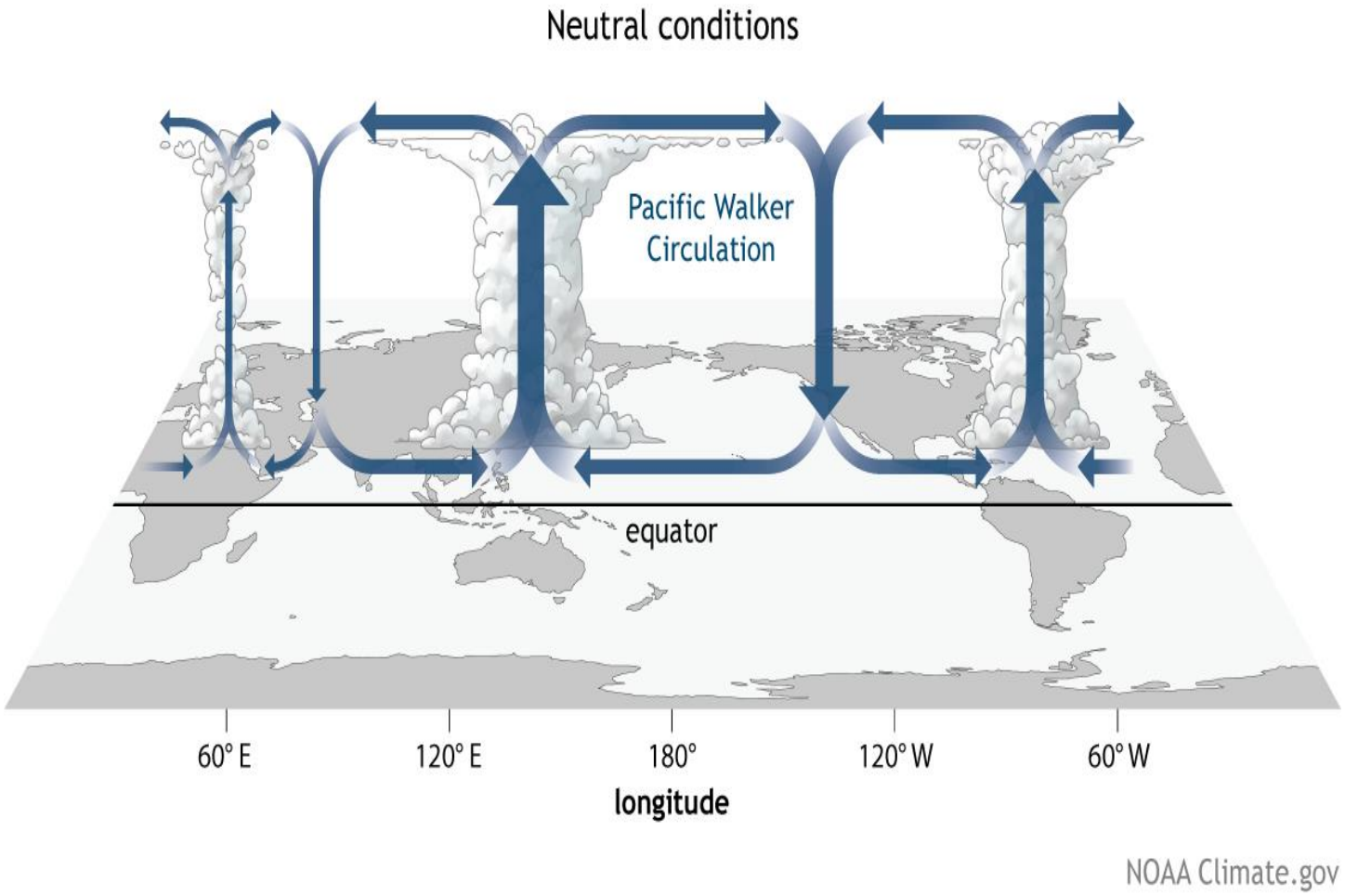
http://www.climate.gov/news-features/blogs/enso/walker-circulation-ensos-atmospheric-buddy



http://www.climate.gov/news-features/blogs/enso/walker-circulation-ensos-atmospheric-buddy



http://www.climate.gov/news-features/blogs/enso/walker-circulation-ensos-atmospheric-buddy



Nino 3.4 region: area bounded from 5N to 5S and from 120W to 160E

NOAA NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

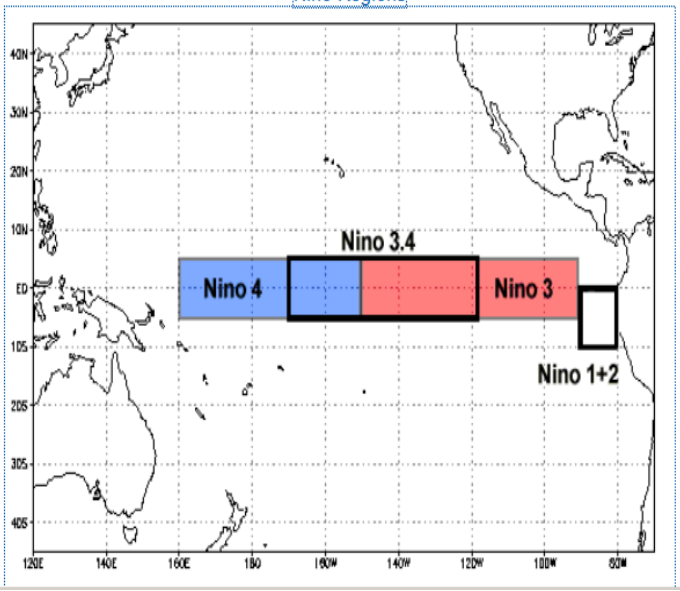
Equatorial Pacific Sea Surface Temperatures

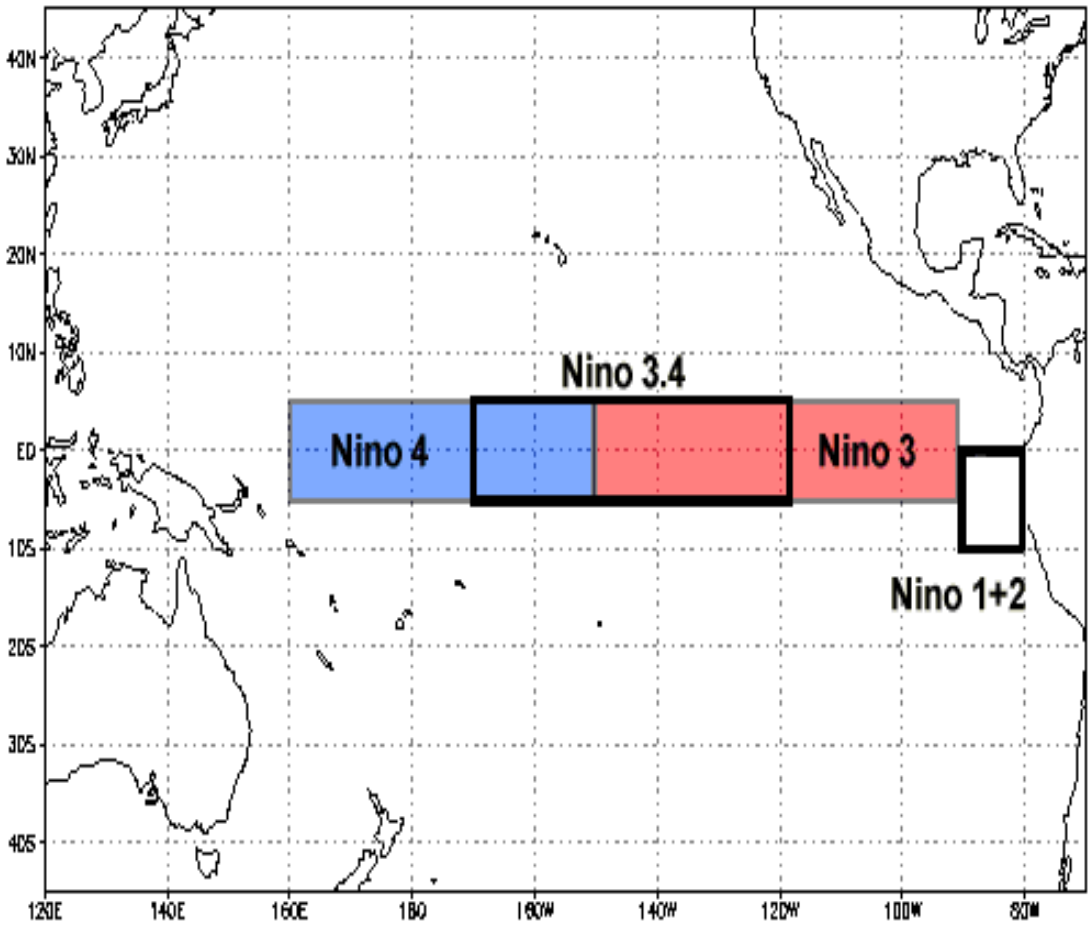
Climate Monitoring
State of the Climate
BAMS State of the Climate
Temp, Precip, and Drought
Climate at a Glance
Extremes
Societal Impacts
Snow and Ice
Teleconnections
GHCN Monthly
Monitoring References

ENSO | Zonal Winds | SSTs | Sea Temps | SST Anomalies | OLR | SOI

El Niño (La Niña) is a phenomenon in the equatorial Pacific Ocean characterized by a five consecutive 3-month running mean of sea surface temperature (SST) anomalies in the Niño 3.4 region that is above (below) the threshold of +0.5°C (-0.5°C). This standard of measure is known as the Oceanic Niño Index (ONI).

Niño Regions

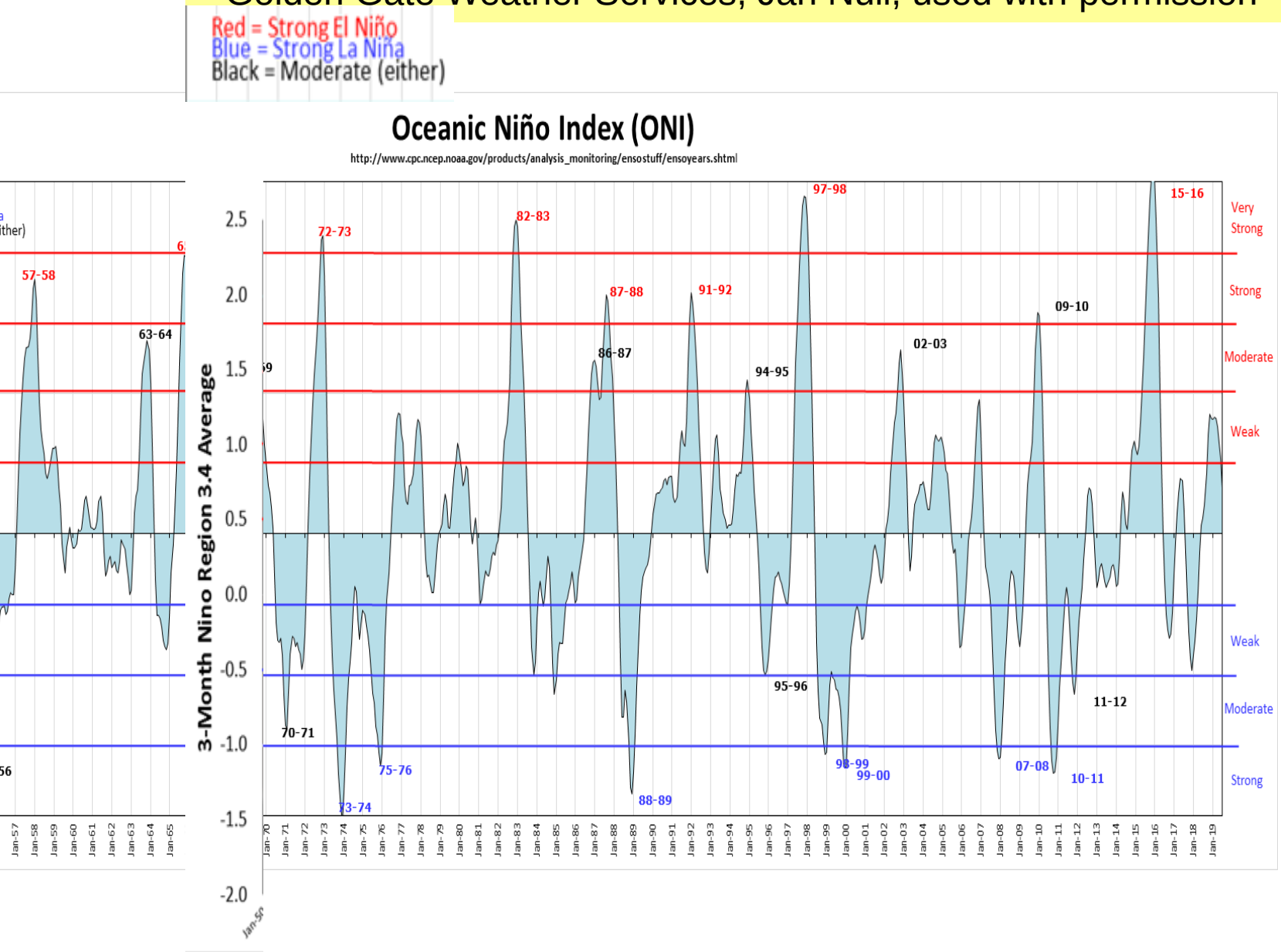




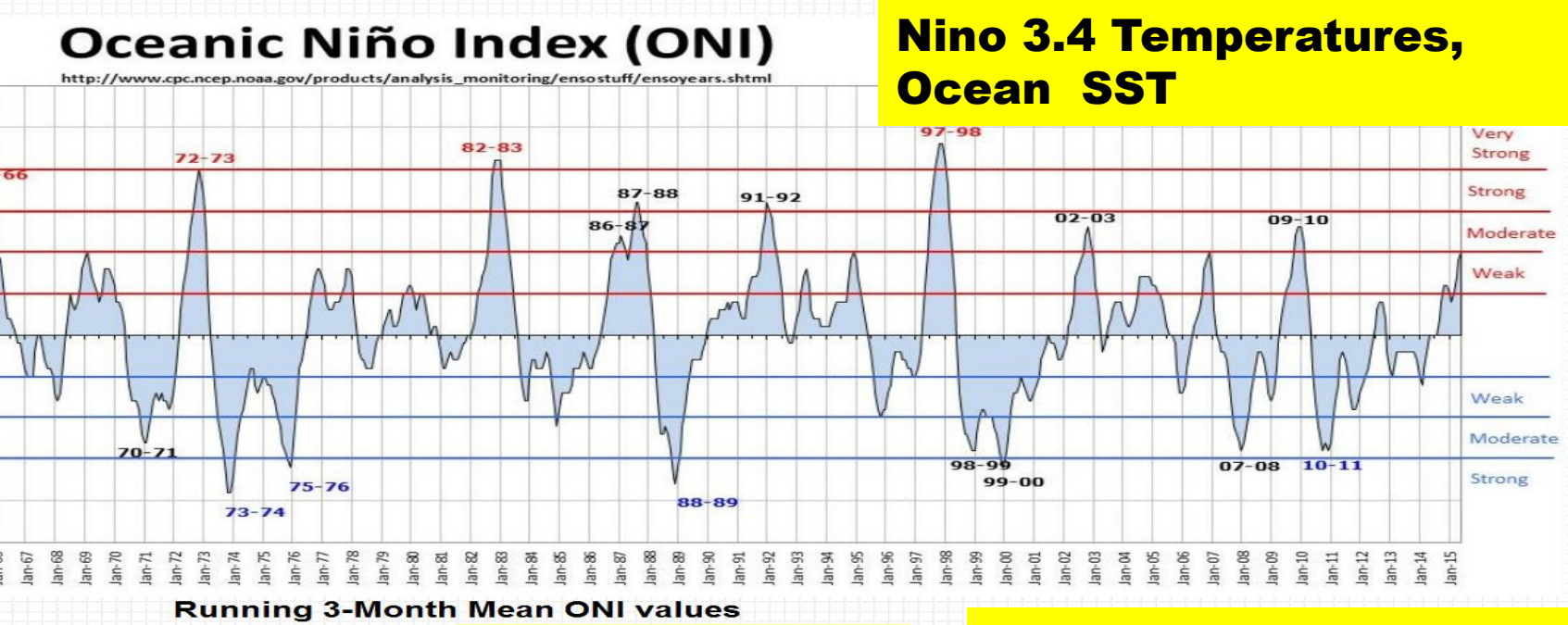
The **Oceanic Nino Index:** (ONI) is one of the primary **indices** used to monitor the El **Nino**-Southern Oscillation (ENSO). The ONI is calculated by averaging sea surface temperature anomalies in an area of the east-central equatorial Pacific **Ocean**, which is called the **Nino 3.4 region** (5S to 5N; 170W to 120W).

http://ggweather.com/enso/oni.htm

Golden Gate Weather Services, Jan Null, used with permission

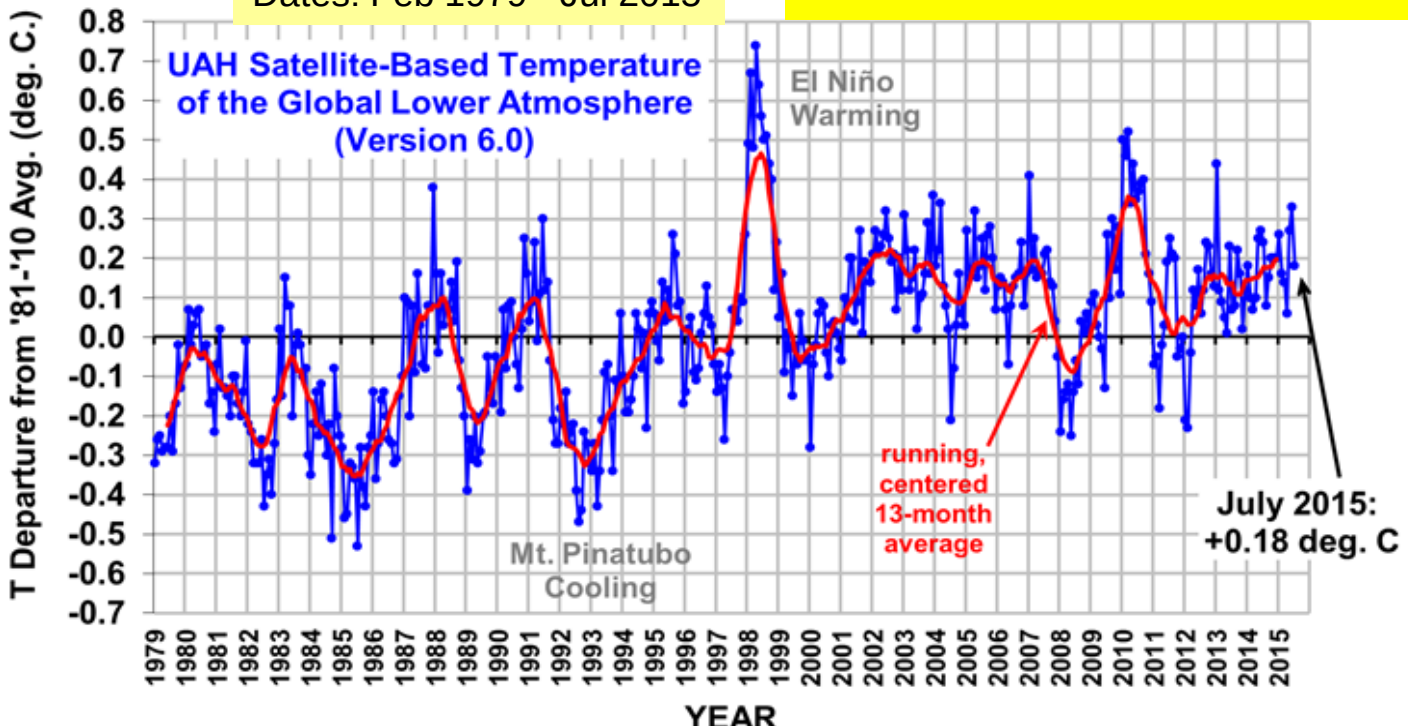


Nino 3.4 Temperatures, Ocean SST

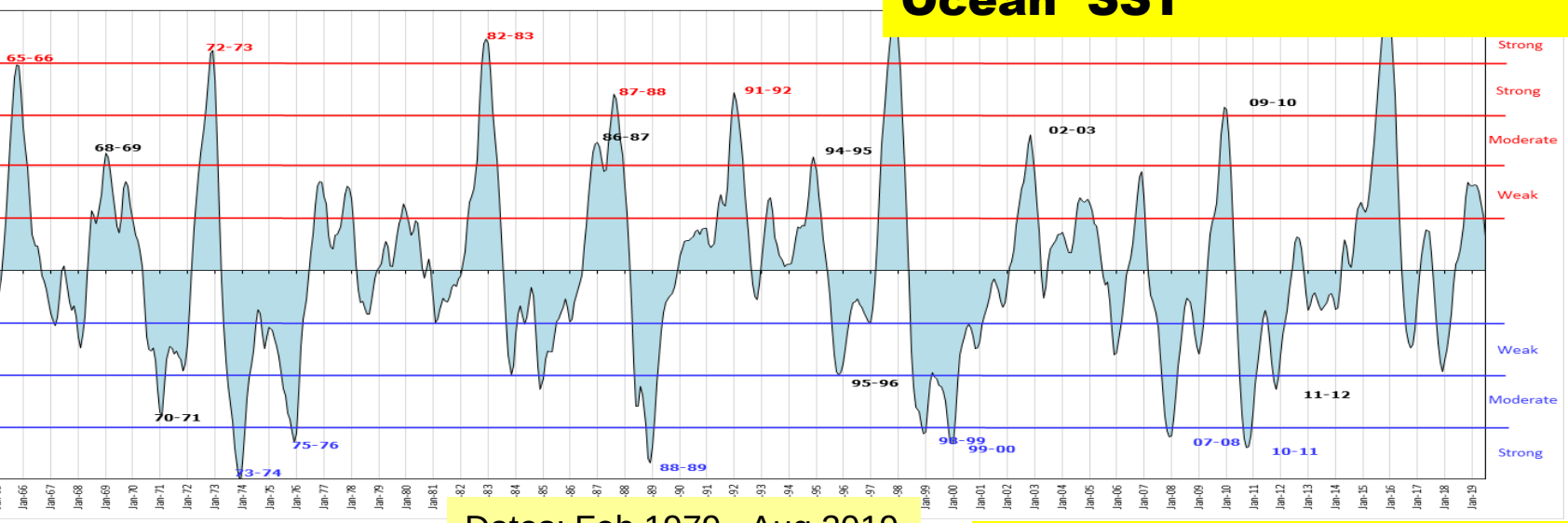


Global Greenhouse Temps, TLT

Dates: Feb 1979 - Jul 2015

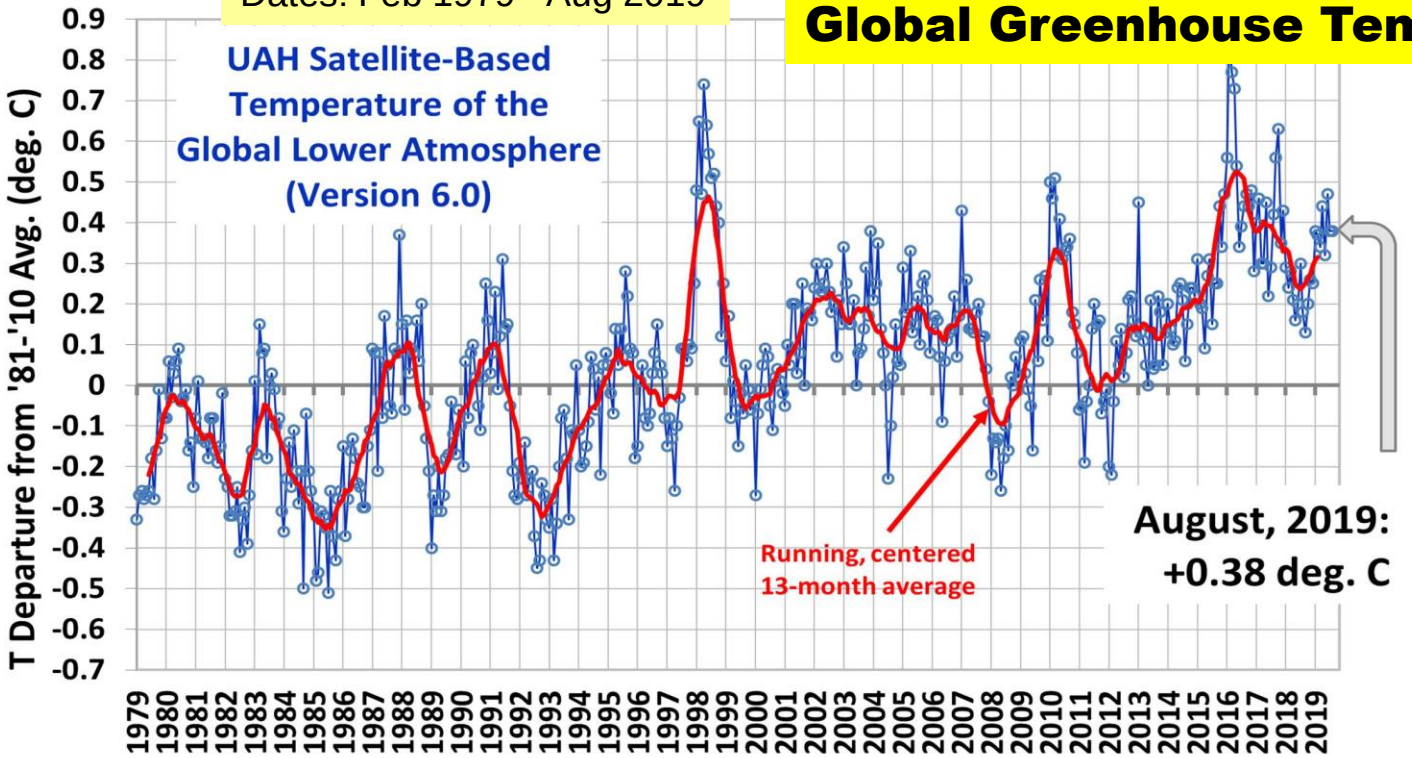


Nino 3.4 Temperatures, Ocean SST



Dates: Feb 1979 - Aug 2019

Global Greenhouse Temps, TLT

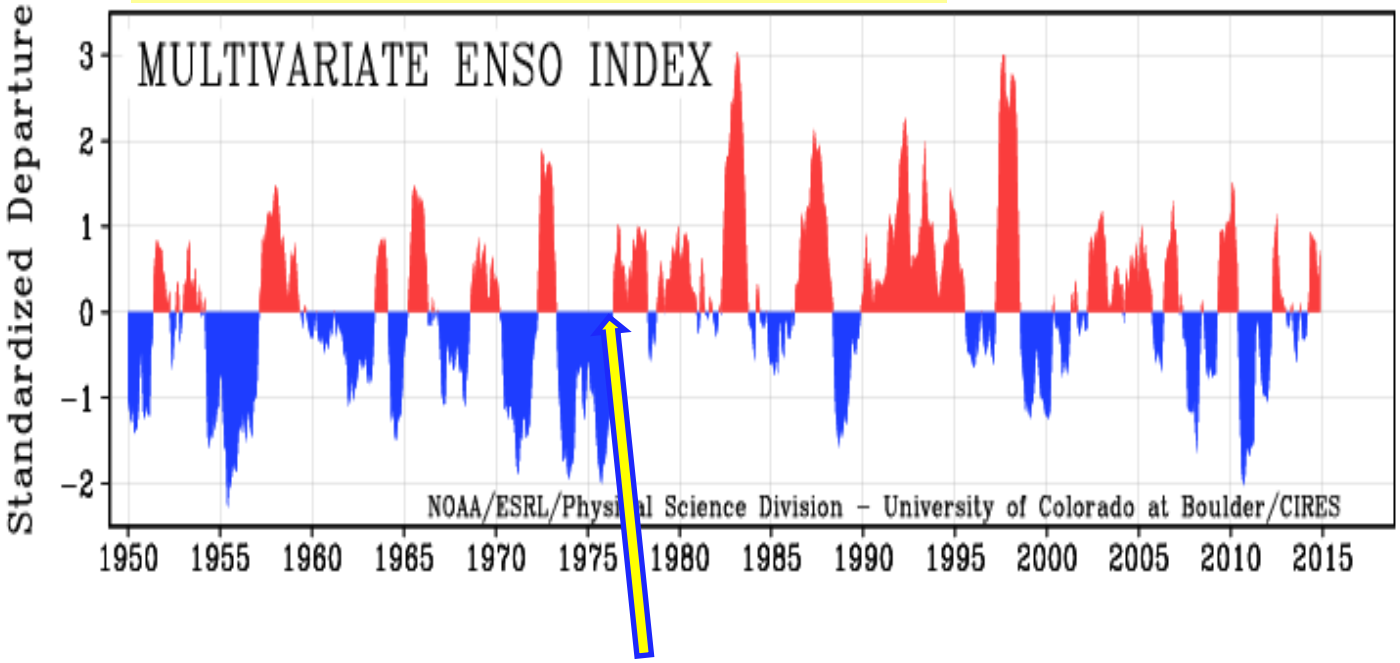


U.S. Department of Commerce | National Oceanic & Atmospheric Administration | NOAA Research

Earth System Research Laboratory

Physical Sciences Division

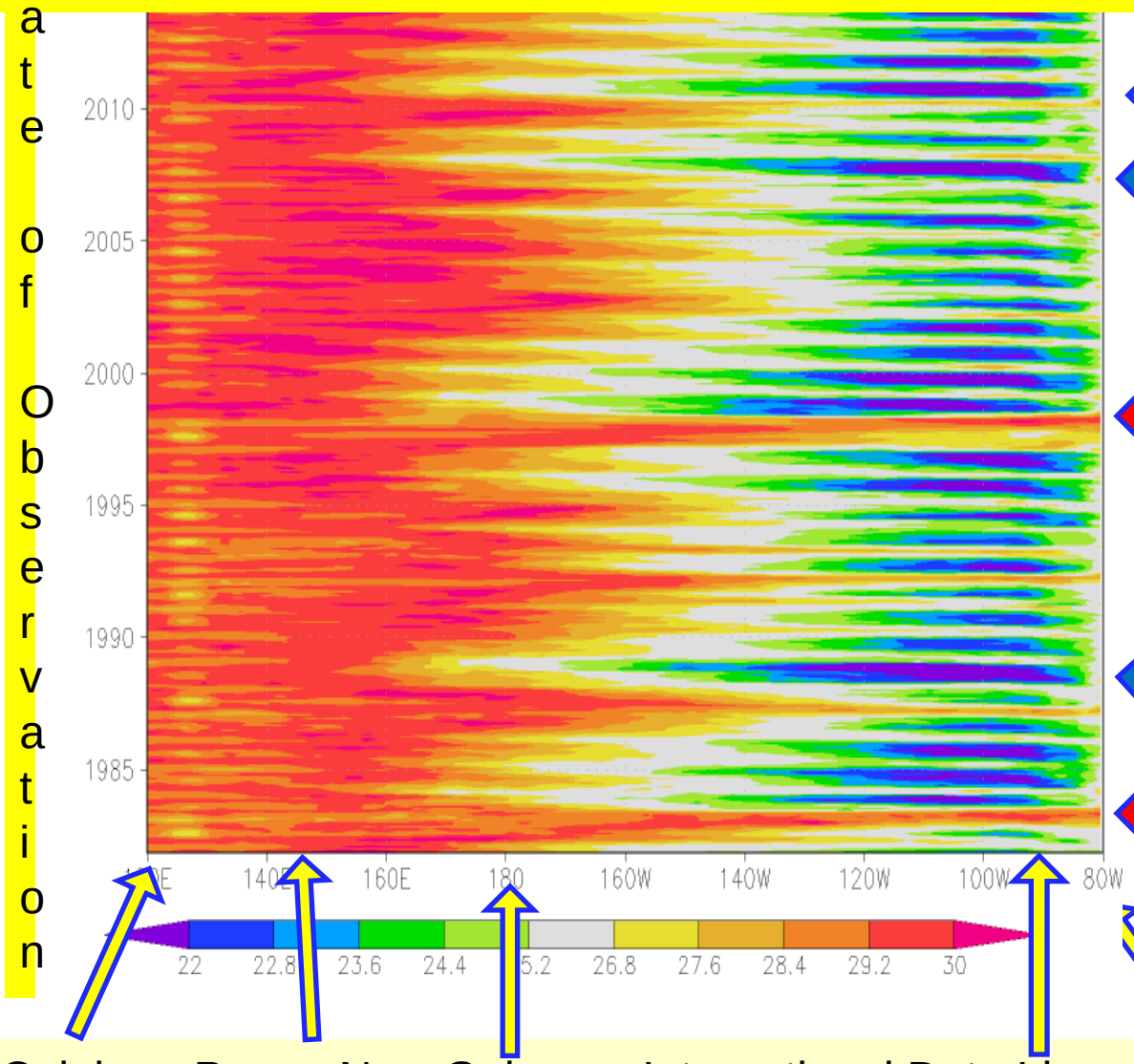
http://www.esrl.noaa.gov/psd/enso/mei/



Notice the Great Climatic Shift of 1976, when the number of El Nin decade increased dramatically.

Bob Tisdale's Hovemuller diagram. Equator Sea Surface Temperature (Longitude)

SSTs , not anomalies. Rough Geography –Yellow a

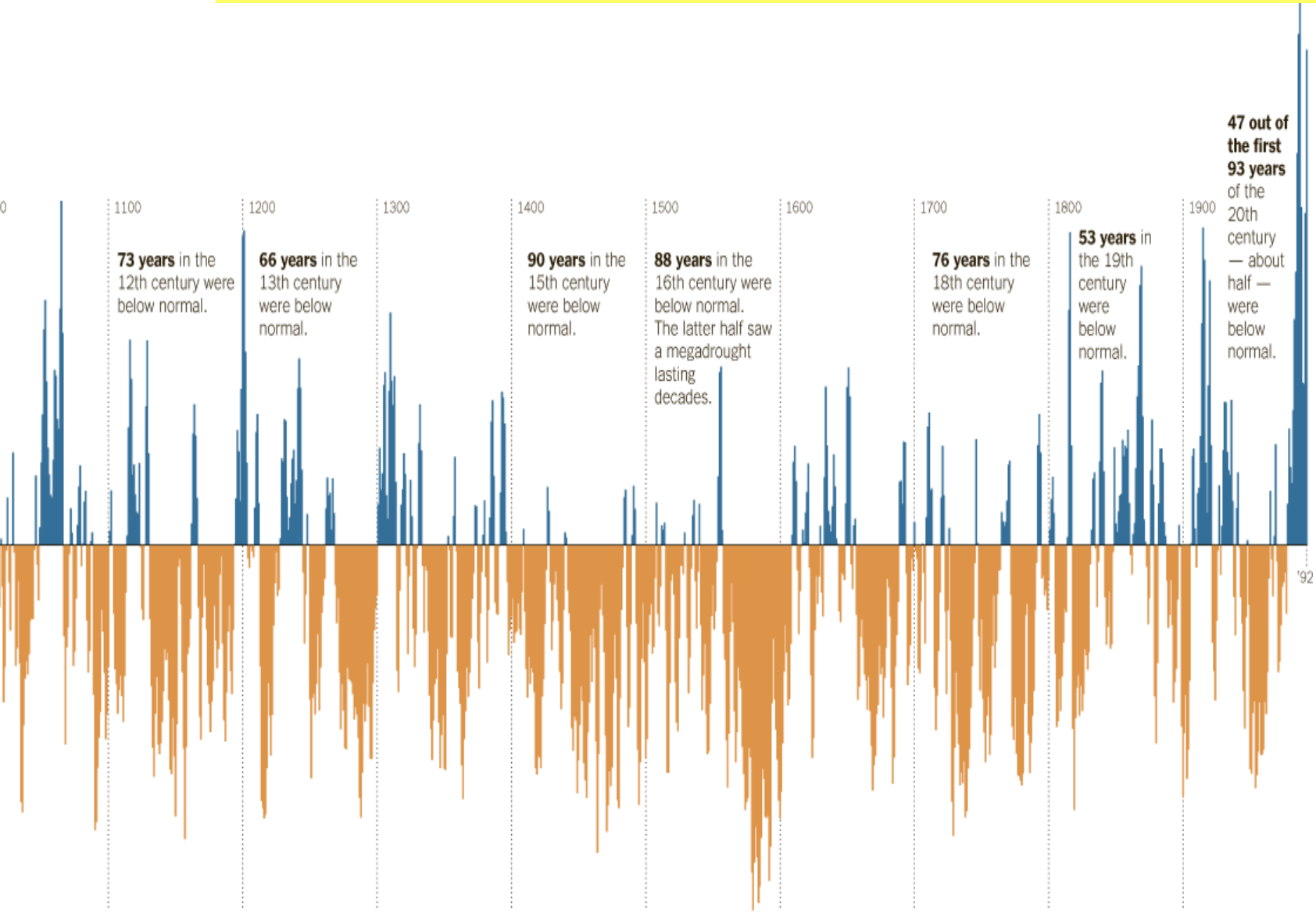


La Nina Years (Blue)

El Nino Years (Red)

Celebes Papua New Guinea International Date Line Galapagos Is.

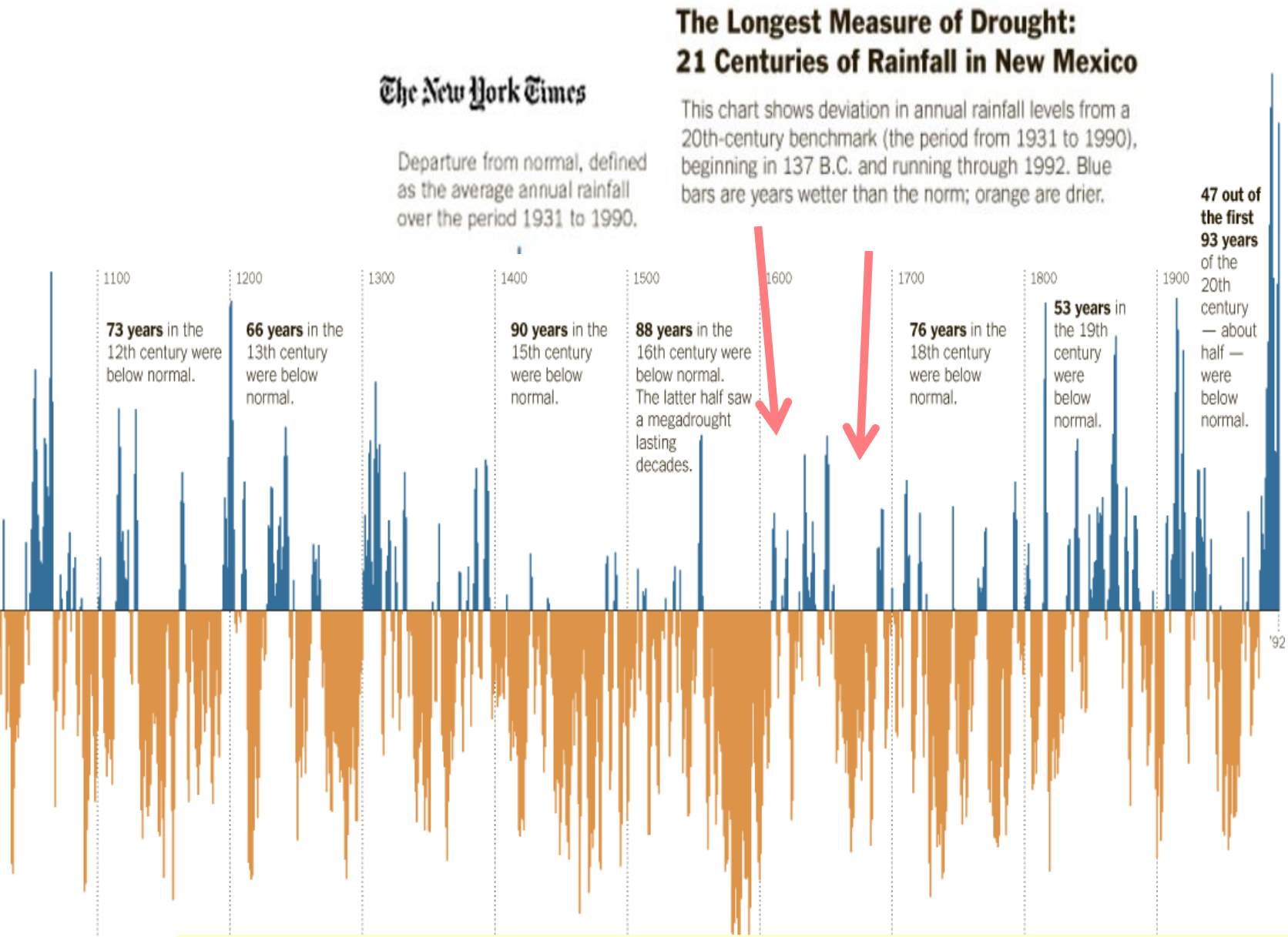
Rainfall and Drought Chart: New York Times, via U of A Tree Ring Laboratory



X-Axis Time: 1200s on LEFT -- present on RIGHT

Y-Axis: Rainfall (Blue, above Axis) Drought (Brown, Below Axis) Axis= 20th Ce

http://www.nytimes.com/imagepages/2012/08/12/opinion/sunday/12drought-ho



Late 20th Century was wettest in 2000 years. Abo' Mission, Mountainair: found re-roofed,1640, abandoned because of drought ~1675.

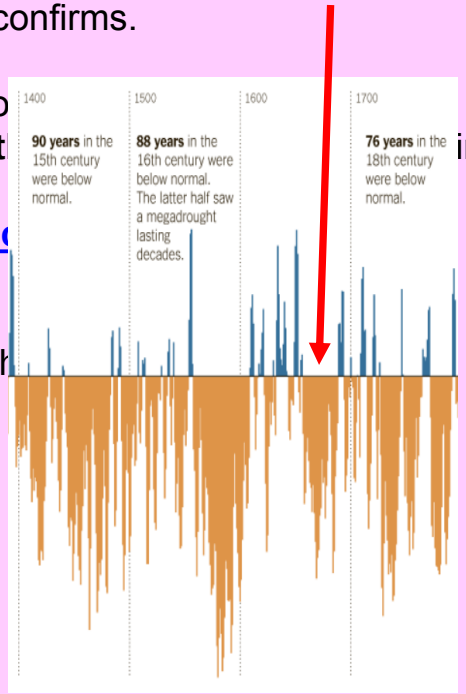
U of A Tree Ring Lab showed late 20th century was the peak rainfall last 2000 years in New Mexico.

National Climate Assessment posits that warmth brings drought and water scarcity, and that cool temperatures
bring fewer droughts.

2000-year tree ring times series data show the Little Ice Age was very dry here, Spanish mission
history of New Mexico's Abo' Mission in Mountainair confirms.

Abo' Mission Church was established in 1629, missio
mission… abandoned in late1600s …. **because of t** ine
and disease,
https://www.nps.gov/sapu/learn/historyculture/abo

Ex phic from 1500 to 1700 sh



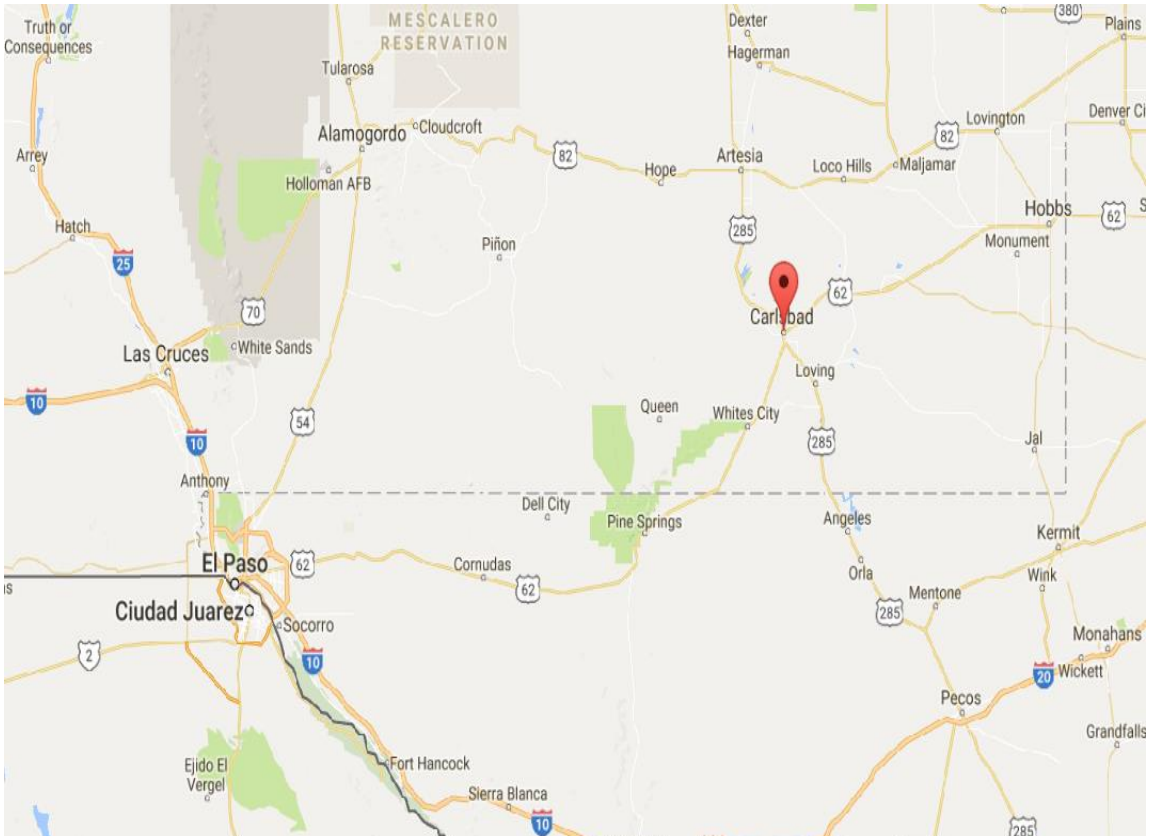
Extremes in precipitation, Carlsbad, New Mexico

1924: with 2.93 inches of Rain

1941: with 33.94 inches of Rain

Think of it: **30 inches difference between wettest and dries**
a factor of Ten Times—difference between the
And, 1941 stands out as the wettest year, by fa

What about 1941 caused so much rain?



The global climate anomaly 1940–1942

http://onlinelibrary.wiley.com/doi/10.1256/wea.248.04/pdf

Weather – December 2005, Vol. 60, No. 12

Stefan Brönnimann

Institute for Atmospheric and Climate Sciences, ETH, Zürich, Switzerland

In summer 1941, German troops were advancing into the Soviet Union, starting the Eastern Front. In the beginning the troops progressed rapidly, but then an exceptionally harsh winter stopped the assault:

> "1942: The winter comes with full strength, hardly a way left to advance without missing winter equipment. Even the winter clothing is missing. (. . .) At midnight the temperature dropped to a new reported low point. On 24 Jan 1942, −56 °C was measured at our division observation post." (from the diary of Otto Geipel (Geipel 1997), see also Fig. 1).

RMetS
Royal Meteorological Society

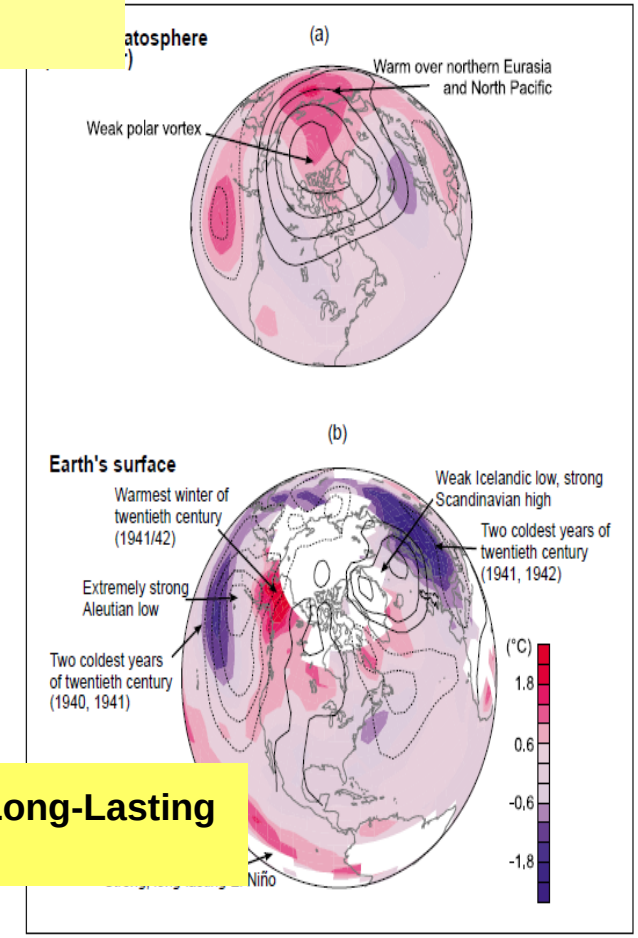
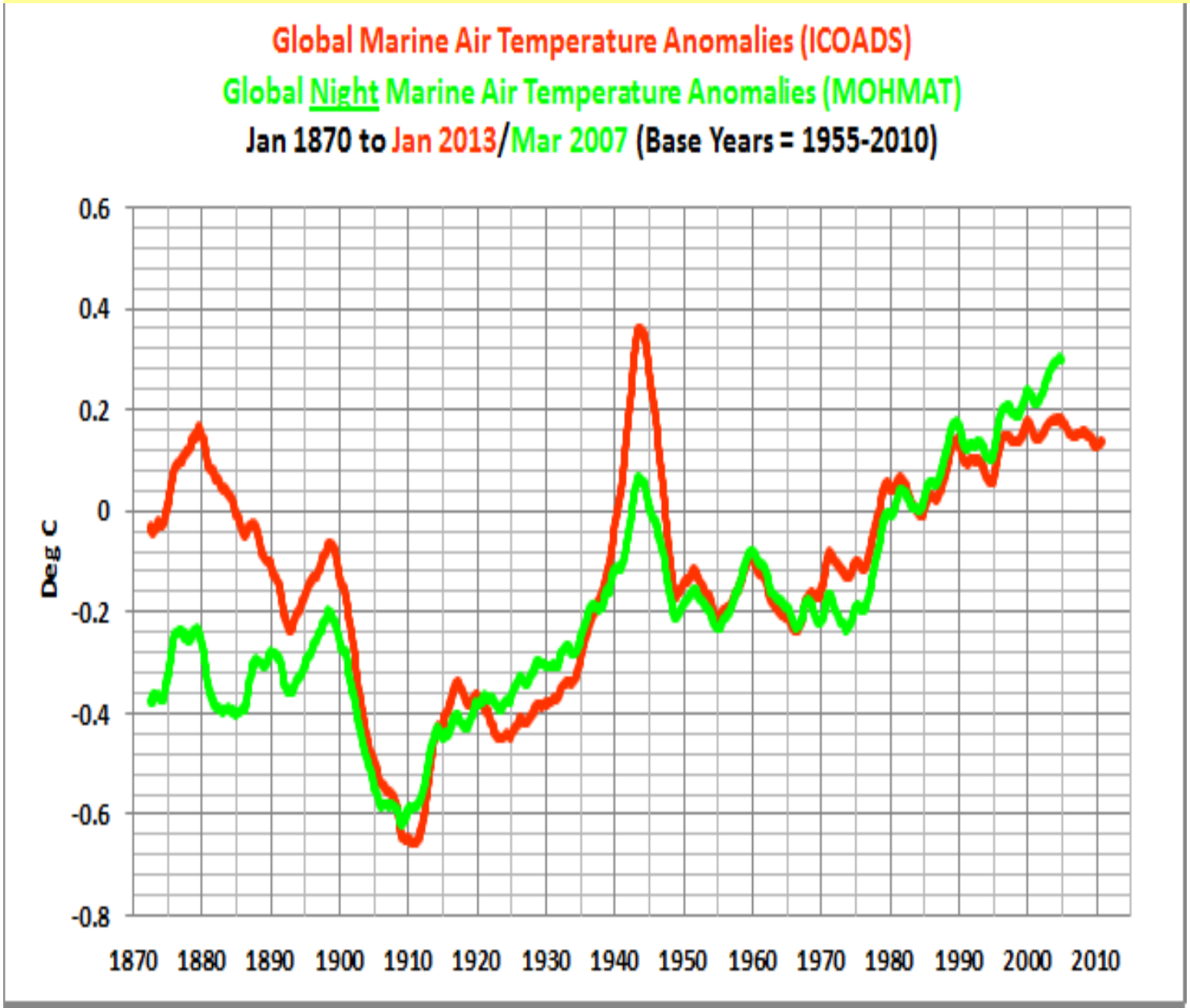


Fig. 7 Averaged anomaly fields (with respect to 1961–1990) from January 1940 to February 1942 of (a) temperature and geopotential height (contours, interval 20 gpm, zero contour not shown) at 100 mbar and (b) surface temperature (HadCRUT2v, Jones and Moberg 2003) and SLP (contours, interval 1 mbar, zero contour not shown, Trenberth and Paolino 1980).

"Strong, Long-Lasting El Nino"

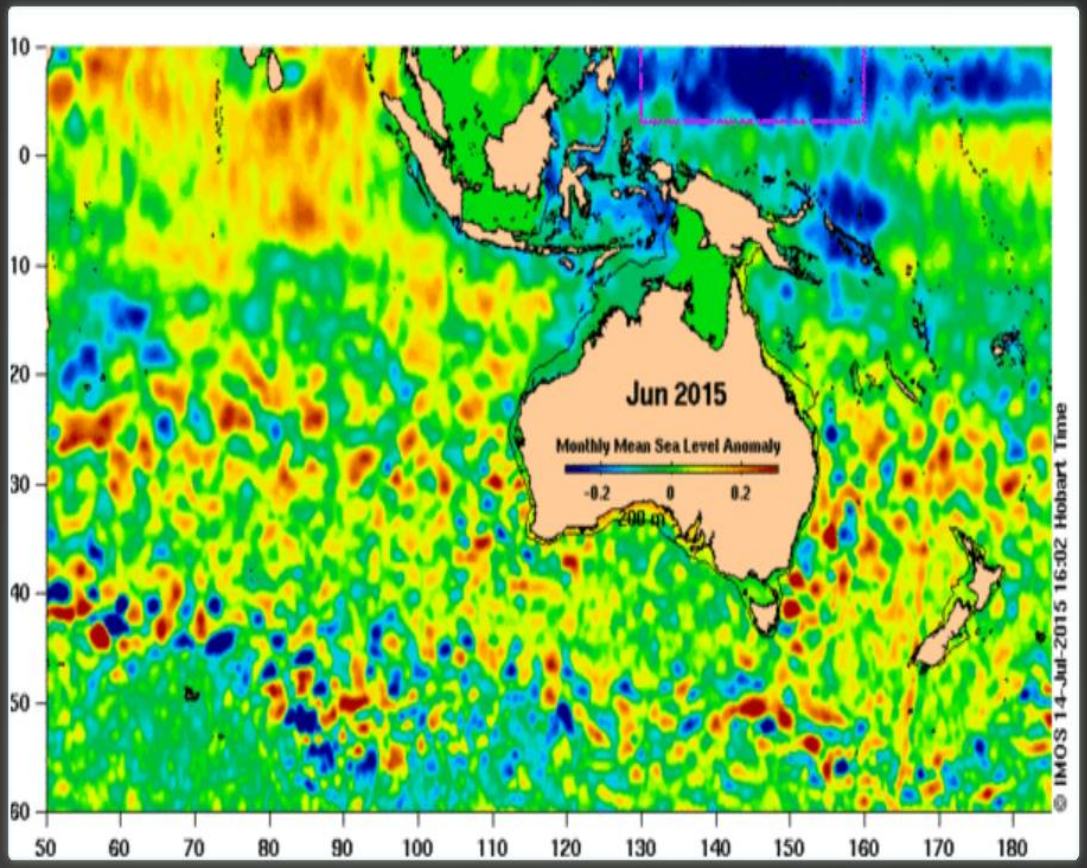
https://bobtisdale.files.wordpress.com/2013/05/figure-16.png



http://www.aviso.altimetry.fr/en/news/idm/2015/jul-2015-el-ninos-return-west-side-story.html

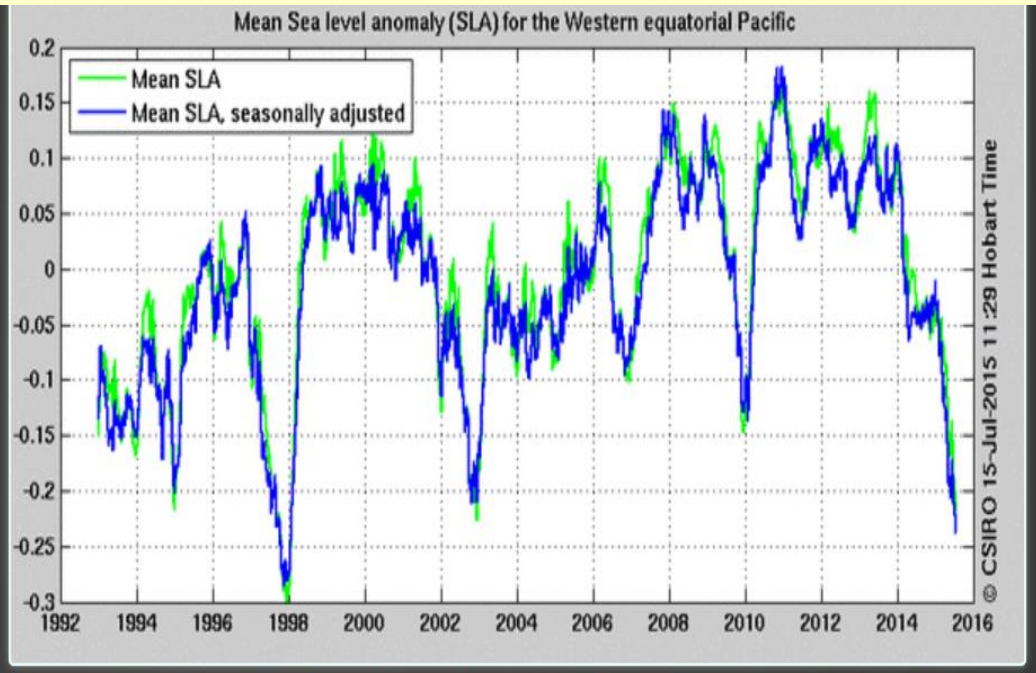
EL NIÑO'S RETURN, WEST SIDE STORY

Image of the Month - July 2015



http://www.bom.gov.au/climate/enso/

http://www.aviso.altimetry.fr/en/news/idm/2015/jul-2015-el-ninos-return-west-side-story.html



June monthly Mean Sea Level Anomaly around Australia (top), and the spatial mean SLA of the region (boxed in map) North of New Guinea (bottom) (Credits IMOS/CSIRO)

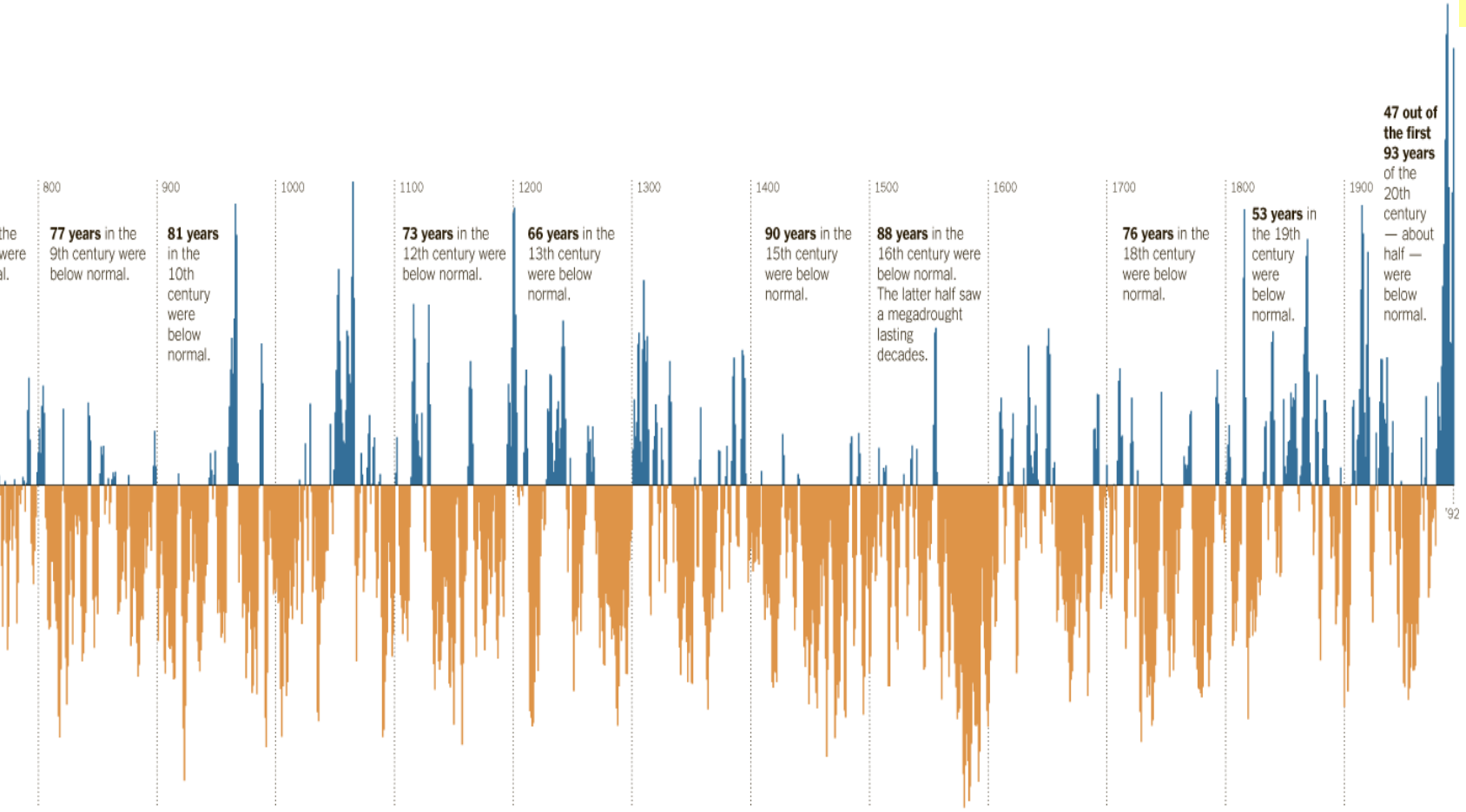
El *Niño*'s name comes from South America. However, this phenomenon impacts the whole Pacific, the Western part no less than the Eastern, though in opposite ways. While on the Peruvian coasts El *Niño* means heavy rainfalls, higher-than-usual sea levels and temperatures, along the Australian, Papuan and Indonesian coasts it means drought and lower sea levels and temperatures. This being as much a problem as the reverse. In 1997 in particular, a lot of forest fires devastated Indonesia.

http://www.bloomberg.com/news/articles/2015-08-12/worst-el-nino-in-30-years-pounds-south-american-economies-polls

- El Niño Is Coming Back: Here's What You Need to Know

http://www.nytimes.com/imagepages/2012/08/12/opinion/sunday/12drought-horizch.html

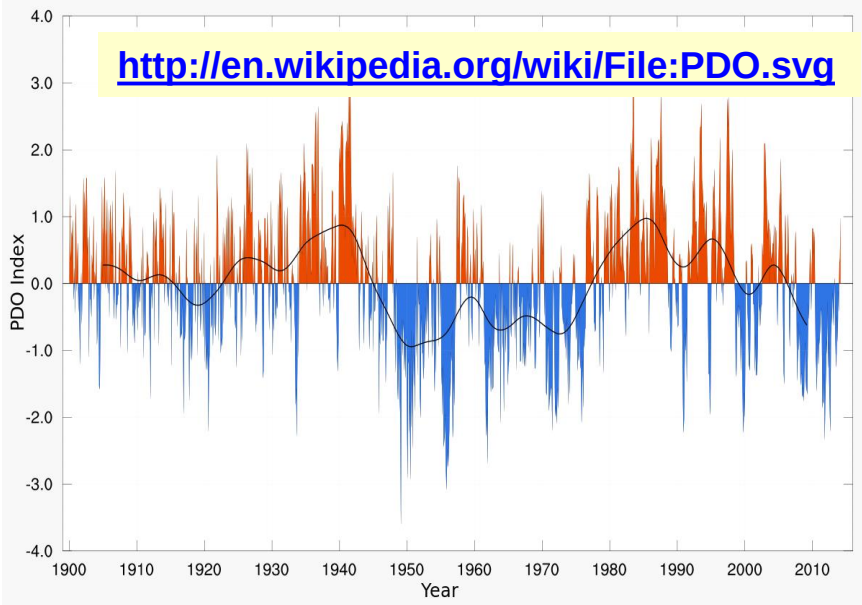
El Nino/ENSO helps explain dramatic changes from Wet to Dry in



Pacific Decadal Oscillation

Natural change in offshore

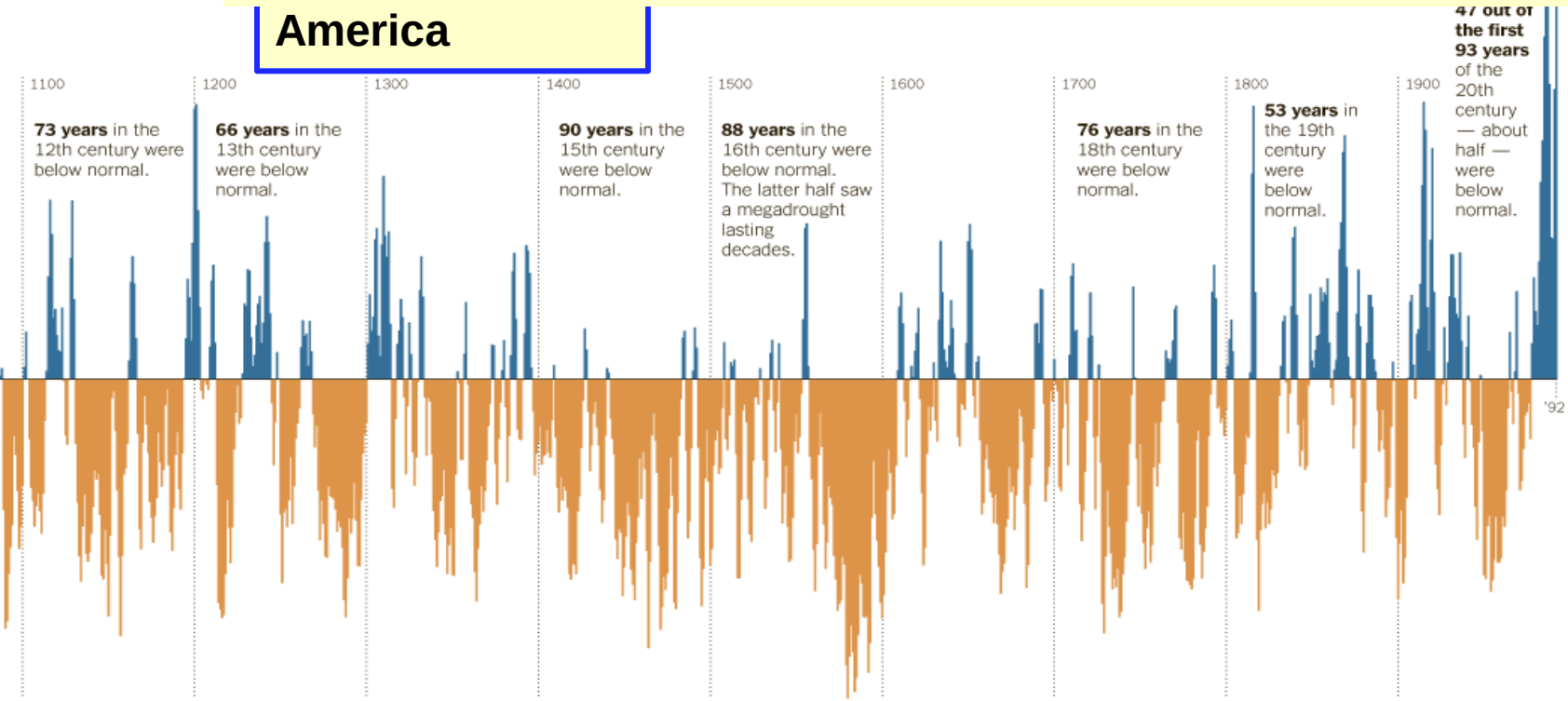
Water Temperature Pattern



http://en.wikipedia.org/wiki/File:PDO.svg

http://www.nytimes.com/imagepages/2012/08/12/opinion/sunday/12drought-horizc

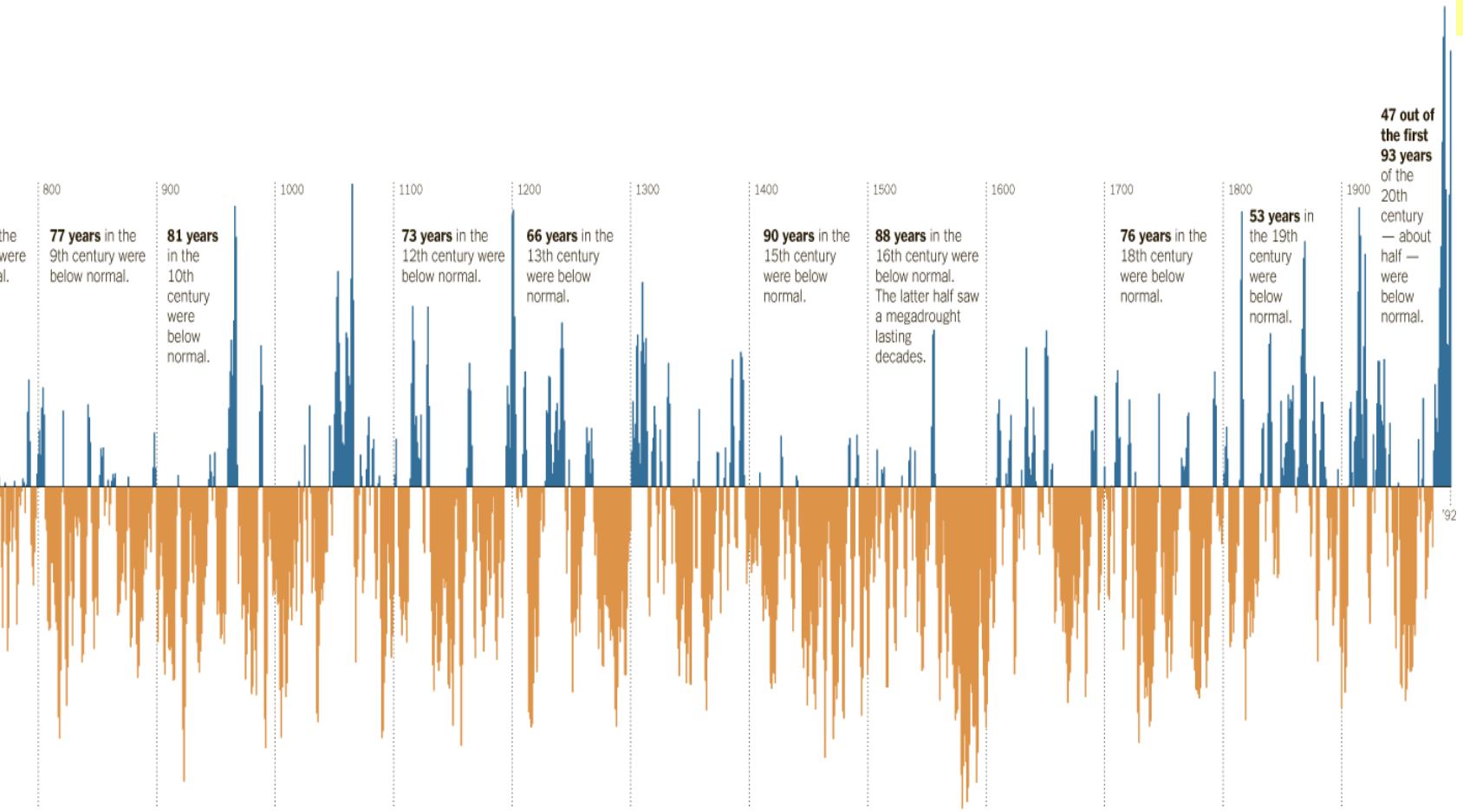
America



http://www.nytimes.com/imagepages/2012/08/12/opinion/sunday/12drought-horizch.html

El Nino/ENSO helps explain dramatic changes from Wet to Dry in New Mexico

60-year Pacific Decadal Oscillation helps explain Rainfall and



http://www.wrh.noaa.gov/twc/monsoon/monsoon_variability.php

Climate Change and the Monsoon

A question of concern is how the North American Monsoon will be altered in the future as a result of climate change. Global warming projections are given by numerical computer models, such as those documented by the Intergovernmental Panel on Climate Change. Unfortunately the IPCC models poorly represent the North American Monsoon in the Southwest. Hence this question does not have an accurate answer at this time.

Here we have a presumably mid-level professional employee of the
trying to provide good technical information on a complex subject,
the variability of the North American Monsoon of the southwestern
and this employee blurts out the truth:

The Intergovernmental Panel on Climate Change, or IPCC, models
represent the North American Monsoon in the Southwest."

Who else has noticed that the IPCC models do poorly?

Climate Science: Roger Pielke Sr.

Pielke Research Group: News and Commentary

Roger A. Pielke Sr.

Born	October 22, 1946 (age 70) United States
Fields	Meteorology, Climatology, Earth System Science
Institutions	University of Colorado Boulder, Colorado State University, Duke University, University of Virginia, NOAA Experimental Meteorology Lab
Alma mater	Towson State College (B.A., 1968), Pennsylvania State University (M.S., 1969; Ph.D., 1973)

Pielke Research Group: News and Commentary

BY RPIELKE | OCTOBER 9, 2012 · 7:00 AM

Quotes From Peer Reviewed Paper That Document That Skillful Multi-Decadal Regional Climate Predictions Do Not Yet Exist

[The Huge Waste Of Research Money In Providing Multi-Decadal Climate Projections For The New IPCC Report]

there is an enormous amount of money being spent to provide multi-decadal regional climate forecasts to the impacts communities. In this post, I select just a few quotes from peer reviewed papers to document that the climate models do not have this skill. There are more detailed on this post also (e.g. see).

As the first example, from

Dawson A., T. N. Palmer and S. Corti: 2012: Simulating Regime Structures in Weather and Climate Prediction Models. Geophyscial Research Letters. doi:10.1029/2012GL053284 In press.

> We have shown that a low resolution atmospheric model, with horizontal resolution typical of CMIP5 models, is not capable of simulating the statistically significant regimes seen in reanalysis, ...It is therefore likely that the embedded regional model may represent an unrealistic realization of regional climate and variability.

Other examples, include

Taylor et al, 2012: Afternoon rain more likely over drier soils. Nature. doi:10.1038/nature11377. Received 19 March 2012 Accepted 29 June 2012 Published online 12 September 2012

> "...the erroneous sensitivity of convection schemes demonstrated here is likely to contribute to a tendency for large-scale models to `lock-in' dry conditions, extending droughts unrealistically, and potentially exaggerating the role of soil moisture feedbacks in the climate system."

Driscoll, S., A. Bozzo, L. J. Gray, A. Robock, and G. Stenchikov (2012), Coupled Model Intercomparison Project 5 (CMIP5) simulations of climate following volcanic eruptions, J. Geophys. Res., 117, D17105, doi:10.1029/2012JD017607. published 6 September 2012.

> The study confirms previous similar evaluations and raises concern for the ability of current climate models to simulate the response of a major mode of global circulation variability to external forcings.

Fyfe, J. C., W. J. Merryfield, V. Kharin, G. J. Boer, W.-S. Lee, and K. von Salzen (2011), Skillful predictions of decadal trends in global mean surface temperature, Geophys. Res. Lett.,38, L22801, doi:10.1029/2011GL049508

> "....for longer term decadal hindcasts a linear trend correction may be required if the model does not reproduce long-term trends. For this reason, we correct for systematic long-term trend biases."

Xu, Zhongfeng and Zong-Liang Yang, 2012: An improved dynamical downscaling method with GCM bias corrections and its validation with 30 years of climate simulations. Journal of Climate 2012 doi: http://dx.doi.org/10.1175/JCLI-D-12-00005.1

> "...the traditional dynamic downscaling (TDD) [i.e. without tuning) overestimates precipitation by 0.5-1.5 mm d-1.....The 2-year return level of summer daily maximum temperature simulated by the TDD is underestimated by 2-6°C over the central United States-Canada region."