Flood and Flash Flood Events of South Central Texas

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National Weather Service Austin-San Antonio TX
Who is the National Weather Service?
NWS Austin/San Antonio
“County Warning Area”

- Forecasts
- Watches/Warnings
- Decision Support
- Local Research
- Outreach
Texas has more flooding deaths than any other state.
148 Deaths in South Central Texas in 21 years

Flash Flood Fatalities
Flash Flooding
Terrain and Heavy Rain Don’t Mix

Don’t drive through low water crossings!
Why are we so prone to flood?

- Close to moisture source regions
- Terrain, lack of soil
- Urbanization, Population growth
Lack of Soil in Hill Country

U.S. Depth to Bedrock Map

High: >200 cm
Low: 0 cm

©The COMET Program
Flash Flooding

#1 Thunderstorm Weather Related Killer

Dangers:
- Low Water Crossings
- Nighttime Driving
People Make Some Really Bad Choices

Sometimes you get lucky!
Don’t Rely on Your Big Vehicles

They Wont Save You

Forces on Vehicles From High Water
The car will be carried when:
Buoyancy Force Greater Than Vehicle Weight

Vehicle Weight

Friction Force

Buoyancy Force

There is no friction force once the vehicle is lifted off the road
Nearby half of all flood fatalities are vehicle related
Bandera County Watersheds

Guadalupe

San Antonio

Nueces
Ways to Get Flash Flooding

- **Cell Mergers (storms combine)**
- **Training (move over same area)**
- **Stationary (storms don’t move)**
- **Tropical System (efficient rain)**
- **Stalled Weather System**
- **Upstream Rain Events**
- **Burn Scar**
San Antonio Memorial Weekend Flood, May-25-2013
a 30% chance of Rain
Cell Mergers Over Olmos Basin

Record Rainfall
USGS River Gauge, Olmos Creek at Dresden

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- 2.58 inches in 15 minutes
- 6.13 inches in 1 hour
- 8.59 inches in 1.5 hours
- 9.46 inches in 2 hours
- 13.70 inches in 4 hours
- 15.31 inches in 5 hours
- 17.00 inches in 24 hours
Flash Flood on a Lake?
Sandy Creek, Lake Travis, Sept 13 2012
6.5” in 1.5 hours
Closeup of I-35 Area...October 30, 2015

Historic rain event
Austin event, 30 October 2015
Annual Exceedance Probabilities (AEPs) for the Worst Case 3-hour Rainfall

Hydrometeorological Design Studies Center
National Water Center, National Weather Service
National Oceanic and Atmospheric Administration
http://www.nws.noaa.gov/ohd/hdsc/

Created 30 November 2015
Rainfall frequency estimates are from TP40 (extrapolated to 1/500 AEP)
Rainfall values come from 1-hour Stage IV data.
Ways to Get Flash Flooding

- Cell Mergers (storms combine)
- Training (move over same area)
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Halloween Flood, October 30-31, 2013
Halloween Flood 2013 Rainfall Totals
National Weather Service
Austin – San Antonio TX

14” of Rain
Record height on Onion Creek

San Marcos River near Martindale
The 1987 Guadalupe River Flood

Observed Rainfall
10 PM July 16 thru 8 AM July 17