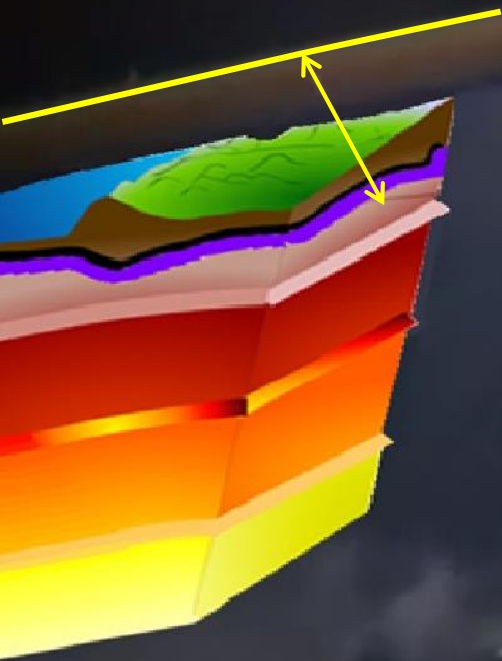




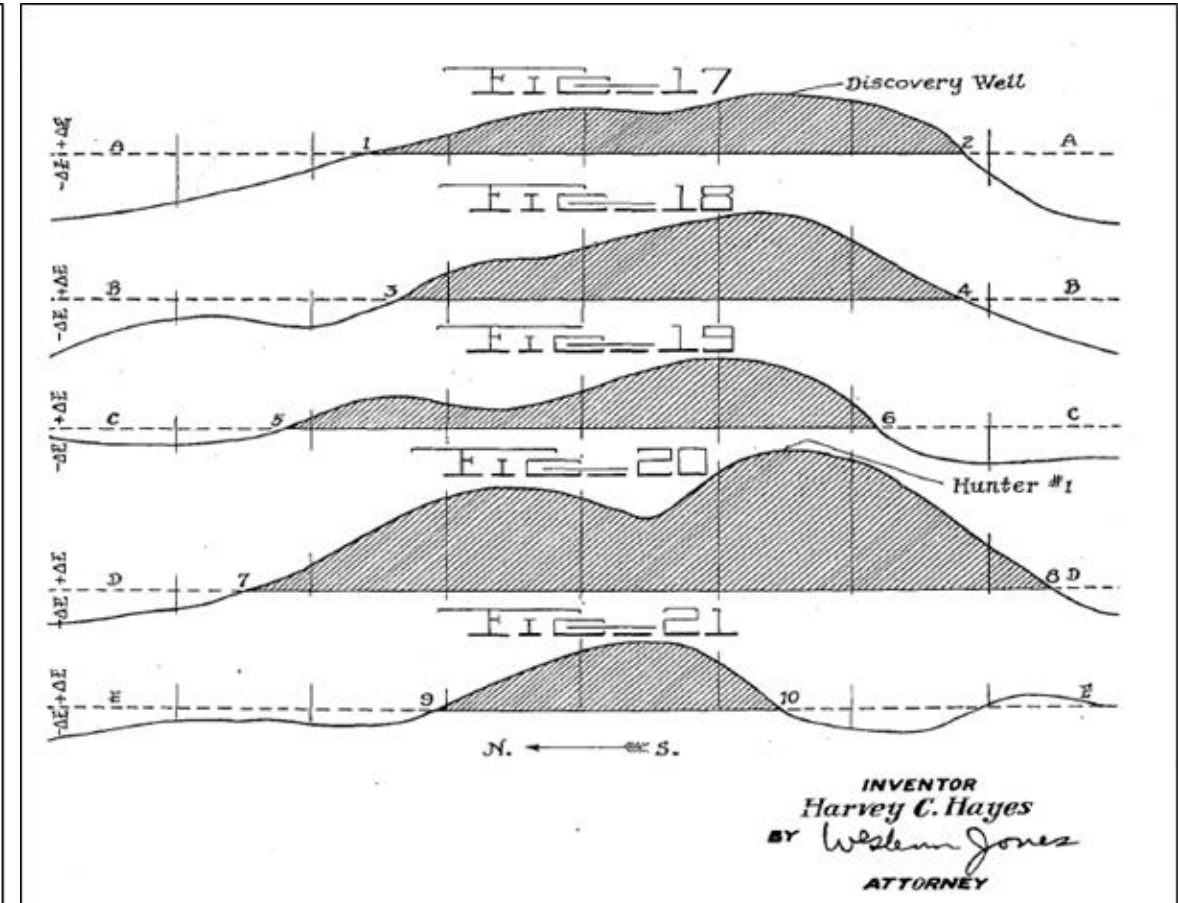
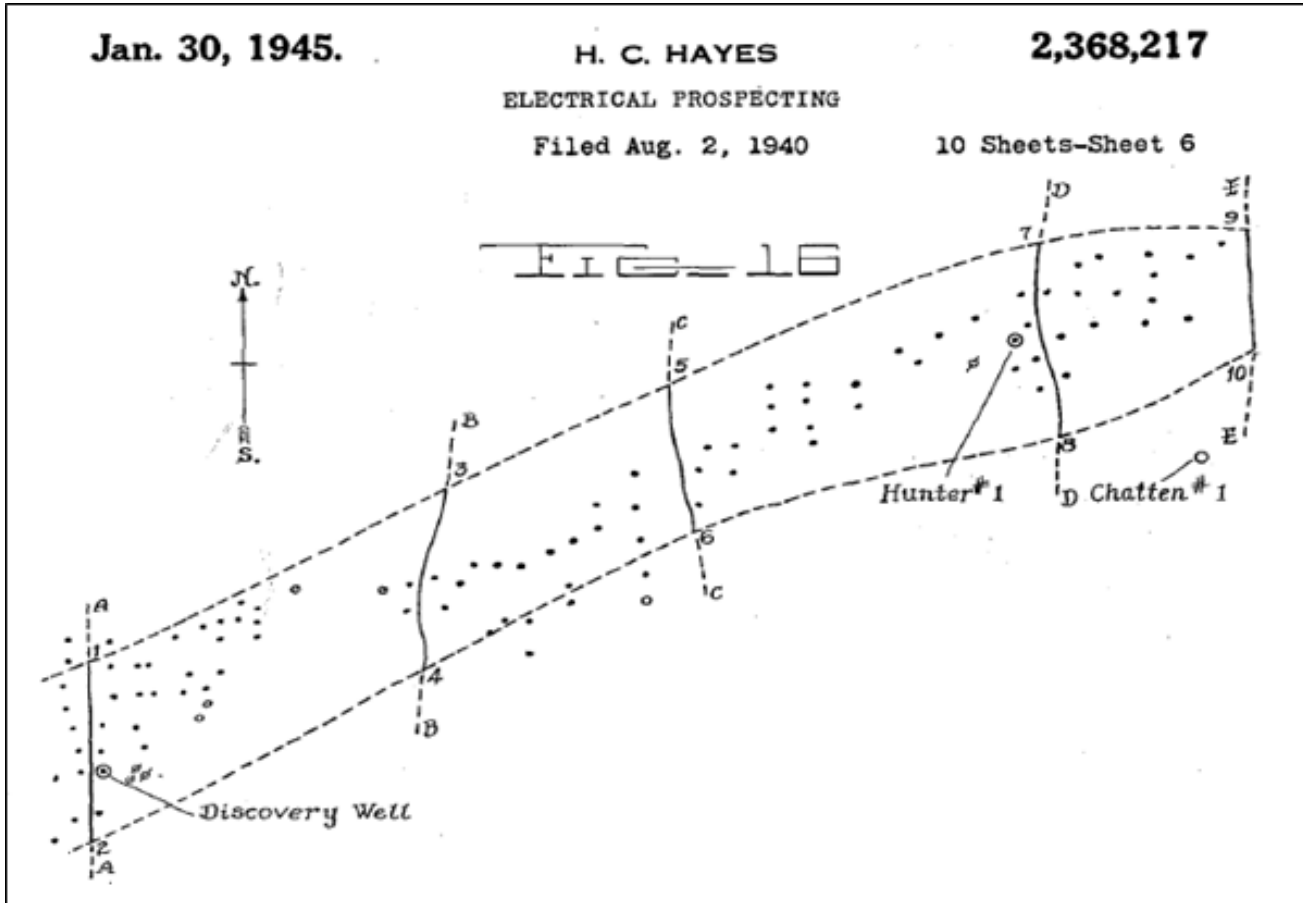
# Telluric and Earth Currents, Lightning Strike Locations, and Natural Resource Exploration

H. Roice Nelson, Jr.,  
Les R. Denham, and Dr. Jim Siebert  
Dynamic Measurement LLC

# Telluric Currents and Lightning Strikes



# Earth Resistivity Profiles (Hayes, 1945)

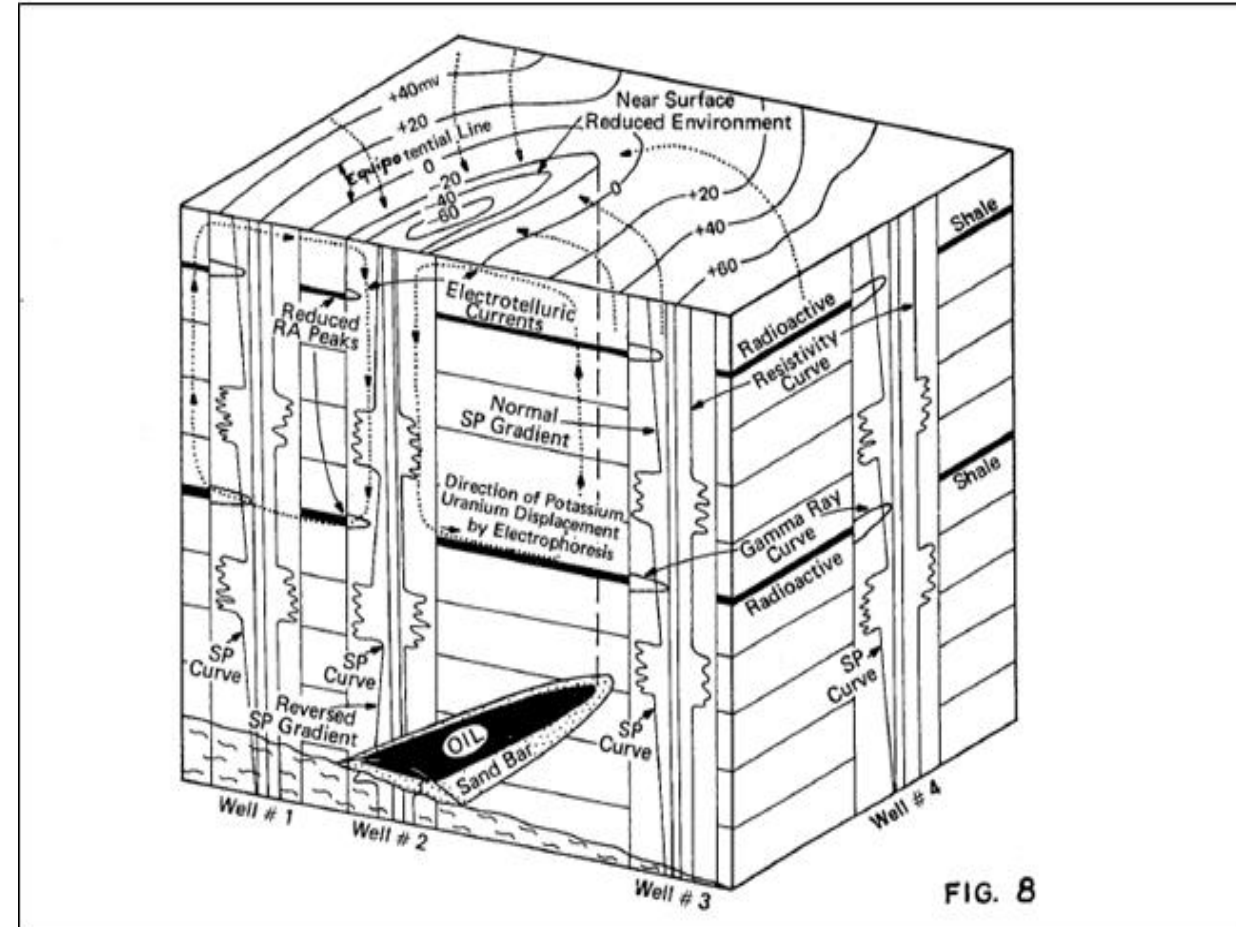
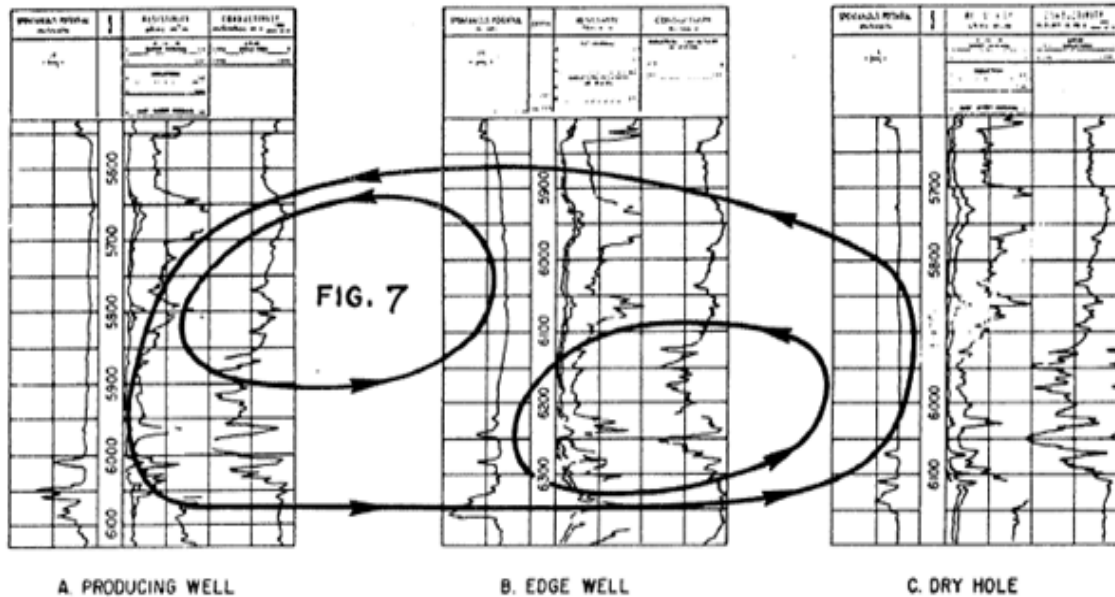


# Electrotelluric Currents (Pirson and Pirson, 1976)

U.S. Patent March 9, 1976 Sheet 4 of 8 3,943,436

[54] LINE INTEGRAL METHOD OF MAGNETO-ELECTRIC EXPLORATION

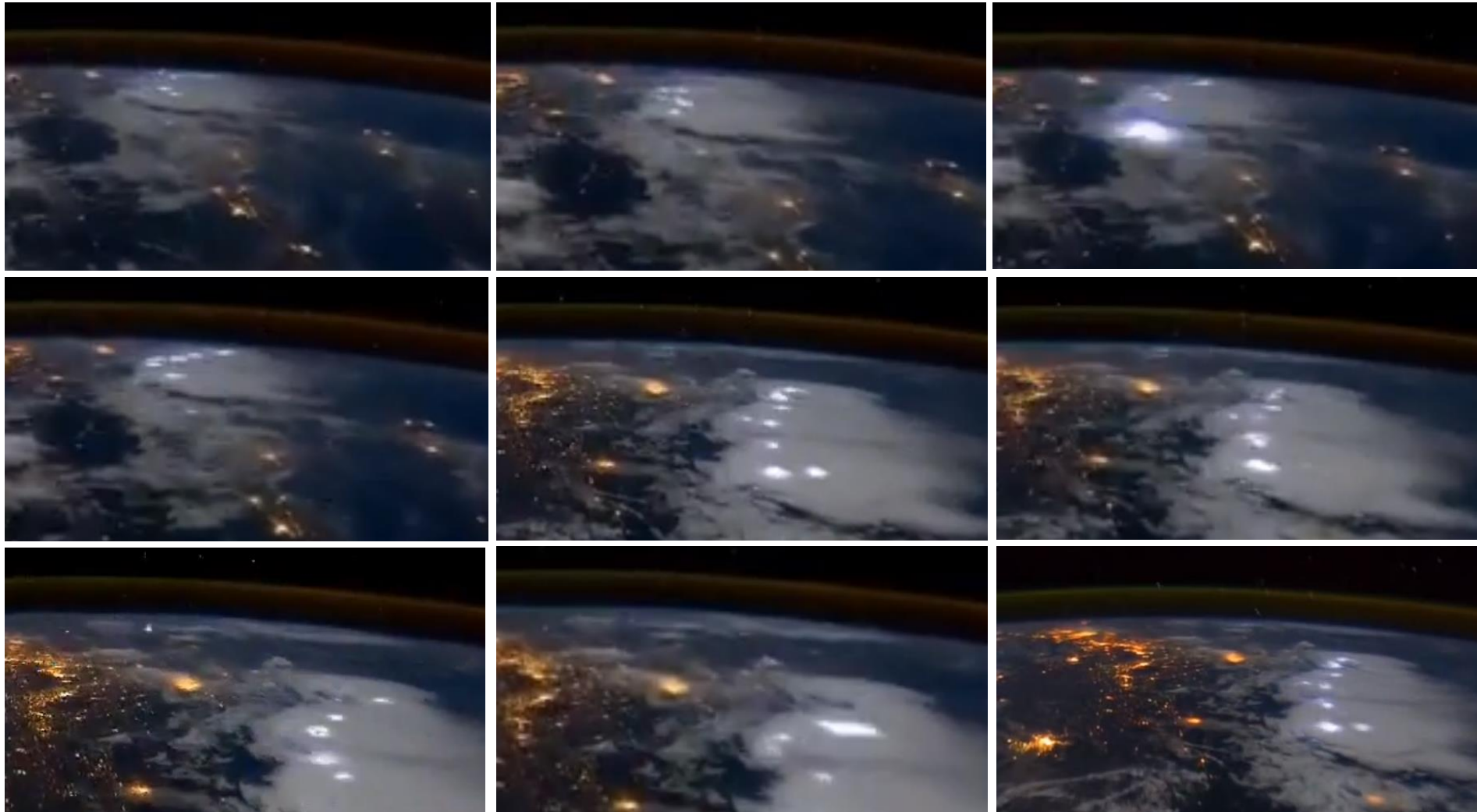
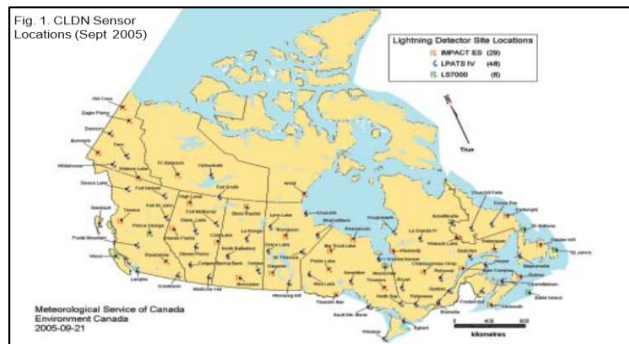
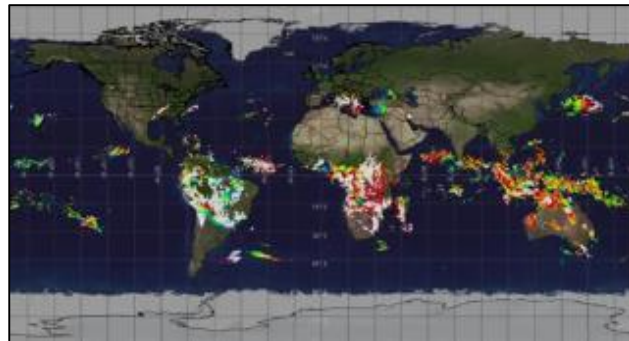
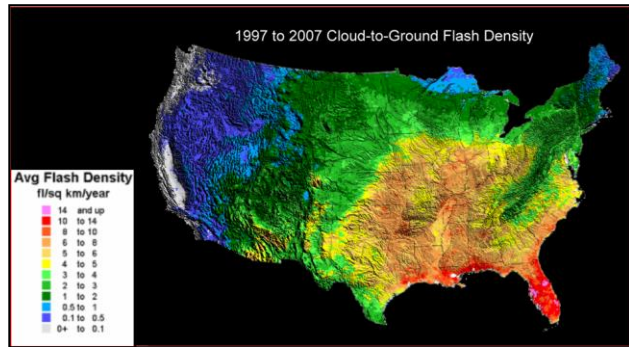
[76] Inventors: Sylvain J. Pirson; Jacques E. Pirson, both of 8608 Mesa Drive, Austin, Tex. 78759



## Terralevis (shallow earth) Currents

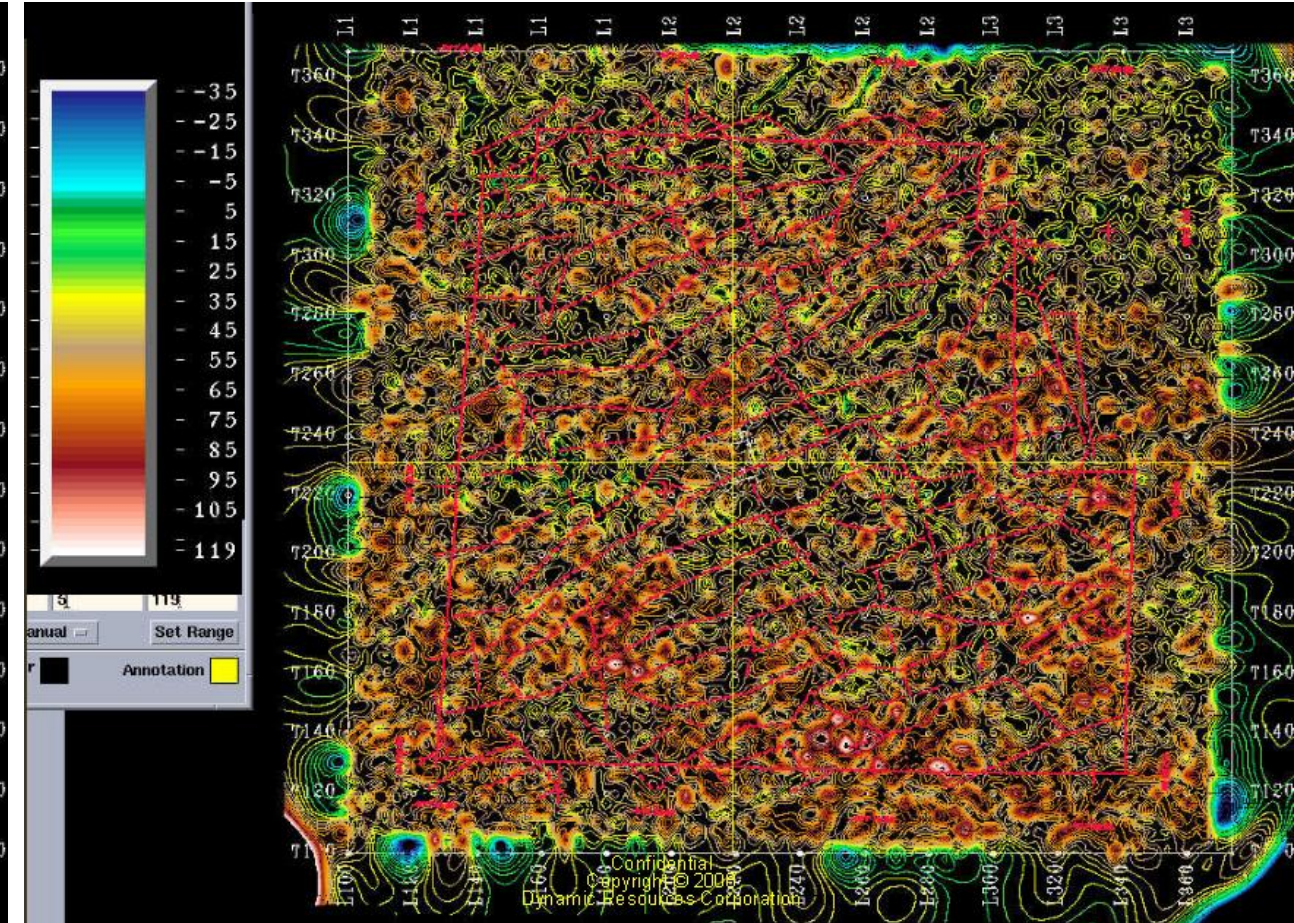
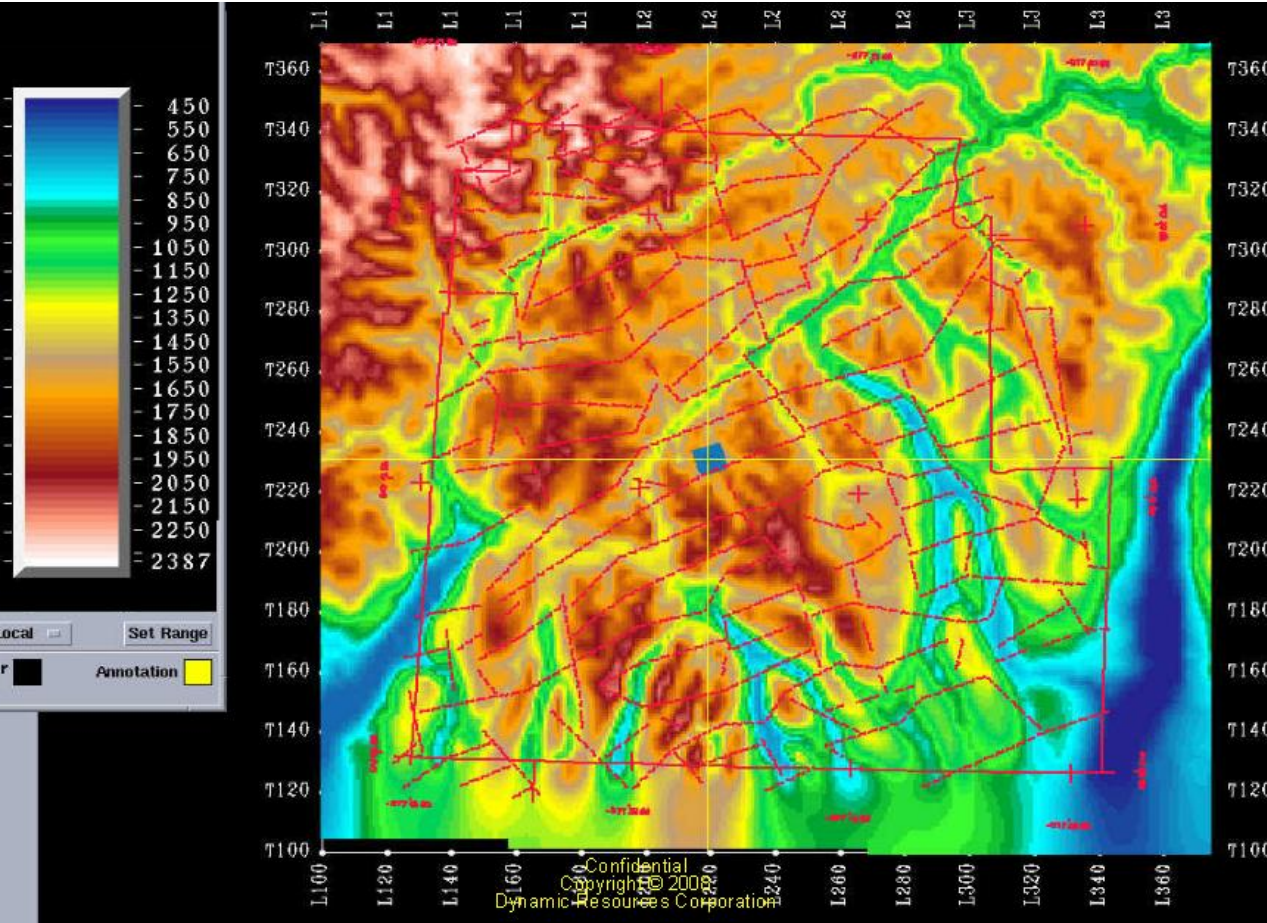


# Lightning occurs everywhere and is available in private and public databases



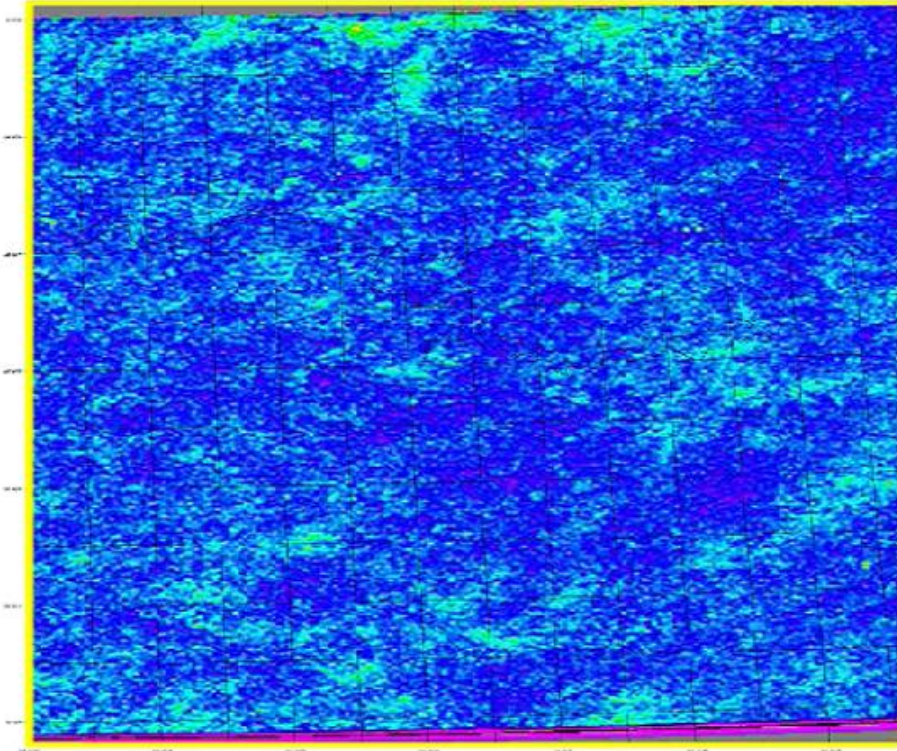
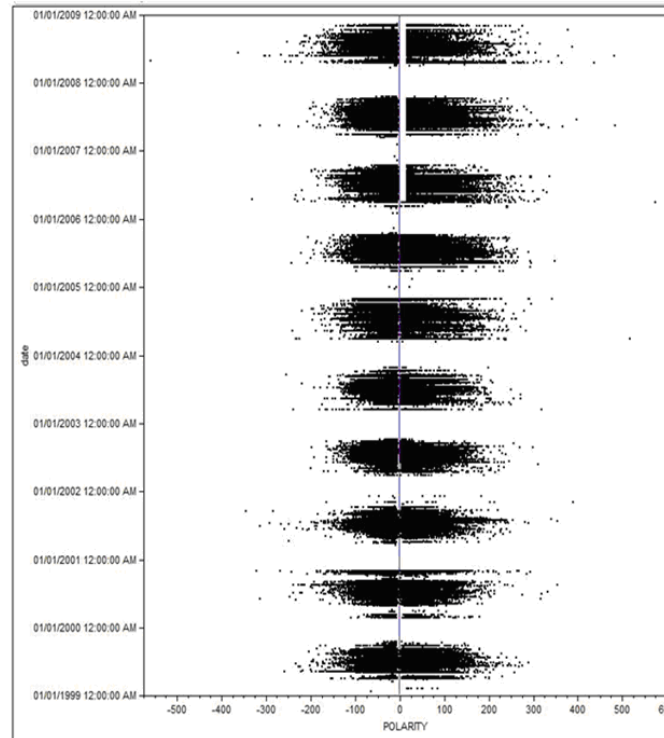
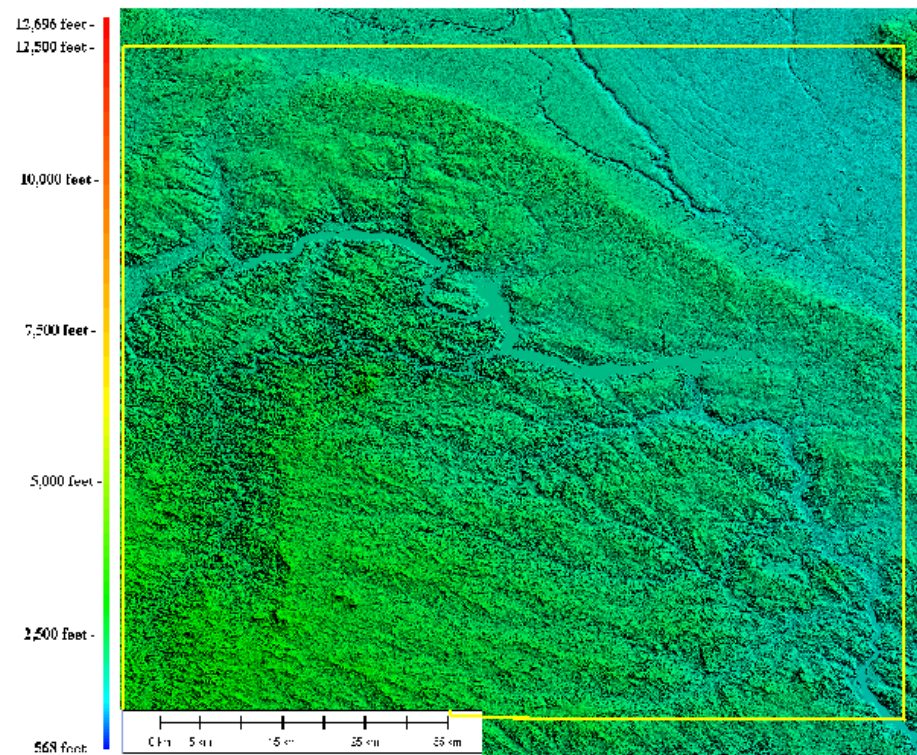


# Topography and Stroke Count, Steuben County, NY





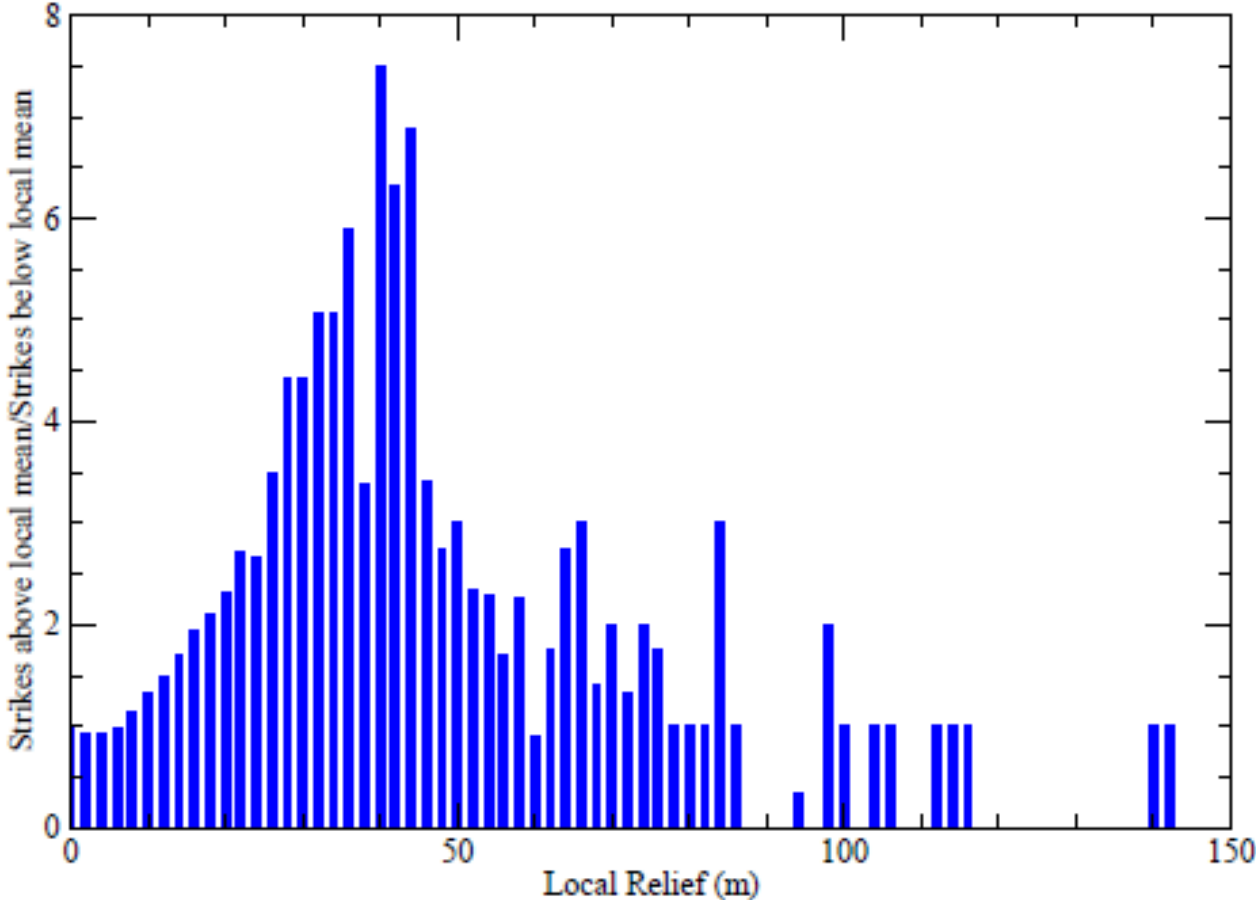
# Topography and Lightning Density, western, ND



# Linear Increase in Number of Strikes with Local Relief

Lightning travels up to 250 km  
Cloud-to-Cloud, then goes to ground

Lightning Strikes vs Local Relief  
North Dakota, 1999-2008

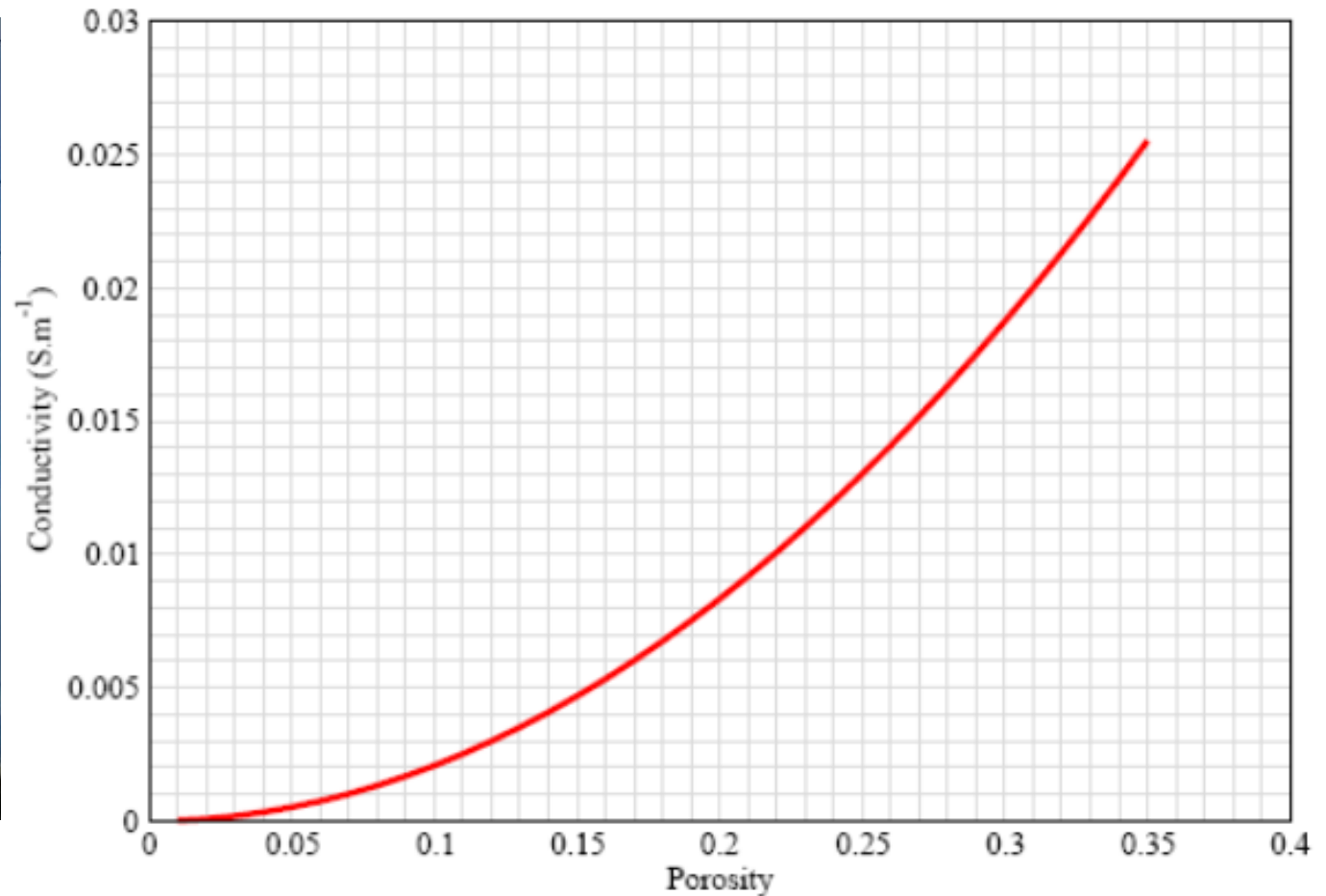




# Air Conductivity & Rock Conductivity Graph

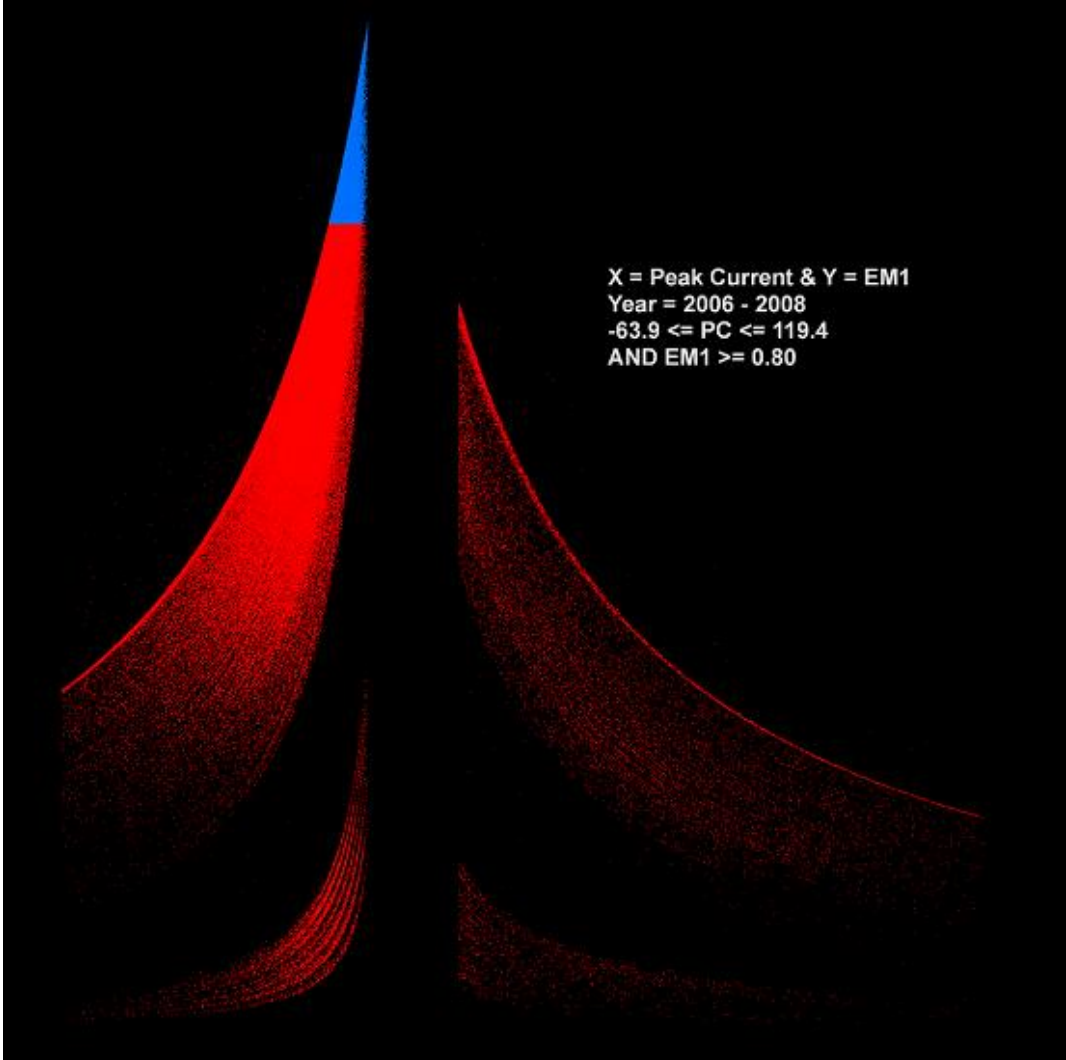
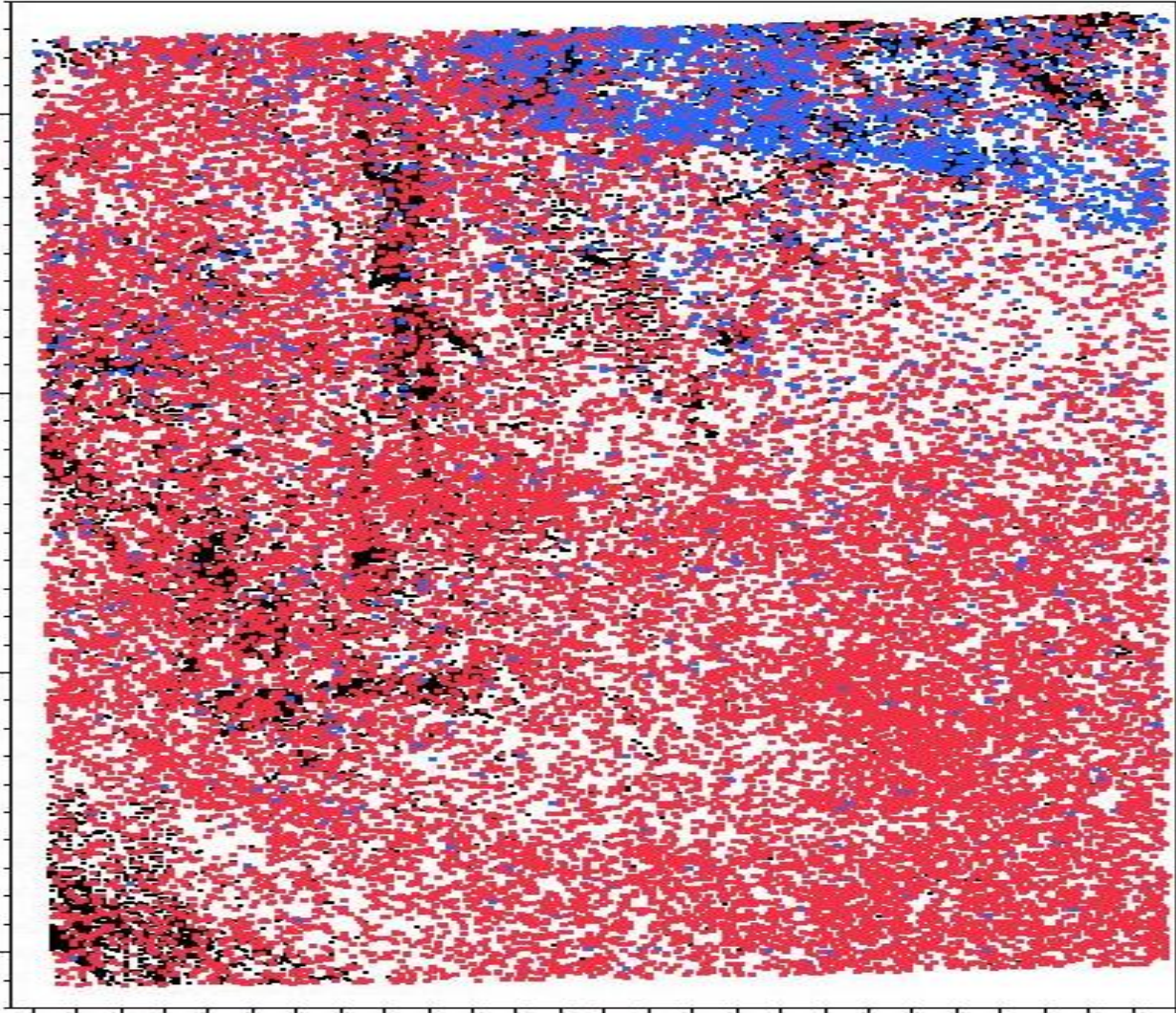


Electrical conductivity of air:  
 $0.3-0.8 * 10^{-14}$  Siemens per Meter



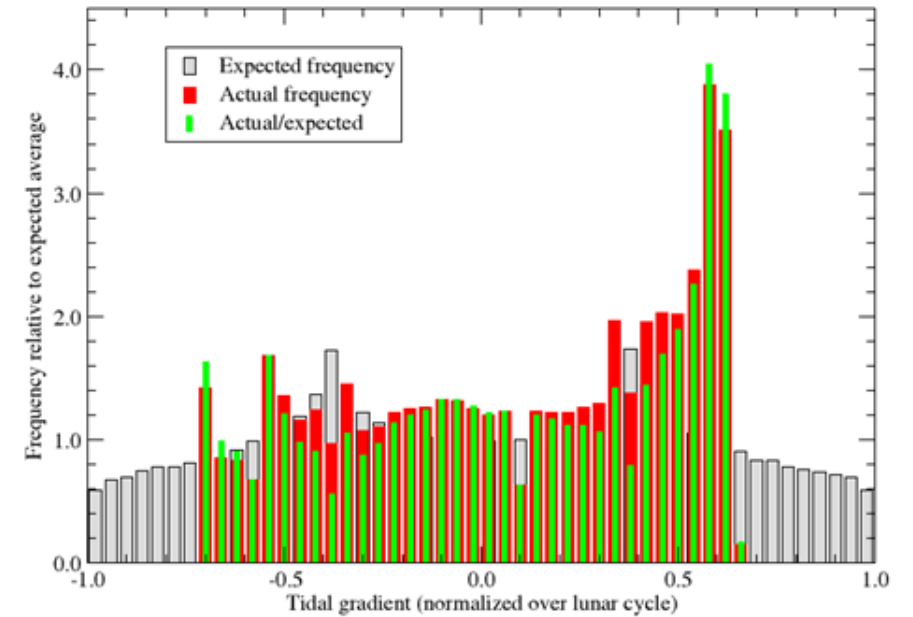
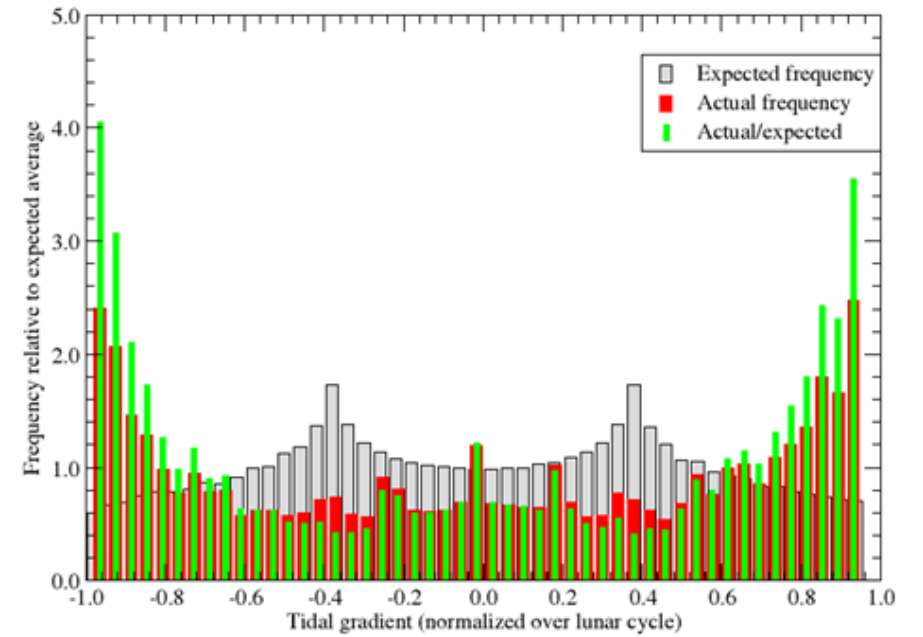
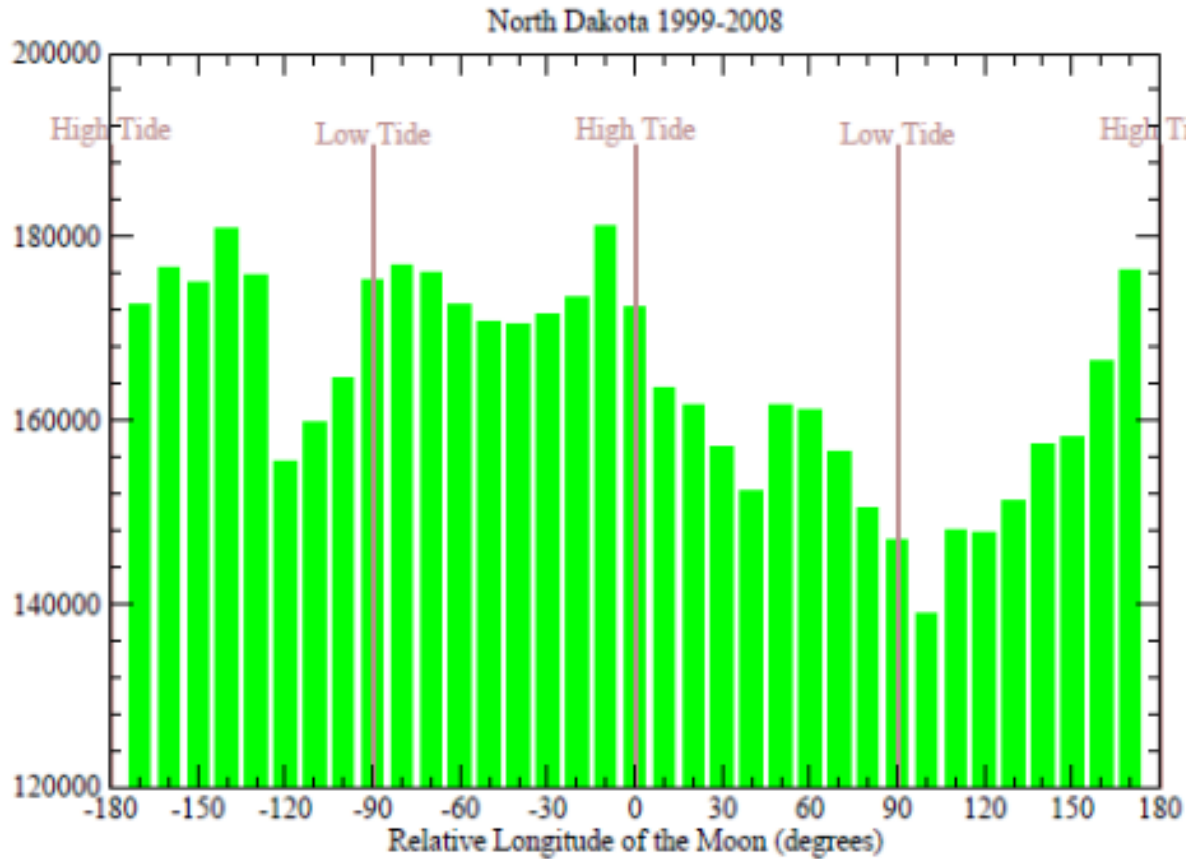


# Lightning Density over wells, Nesson Anicline, ND

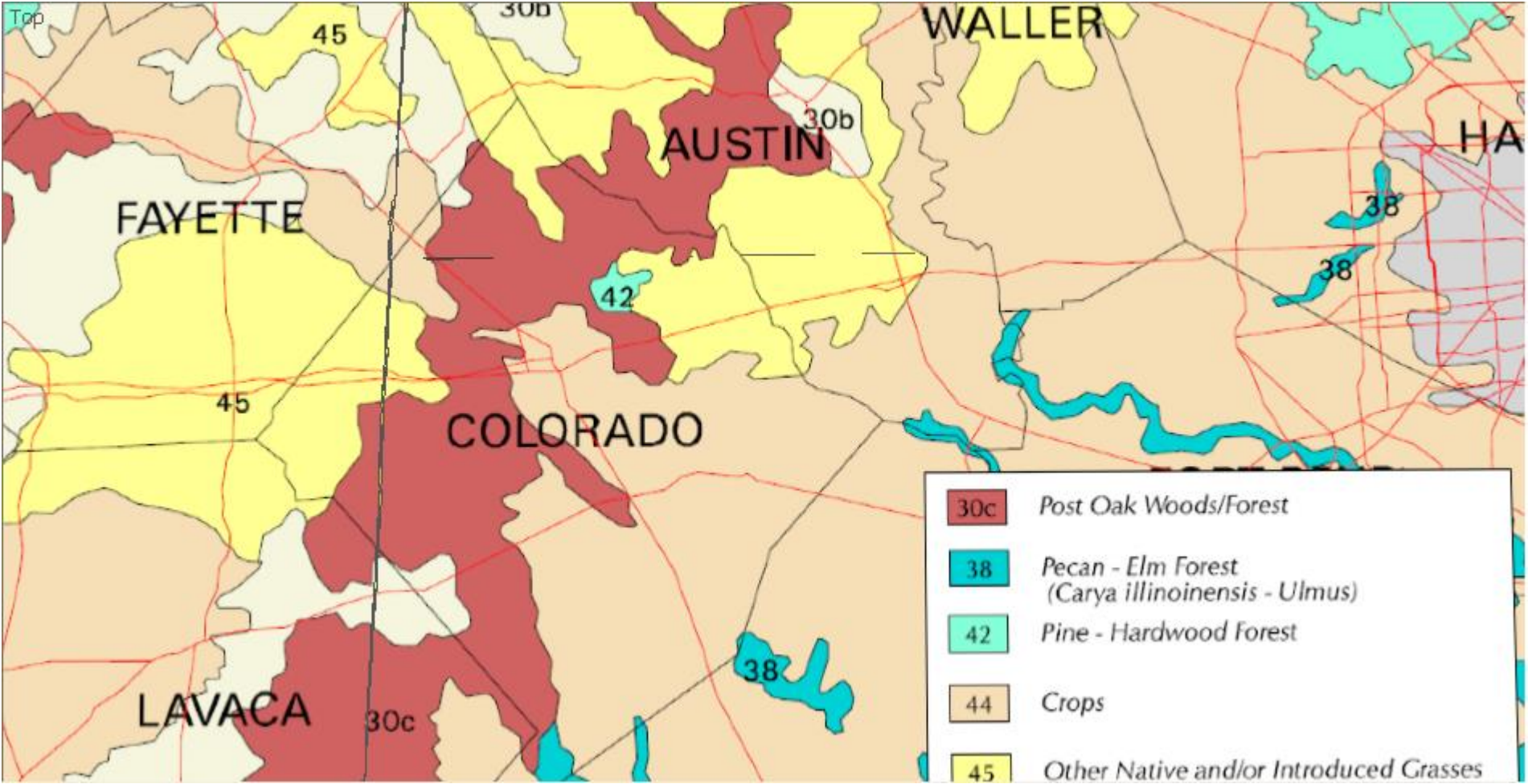




# Lightning Strikes and Earth Tides

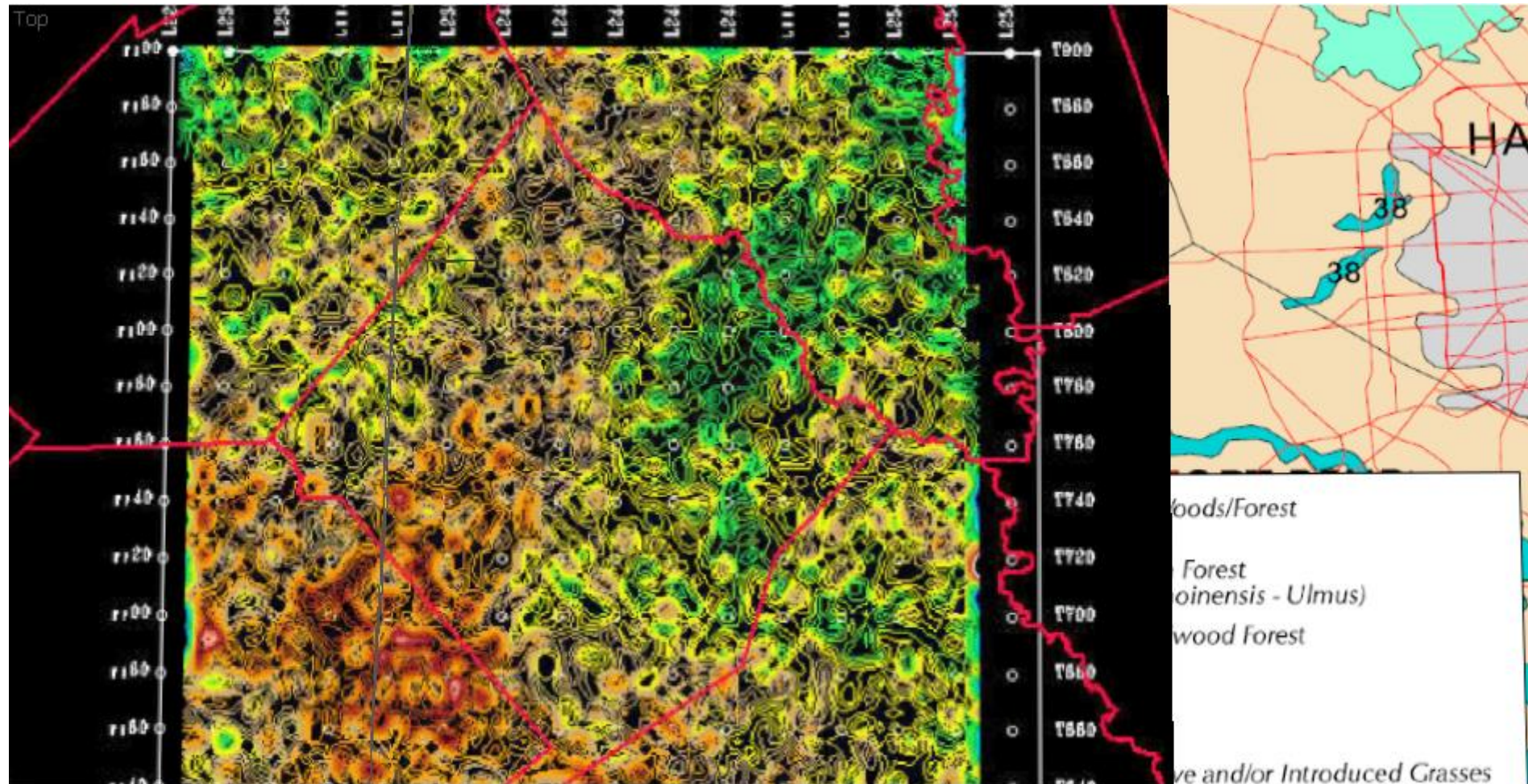


# Oak Trees in Colorado County, TX (red)



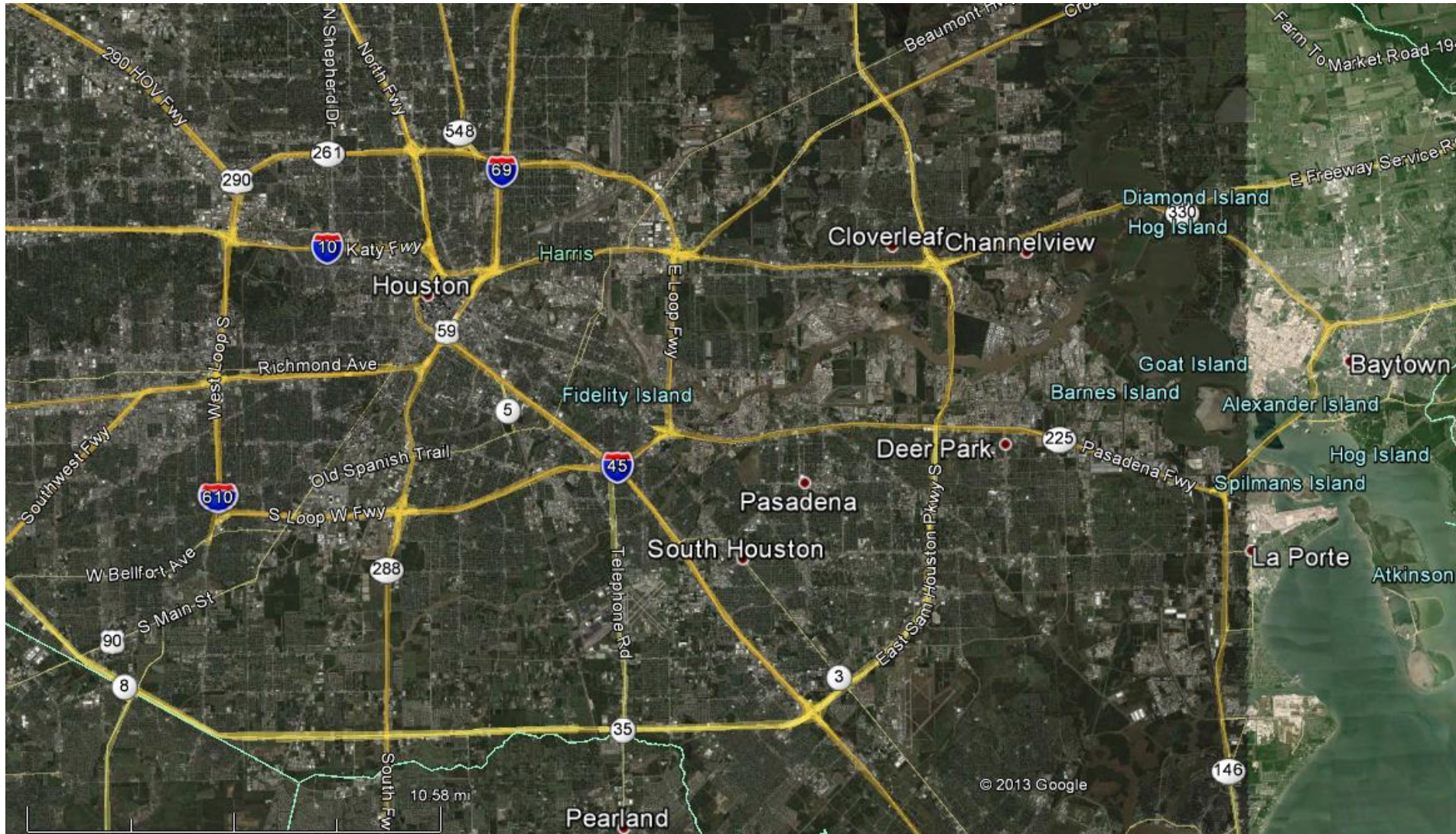


# Positive Lightning Strike Density, Colorado County, TX



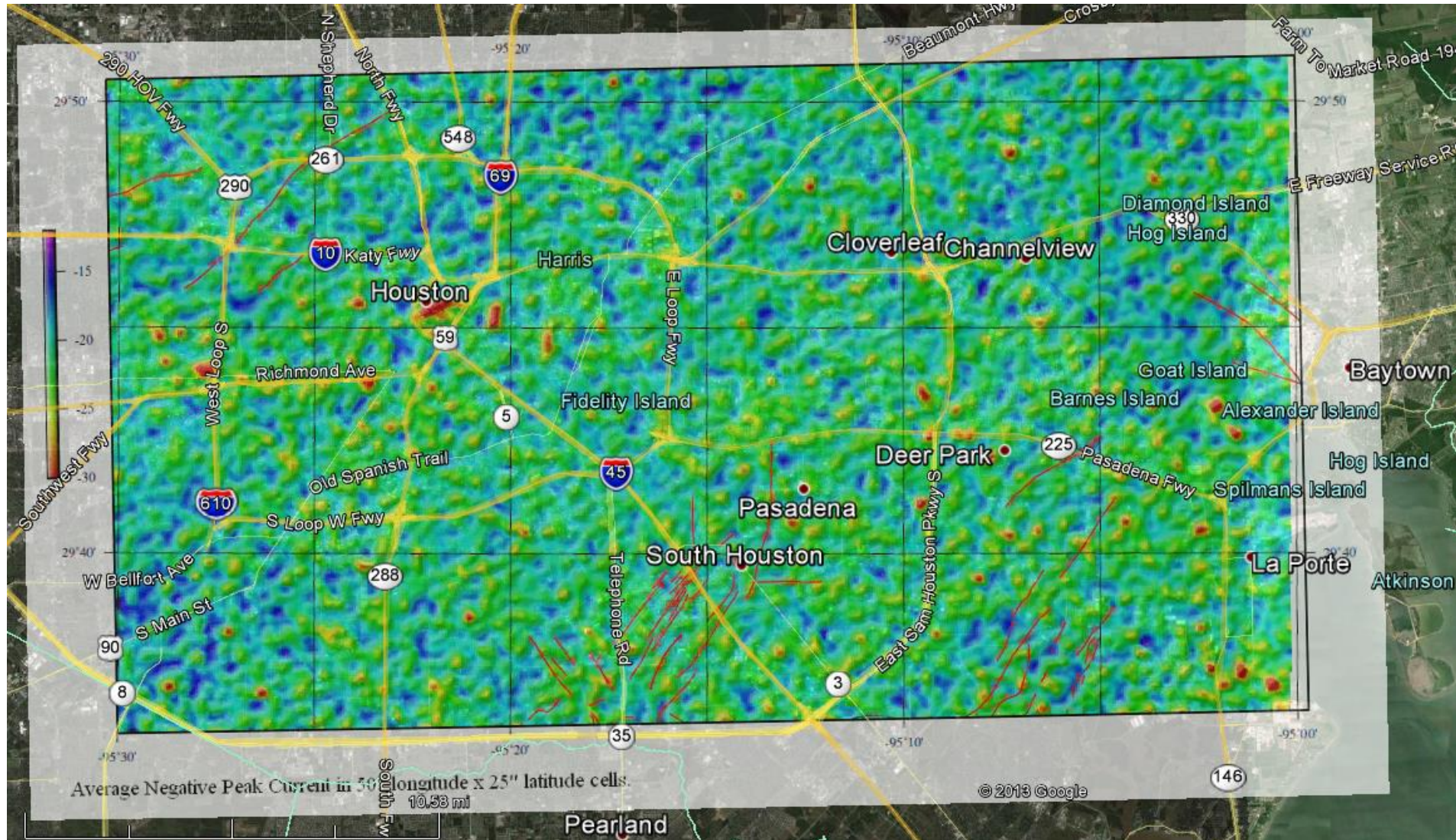


# Houston Area Lightning Analysis



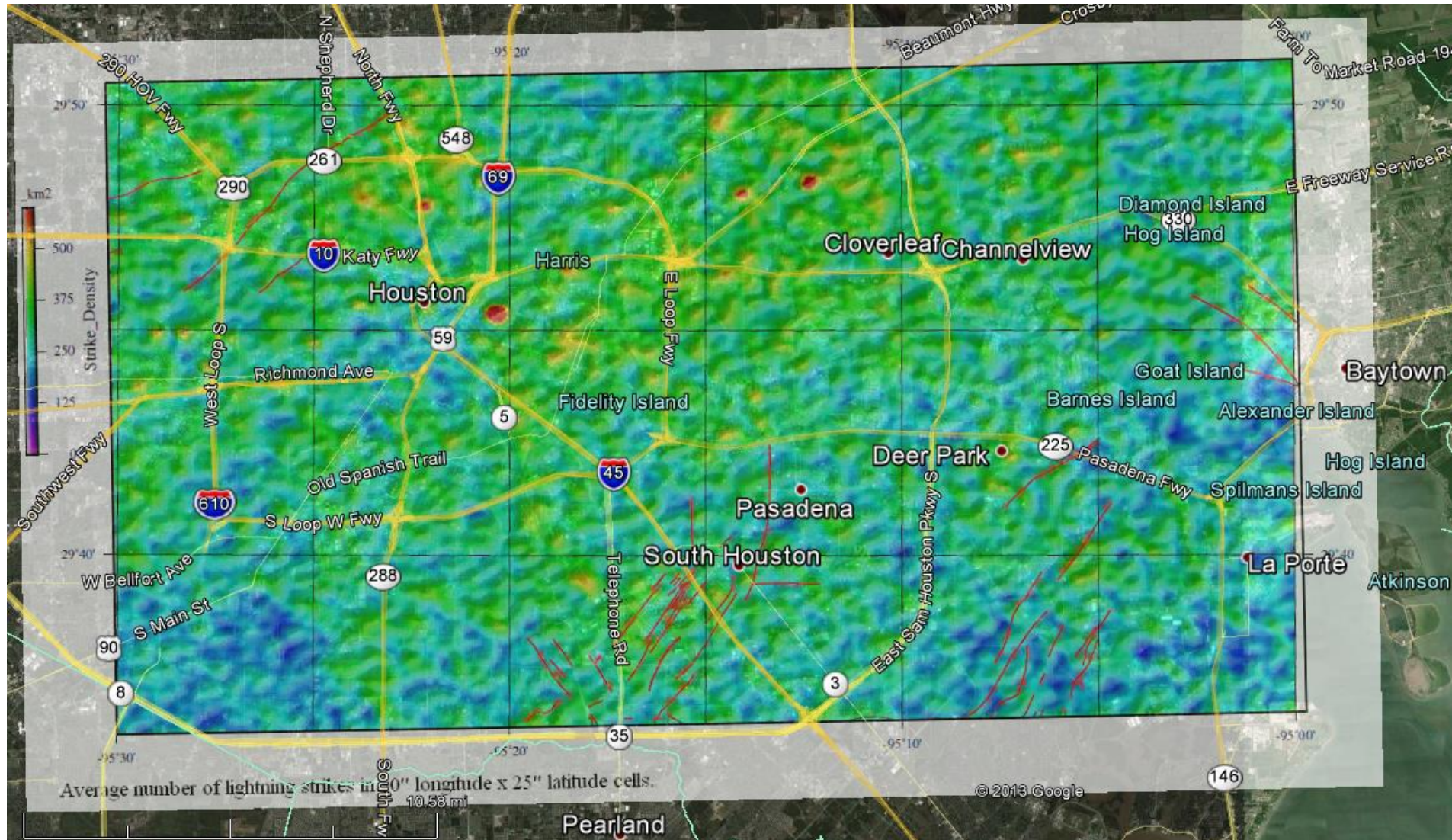


# Average Negative Peak Current, 880 x 500 foot cells



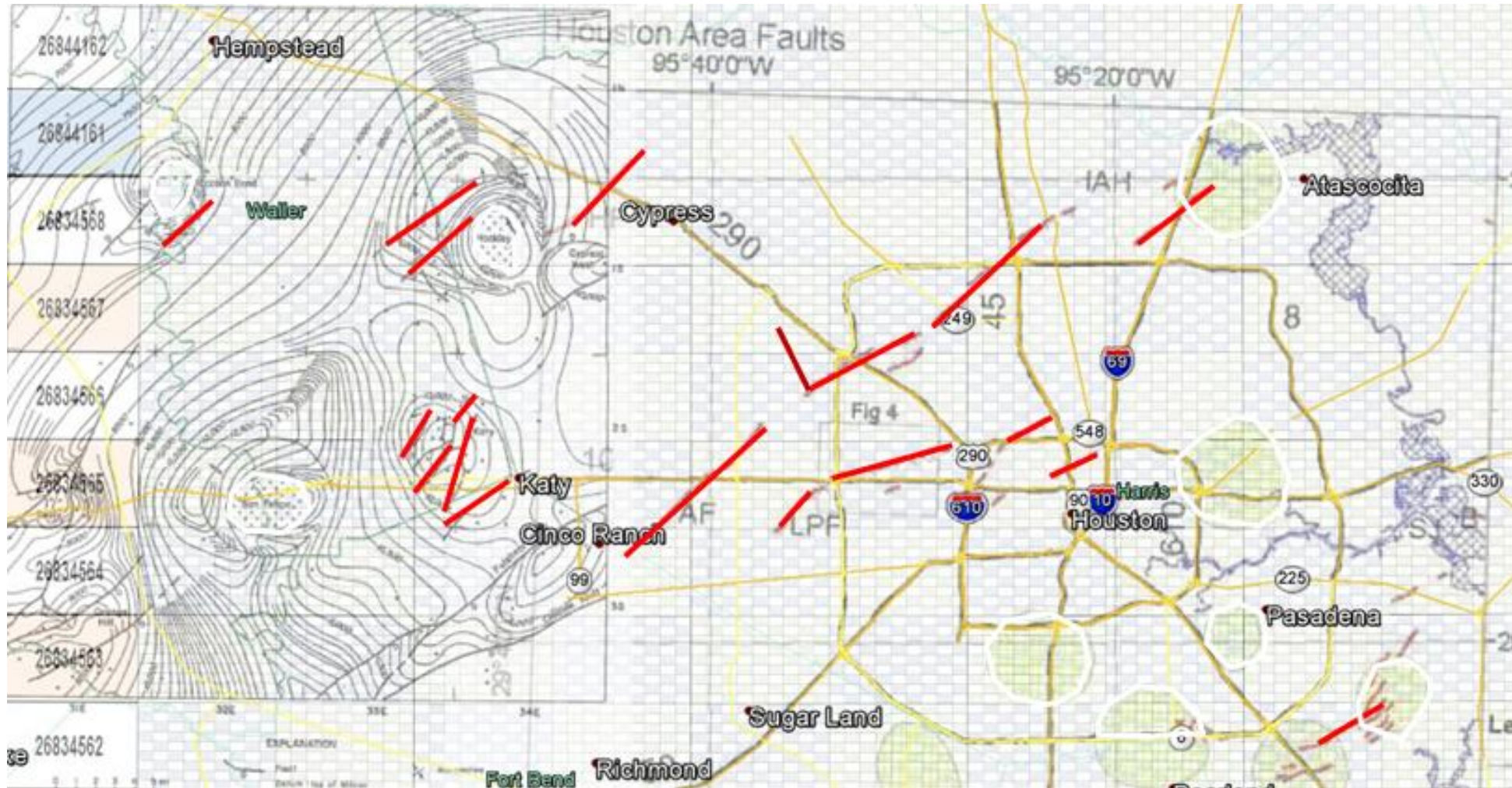


# Average Number of Lightning Strikes, 880 x 500 foot cells



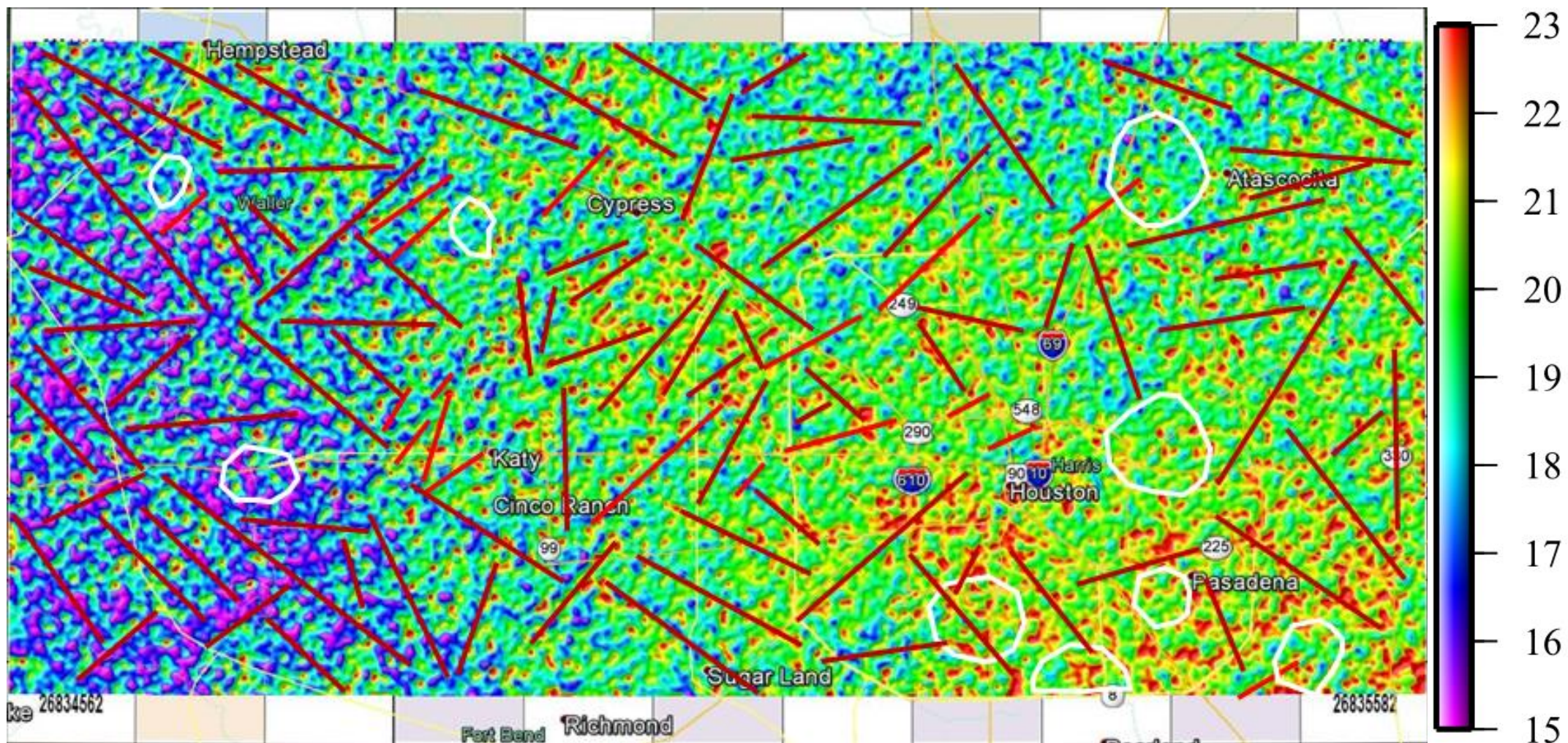


# Salt Domes and Faults in Houston Analysis Area



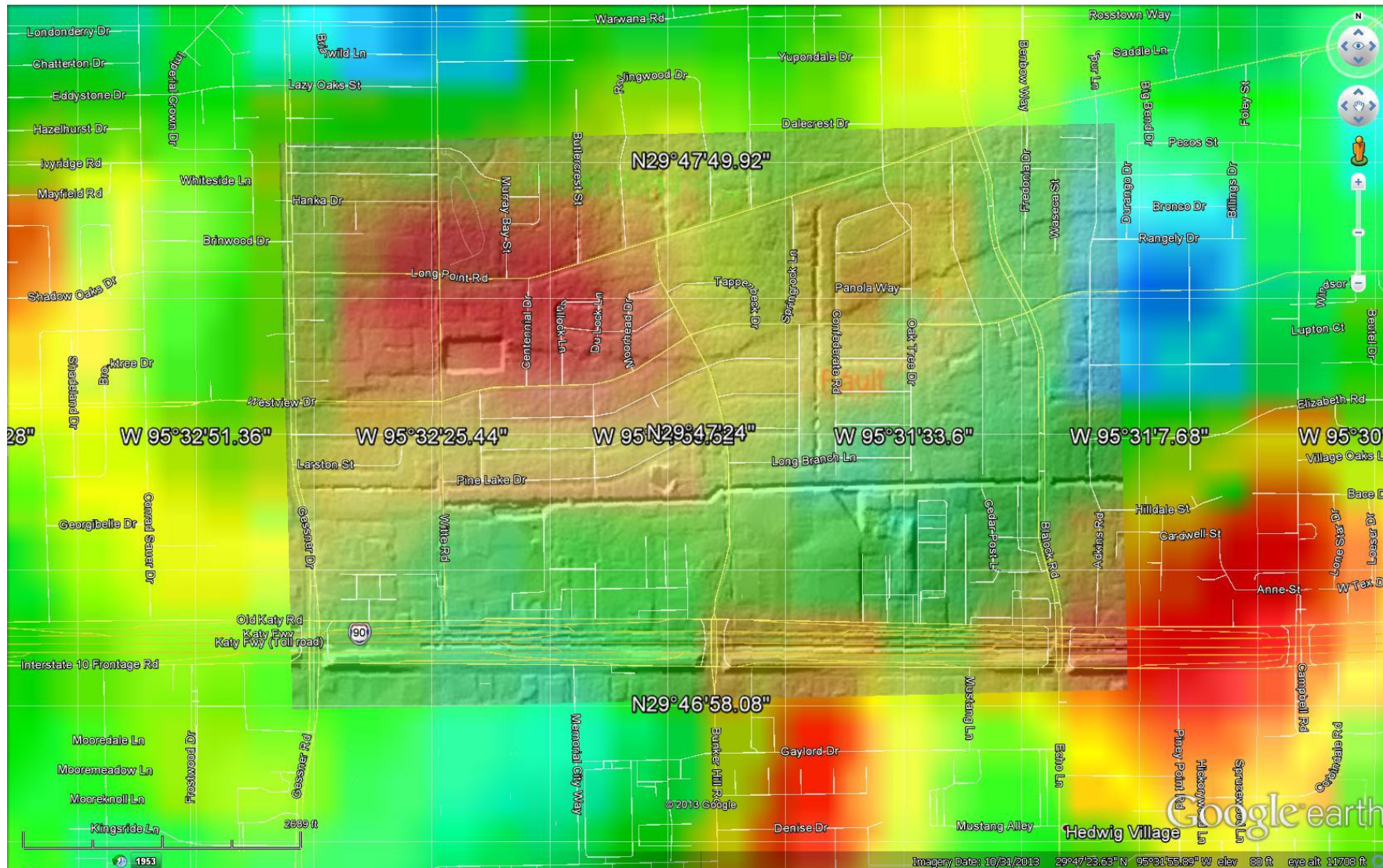


# Peak Current



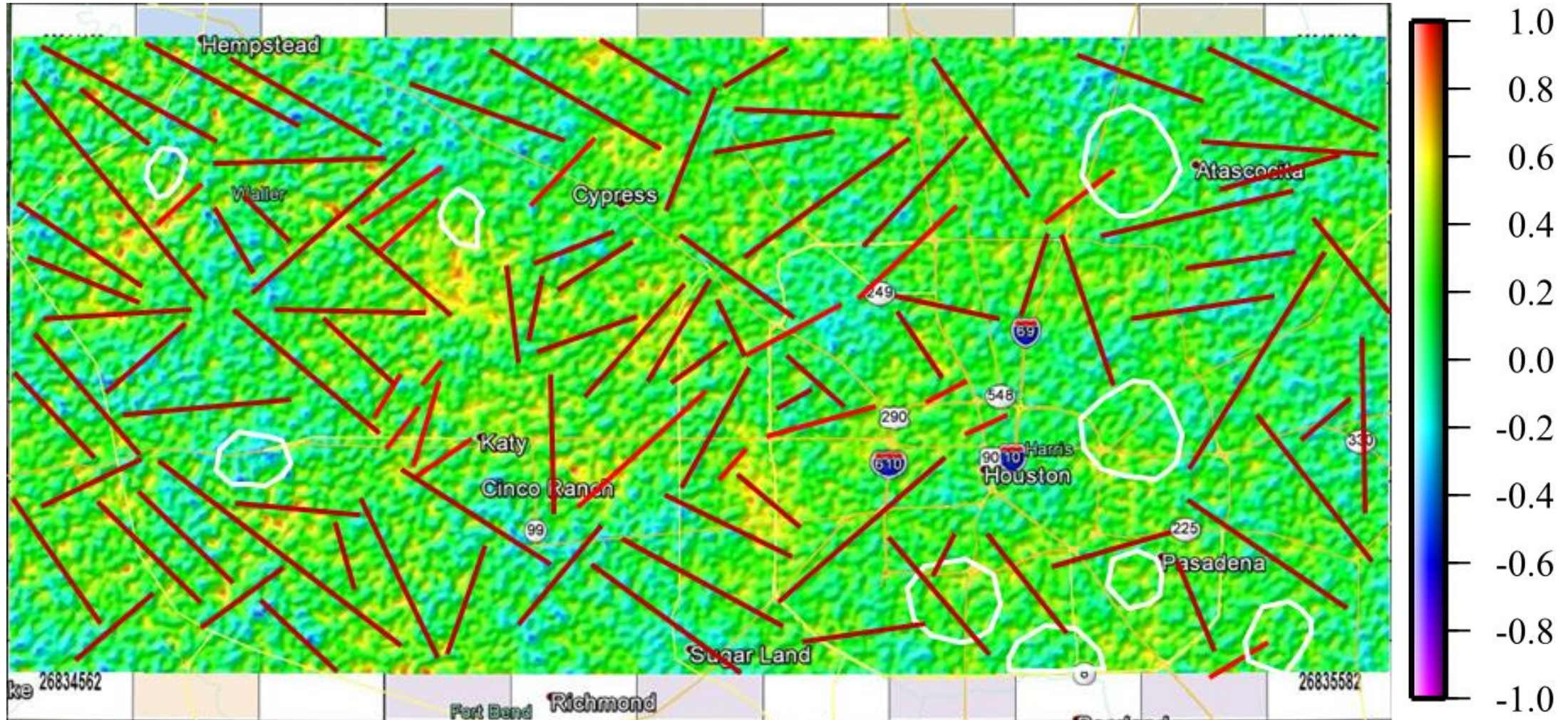


# Peak Current and Long Point Fault on Lidar



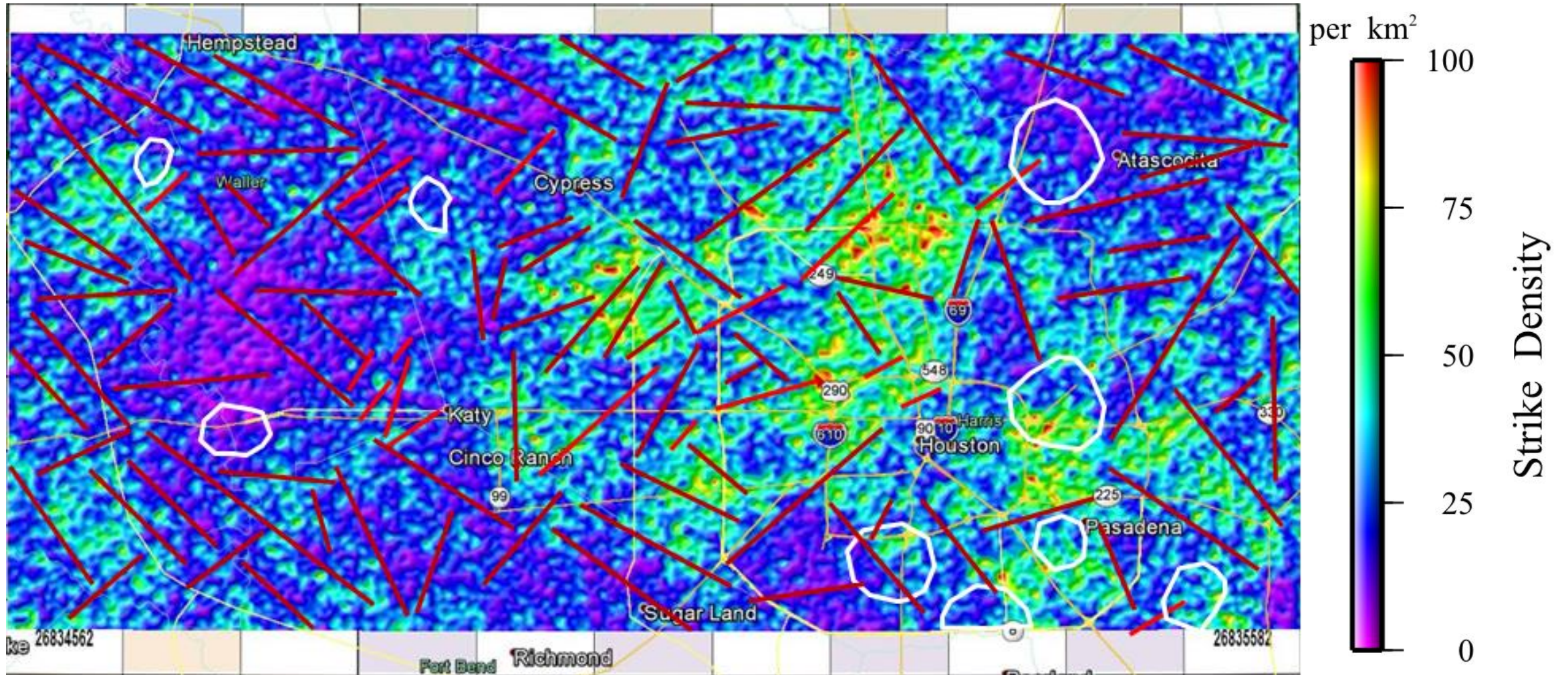


# Tidal Gradient



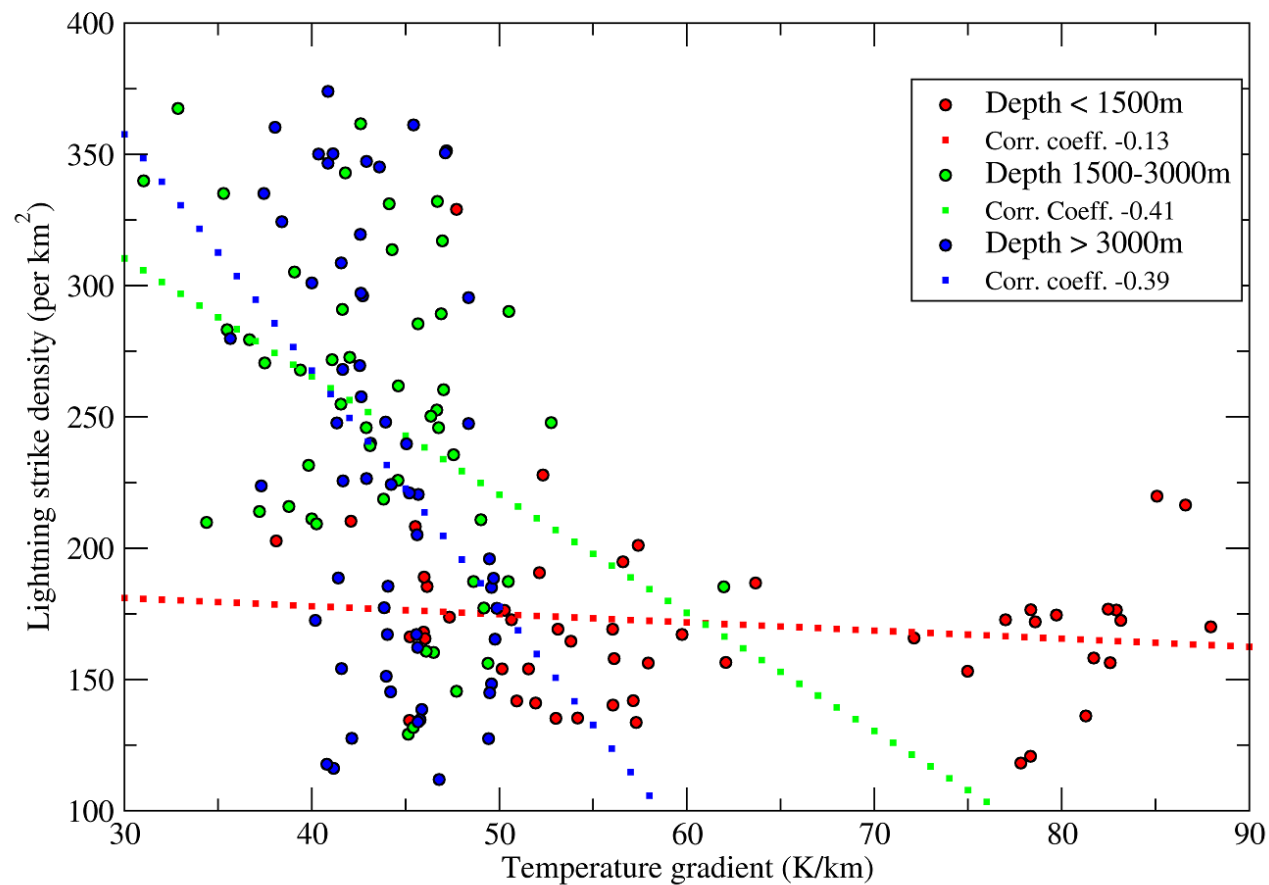
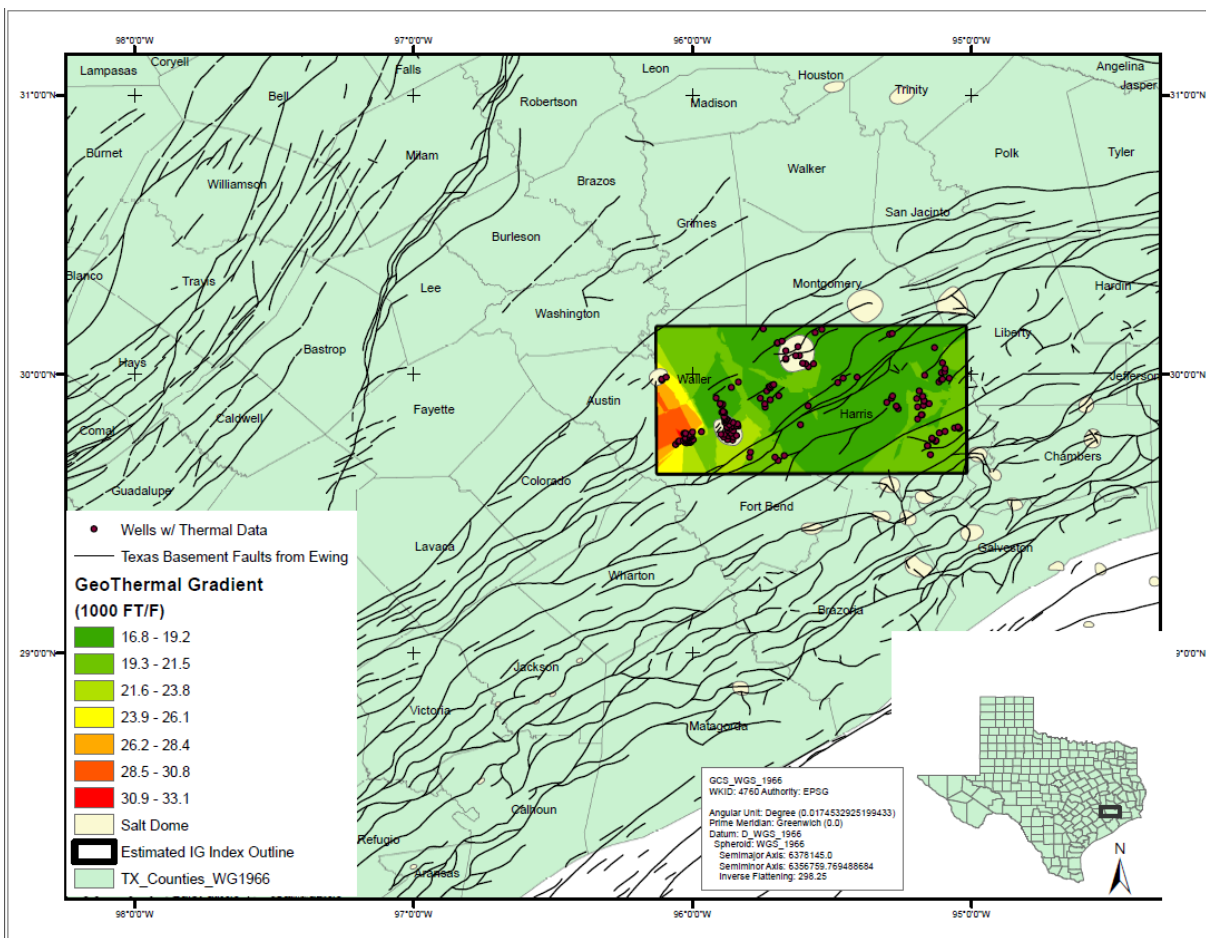


# Density of Tidal Gradient



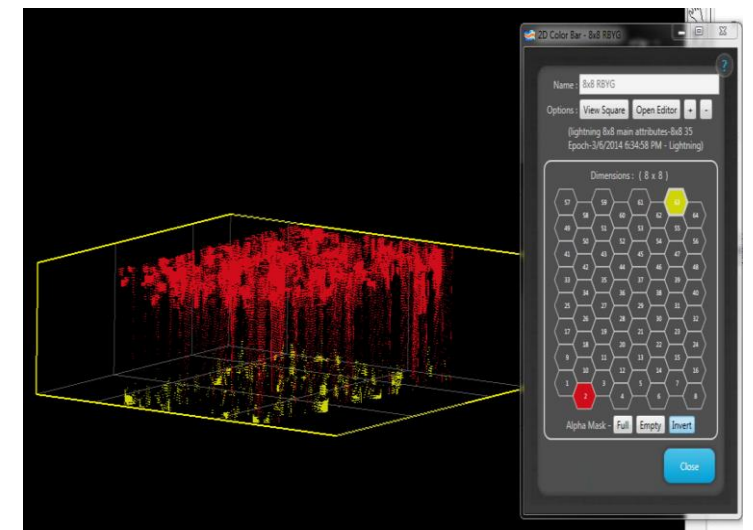
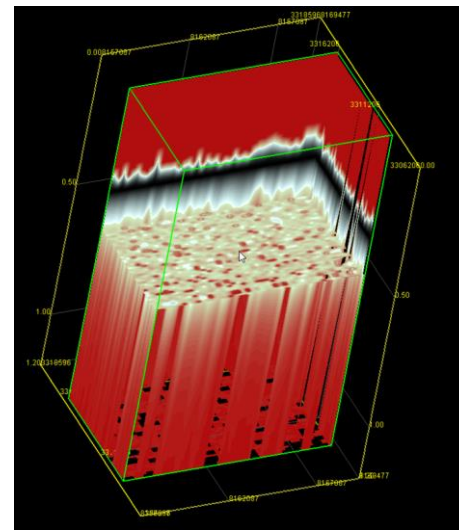
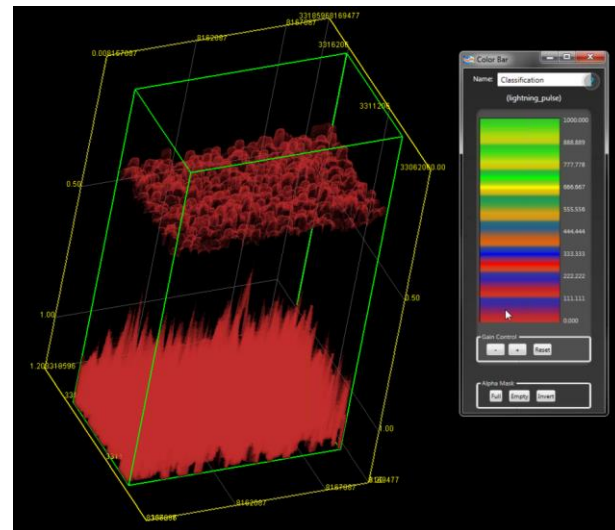
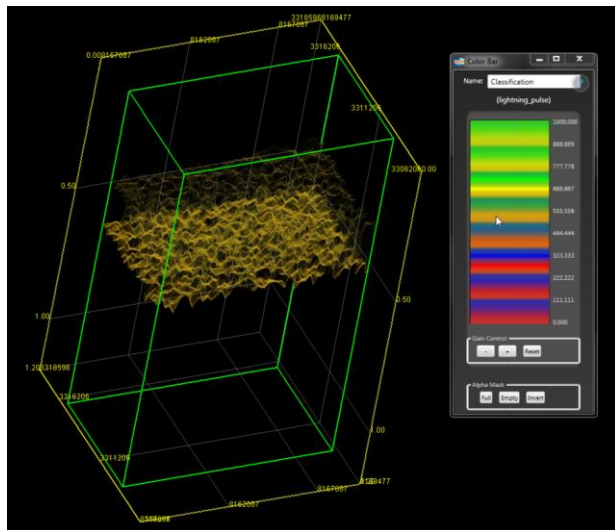
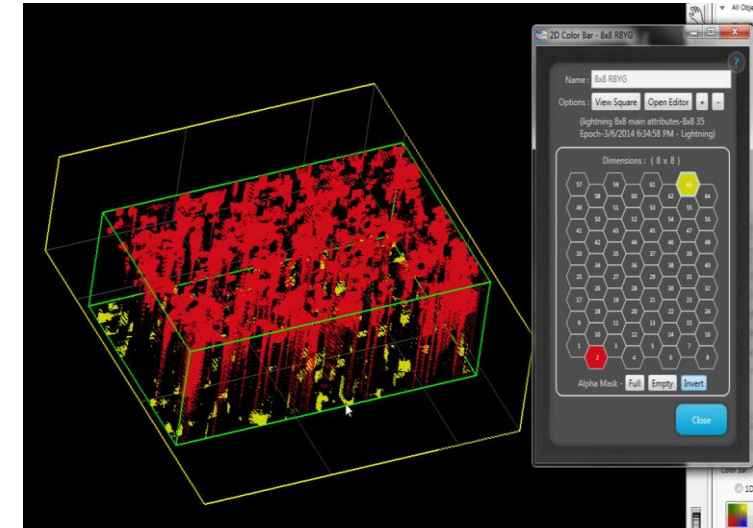
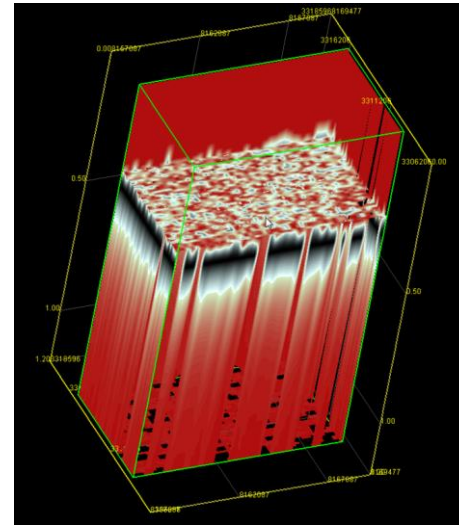
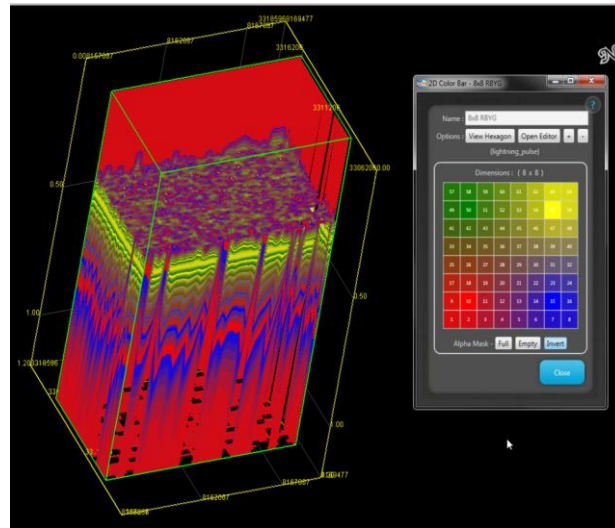
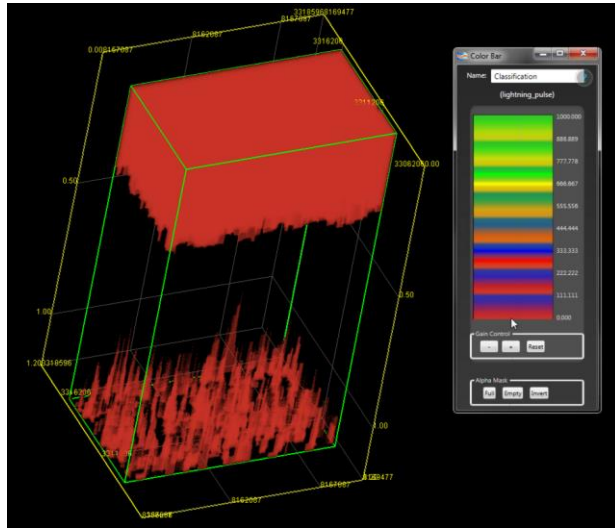


# Integration of Lightning Data with Geothermal Gradient





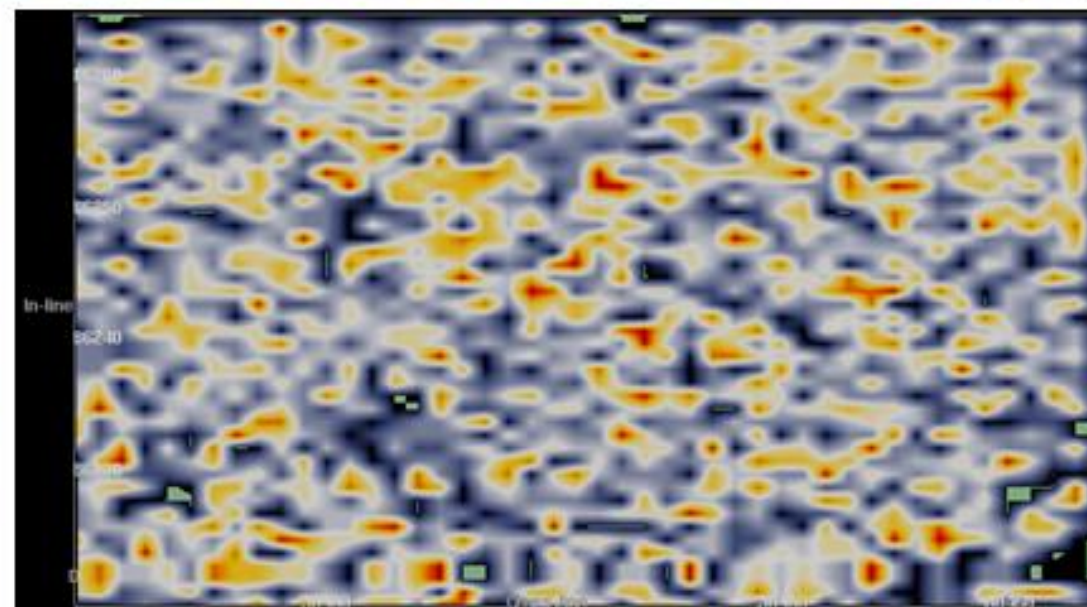
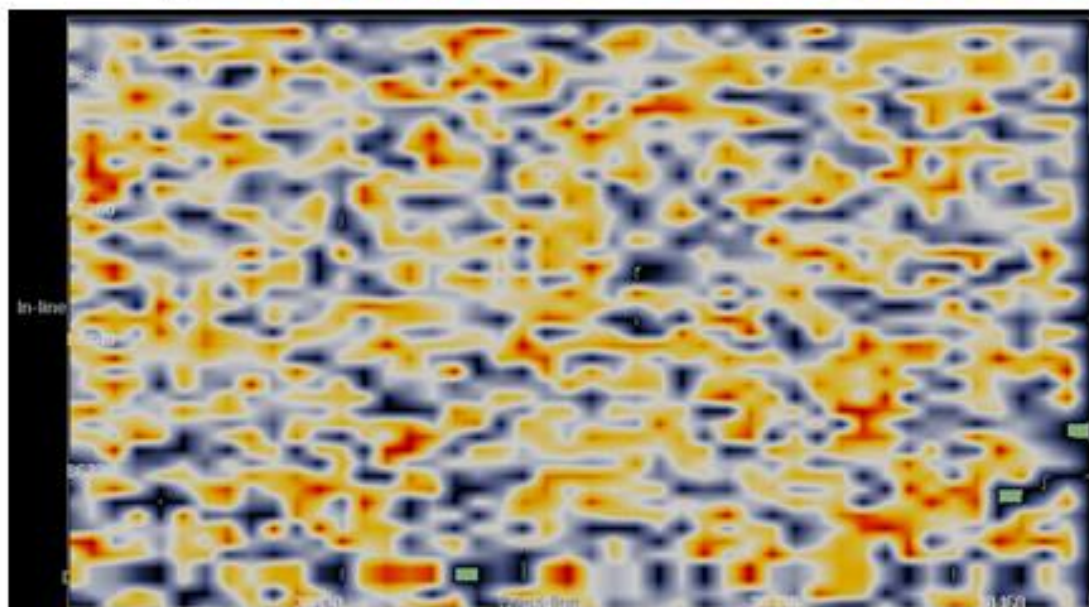
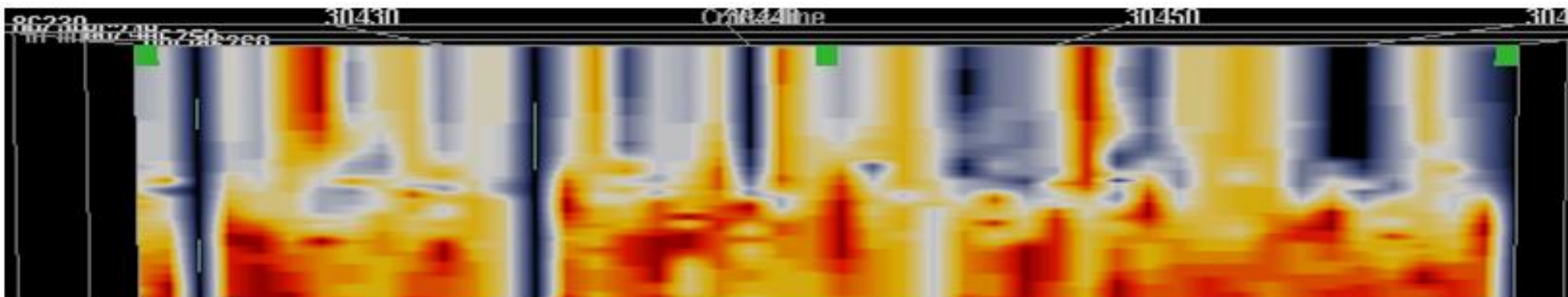
# Looking at new ways to analyze Lightning Data, courtesy Geophysical Insights





# Surface Resistivity and Resistivity Volumes

cumulative  
probability  
distribution





# A New Business Enterprise



## Thank You