Lightning is a meteorological phenomenon. However, lightning strike location and lightning strike attributes appear to be influenced, if not controlled, by geology. The result was the creation of the National Lightning Detection Network (NLDN), and recent advances in measuring ability has opened the door to data mining and mapping millions of lightning strikes. This has shown geology influences strike locations and attributes. When various attributes are mapped from databases from Florida, Louisiana, Michigan, New York, North Dakota, and Texas patterns have been identified. Lightning strike density varies spatially, and these variations are somewhat consistent over time. Key attributes are used to identify geologic features.

**Earth/Telluric Current**

Run along faults, salt domes and other subsurface artifacts. Geomagnetic Hot Zones near the surface are more prone to Cloud-to-Ground Lightning Strikes. The flow of these currents are modified by faults, mineralization, fluids like resistive fresh water or oil or gas or like conductive brines and geothermal waters, and by the conductivity or resistivity of lithology and geology like clays (conductive) and salt (resistive), etc.

**Locations Not Random**

A dozen lightning analyses show lightning strike locations are not random. From this work faults have been mapped, relationships have been made to sediment thickness, possibly we are predicting seeps, maps of anisotropy (fault density and orientation) have the potential to differentiate between ductile and brittle shales in significant new shale resource plays.

**Conclusions**

The physics of lightning discharge are similar to the physics of a neon-tube relaxation oscillator. In each case, voltage builds across a capacitor until an insulating gas ionizes and becomes a conductor. The flow of these currents are modified by faults, mineralization, fluids like resistive fresh water or oil or gas or like conductive brines and geothermal waters, and by the conductivity or resistivity of lithology and geology like clays (conductive) and salt (resistive), etc. Lightning strike density varies spatially, and these variations are somewhat consistent over time. Key attributes are used to identify geologic features.