The Potential Lightning Ignition map spatially integrates the Lightning Ignition Efficiency map with daily cloud to ground (CG) lightning strike data from The Weather Company (TWC). The 24 hour “day” runs from 0000 to 2400Z (1800 MDT).
Potential Lightning Ignition

The current Lightning Ignition Efficiency map calculation has a built-in ratio for positive and negative discharges. The Potential Lightning Ignition map splits the CG strike data and efficiency calculations into separate datasets for positive and negative discharges. Potential ignition values are simply the cells efficiency value multiplied by the number of lightning strikes in the cell. (Sopko, et al 2007) describes the general process. The efficiency algorithms are described by (Latham and Schlieter 1989). Separate polarity based potential ignition values are calculated and then recombined for the total potential ignitions per 1km pixel. Positive discharges yield higher efficiency values and increase the likelihood of an ignition. Under extreme conditions, 2 positive discharges (per pixel) would result in one ignition. Regardless of polarity, more CG strikes per 1km pixel increase the likelihood of a potential ignition. Values of less-than-one fire are possible and occur when a discharge(s) occur in combination with pixels having low efficiency values or when a single discharge occurs in a pixel.

Presently, the rainfall that occurs in conjunction with the lightning-producing cell is not part of the efficiency calculation. The efficiency map is based on the 100 fuel moisture value before the lightning storm. A “dry” lightning map which integrates 1-day estimated rainfall and lightning strike data, is now available under the WFAS “Experimental Products” section.

In general, higher rainfall amounts correspond with higher CG strike rates and clustered potential ignition pixels. Look for isolated pixels that have higher potential ignition values. This is where there’s a greater likelihood of a “dry” lightning strike.
Potential Lightning Ignition

Questions? Contact Paul Sopko, 329-4830, psopko@fs.fed.us

References: