

## ZP11/Jim Smoot/Weekly Notes

6/3/14

### **PAPER ACCEPTED IN MONTHLY WEATHER REVIEW** (email:

[timothy.j.lang@nasa.gov](mailto:timothy.j.lang@nasa.gov) / 256-961-7861): Timothy Lang (ZP11) is second author on an article recently accepted for publication in *Monthly Weather Review*. Titled “Regional, Seasonal, and Diurnal Variations of Cloud-to-Ground Lightning with Large Impulse Charge Moment Changes,” the paper describes the climatological distribution of powerful cloud-to-ground lightning that neutralizes large amounts of cloud electrical charge. Some of these lightning strokes can perturb the upper atmosphere, leading to sprites. In addition, they have a disproportionate effect on the global electric circuit. During summer, positive versions of these special lightning strokes are favored within the northern Great Plains of the United States, while negative versions occur mainly in the southeastern United States. The Southeast also features both polarities during the cold and transition seasons. The spatial and temporal behavior of large charge moment change lightning matches well with previously published research on the behavior of mesoscale convective systems, thereby linking this special lightning to large precipitation systems with extensive electrical charge reservoirs.

### **PARTICIPATION IN IPHEX FIELD CAMPAIGN** (email: [timothy.j.lang@nasa.gov](mailto:timothy.j.lang@nasa.gov) / 256-

961-7861): Timothy Lang (ZP11) served as a Mission Scientist for the NASA Integrated Precipitation and Hydrology Experiment (IPHEX) during 5/23-29/14. IPHEX - a collaboration between NASA, the National Oceanic and Atmospheric Administration (NOAA), and Duke University - is part of the ground validation effort for the recently launched Global Precipitation Measurement (GPM) satellite mission. In particular, IPHEX seeks to utilize high-quality measurements to improve precipitation estimation and flood forecasting in mountainous regions. Two aircraft, the NASA ER-2 (N809NA) and the University of North Dakota Citation (N555DS), are currently supporting IPHEX. Weather was active during Dr. Lang's week, and at least one aircraft flew every day he was a Mission Scientist. He led or assisted on a combined total of 12 science flights between the two aircraft, sampling a variety of meteorological regimes including severe hailstorms, diurnal mountain convection, clear air for instrument calibration, and oceanic cumulus congestus clouds (a side mission to support the future Aerosol-Cloud-Ecosystems satellite).