**Graduate Student Working Group:**

**Investigating precipitation anomalies using multiple site long-term data**

**Location:**

Wednesday, September 2, 2015 1:30-3:30 pm

Ruesch Auditorium-Hobbs

**Organizers:**

J. Aaron Hogan (LUQ), Omar Gutiérrez del Arroyo (LUQ), Fox Peterson (HJA)

**Agenda:**

Introductions: 1:30-1:45 pm

Aaron: 1:45-2:15 pm

Fox: 2:15-2:45 pm

Open discussion: 2:45-3 pm

Data analysis: 3-3:30 pm

**Summary report:**

The attendants of our working group were mainly graduate students (9), along with a data scientist and a PI (Alan Covich), in total representing eight LTER sites, and thus providing a diversity of perspectives to tackle the question at hand: detecting precipitation anomalies in long-term data across the LTER network. After a round of short introductions, our first presenter, J. Aaron Hogan, a graduate student working in the Luquillo LTER, highlighted the importance of studying precipitation anomalies given the unprecedented climate changes were experiencing across the globe (i.e., warming). He then added several examples of statistical analyses using the Luquillo precipitation data that are currently being used to detect and visualize long-term precipitation anomalies, which is not trivial when dealing with relatively short data sets of ~30 years. Importantly, several of the data products presented were useful for visualizing trends of changing precipitation, and the respective codes were shared with the group for application to data from other LTER sites. Following Aaron’s presentation, group discussion revolved around determining meaningful metrics of precipitation anomalies, and then translating the observed changes in climate to both aquatic and terrestrial ecosystem processes. The wide representation of LTER sites stimulated this discussion as individual experiences were shared providing real-world examples of ongoing changes in precipitation patterns and their impacts of multiple ecosystem processes, ranging from species distributions to carbon and nutrient cycling.

After the group discussion, Fox Peterson, a data scientist in the HJ Andrews LTER, continued with her presentation on methods of quality assurance and quality control for long-term automated precipitation data. Her ample experience as a data scientist allowed her to construct a state machine that “cleans up” precipitation data from the HJA LTER, giving them confidence on the subsequent analyses they perform to detect any anomalies related to regional or global climate change. Fox’s presentation further stimulated group discussion regarding the most reasonable and informative sampling frequency for precipitation data, which can range from every 15 minutes at HJ Andrews to daily measurements at Luquillo (we agreed hourly intervals should be the norm).

Overall, our working group was successful in bringing together a diverse group of scientists interested in improving our capacity to detect precipitation anomalies across the LTER network. Our discussions were productive and may lead to further collaborations among graduate students from the North Temperate Lakes, Santa Barbara Coastal, and Luquillo LTERs, who are all interested in employing statistical methods to detect significant anomalies using their local, long-term precipitation records.