Poster #7

Characterization and Partitioning of CH_4 and CO_2 Eddy Flux Data Measured Near Utqiaġvik, Alaska

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Arctic regions are currently the most vulnerable ecosystems under our changing climate. Since the advancement in Eddy Covariance measurements, the number of sites in these high latitudes measuring greenhouse gases and energy (CO_2, CH_4 and H_2O), is steadily increasing with new sites being established each year. These valuable data are not only important for annual carbon budget calculations, but also vital to the modeling community in improving their predictions on emission rates and trends.

CH_4 flux measurements are not as straightforward as CO_2 measurements where drivers are known, or as predictable or as easily interpretable as CO_2 fluxes. Understanding CH_4 emission patterns are often challenging. Contributing to these challenges is the limited number of ancillary measurements carried out at many sites and the lack of standardized data processing, QA/QC and gap-filling procedures. As CH_4 flux fluctuations are spatially and temporally diverse, and in many cases event-based, a better understanding or interpretation of results is required. An improvement in understanding also increases the reliability of models, predictions and gap-filling methods, as annual greenhouse gas budgets rely on high quality data.

CO_2, CH_4 and energy flux measurements are ongoing at the NGEE Arctic/AmeriFlux US-NGB site, established in 2012 on the Arctic coastal plain near Utqiaġvik (formerly known as Barrow), Alaska. The site, characterized as polygon tundra with underlying continuous permafrost, shows a high degree of inter-annual and seasonal variability in CH_4 fluxes. In order to interpret this variability, we apply a variety of models, such as footprint characterization, generalized additive models, as well as artificial neural networks, in an attempt to decipher these diverse fluxes, patterns and events.