Geophysical Research Abstracts
Vol. 19, EGU2017-11494, 2017
EGU General Assembly 2017

Drying-induced consolidation, organic matter decomposition, and restructuring of soil aggregates

Asmeret Asefaw Berhe, Chelsea Arnold, and Teamrat A. Ghezzehei
University of California, Merced, United States (aaberhe@ucmerced.edu)

While peatlands are garnering much attention for their greenhouse gas feedback potential in a warming climate, the coupled biogeochemical and hydrological impact of structural and physical changes in these types of systems as a result of drought-induced drying and desiccation has not been studied in detail. The cyclic drawdown/recharge of the water table that exists in most peatland systems impose important controls on organic matter storage and decomposition as well as soil physical properties. In order to better understand how high elevation peatlands will respond to increasingly dry years, we incubated meadow soils collected along a hydrologic gradient at 5 different water potentials and measured the CO_2 flux at intervals for over one year to determine how desiccation of meadow soils (from the Harvey Monroe Hall Research Natural Area at the crest of the Sierra Nevada) influences gaseous fluxes of C, as well as aggregation of the organic-rich soils and distribution of the soil C in different physical pools (macro- vs. micro-aggregate, and silt+ clay fractions). We found that the cumulative carbon mineralization was greatest at the highest (0.1 bar) and lowest (4 bar) water potential, across all regions of the meadow, indicating the presence of two separate pools of labile carbon that can be accessed only after a threshold of drying is reached in the soil. We also observe important changes associated with aggregate size distributions and fraction of total carbon distributed in three distinct pools.