Geophysical Research Abstracts
Vol. 18, EGU2016-5002, 2016
EGU General Assembly 2016

Assessing the temperature sensitivity of soil carbon decomposition along a geo-climatic gradient in Chile

Sebastian Doetterl (1,3), Cristina Munoz (2), Pascal Boeckx (1), and Erick Zagal Venegas (2)

(1) ISOFYS – Isotope Bioscience Laboratory, Ghent University, Gent, Belgium (sebastian.doetterl@ugent.be), (2) Department of Soils and Natural Resources, Universidad de Concepción, Chillan, Chile, (3) Institute of Geography, Augsburg University, Augsburg, Germany

Grasslands are recognized for having a high C sequestration potential and to play an important role in the development of sustainable agriculture in a warming world. Soil organic carbon (SOC) decomposition, and the resultant CO_2 emissions, can have a significant impact on atmospheric CO_2 levels. However, at a global scale, the temperature sensitivity of C decomposition is not addressed spatially explicit and, hence, introduces large uncertainty into global assessments of future C release from soils. Furthermore, temperature sensitivity is not only a question of climatic and biochemical recalcitrance of SOC, but also crucially dependent on the soil environment in which decomposition takes place. Hence, it is crucial to study SOC decomposition across a large variety of environmental conditions in order to improve the prediction of long-term impacts of global warming on SOC storage.

Chile provides one of the best natural laboratories in the world to assess the links between soils, climate and carbon dynamics as both climate and mineralogical parameters show large variability. Here, we show the first results from a one-year temperature sensitive incubation study on soil samples from 37 grassland sites across a 4000km North-South gradient in Chile. Incubation was performed at 5 different temperature levels and we analyze the variability of temperature sensitivity of decomposition in relation to C input quality, soil geochemistry and climatic conditions at the sampling sites.