Data from: Legacy effects of land use on soil nitrous oxide emissions in annual crop and perennial grassland ecosystems

Abraha M, Gelfand I, Hamilton SK, Chen J, Robertson GP

Date Published: April 11, 2018

DOI: https://doi.org/10.5061/dryad.17g36j4

Files in this package

Title	**Land use legacy effects on N2O emissions**
Downloaded	9 times
Description	All data presented is collected at the Great Lakes Bioenergy Research Center (GLBRC) Scale-up Experiment of the Michigan State University Kellogg Biological Station (KBS) Long-Term Ecological Research site. The file describes short-term carbon mineralization rates (0-10 cm; 2009 and 2014), and annual and cumulative soil nitrous oxide (N2O-N) fluxes (2010 through 2014) for no-till continuous corn, switchgrass and restored prairie systems. Fields were converted from Conservation Reserve program (CRP) grasslands and/or conventionally tilled corn-soybean rotation row croplands (AGR). Emission factors for direct N2O-N emissions for fertilized systems (corn and switchgrass) are also presented. See associated 'Read me' file for more information.
Download	abraha_2018_ecoapp_legacy_effects.xlsx (19.03 Kb)
Download	README.docx (20.21 Kb)
Details	View File Details

When using this data, please cite the original publication:

> Abraha M, Gelfand I, Hamilton SK, Chen J, Robertson GP (2018) Legacy effects of land use on soil nitrous oxide emissions in annual crop and perennial grassland ecosystems. Ecological Applications, online in advance of print. https://doi.org/10.1002/eap.1745

Additionally, please cite the Dryad data package:

> Abraha M, Gelfand I, Hamilton SK, Chen J, Robertson GP (2018) Data from: Legacy effects of land use on soil nitrous oxide emissions in annual crop and perennial grassland ecosystems. Dryad Digital Repository. https://doi.org/10.5061/dryad.17g36j4

Cite | Share

Download the data package citation in the following formats:

RIS *(compatible with EndNote, Reference Manager, ProCite, RefWorks)*

BibTex *(compatible with BibDesk, LaTeX)*

Pageviews 31

Abstract

Land use conversions into and out of agriculture may influence soil-atmosphere greenhouse gas fluxes for many years. We tested the legacy effects of land use on cumulative soil nitrous oxide (N2O) fluxes for five years following conversion of 22 year-old Conservation Reserve Program (CRP) grasslands and conventionally tilled agricultural fields (AGR) to continuous no-till corn, switchgrass, and restored prairie. An unconverted CRP field served as a reference. We assessed the labile soil C pool of the upper 10 cm in 2009 (the conversion year) and in 2014 using short-term soil incubations. We also measured in situ soil N2O fluxes biweekly from 2009 through 2014 using static chambers except when soils were frozen. The labile C pool was ~2-fold higher in soils previously in CRP than in those formerly in tilled cropland. Five-year cumulative soil N2O emissions were ~3-fold higher in the corn system on former CRP than on former cropland despite similar fertilization rates (~184 kg N ha-1 yr-1). The lower cumulative emissions from corn on former cropland were similar to emissions from switchgrass that was fertilized less (~57 kg N ha-1 yr-1), regardless of former land use, and lowest emissions were observed from the unfertilized restored prairie and reference systems. Findings support the hypothesis that soil labile carbon levels modulate the response of soil N2O emissions to nitrogen inputs, with soils higher in labile carbon but otherwise similar – in this case reflecting land use history – responding more strongly to added nitrogen.

Show Full Metadata