This readme file was generated on 2024-03-28 and updated on 2024-09-13 by Marcus Klaus and provides a list and description of each file included in the dataset.

DATASET GENERAL INFORMATION

Title of dataset: Tree stem-atmosphere greenhouse gas fluxes in a boreal riparian forest

Creator(s)/Primary investigator(s):

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Persistent identifier of dataset: https://doi.org/10.5878/9jqq-s279

Related publication for description of project, methods etc:

Klaus, M., Öquist, M. and Macháčová, K. (2024). Tree stem-atmosphere greenhouse gas fluxes in a boreal riparian forest. *Science of the Total Environment*. https://doi.org/10.1016/j.scitotenv.2024.176243.

FILE OVERVIEW

Data_CO2_CH4_flux.tsv

Time series of stem and forest floor fluxes of carbon dioxide and methane in 28 trees and 12 forest floor plots.

Data_CO2_CH4_N2O_soil.tsv

Time series of soil partial pressures of carbon dioxide, methane and nitrous oxide at 24 sampling sites.

Data_Tg_WL.tsv

Time series of groundwater temperature and groundwater level, as a mean and standard deviation over four sampling sites.

Data_SnowDepth.tsv

Time series of snow depth at 12 sampling sites.

Data_SoilSamplingDepth.tsv

Depths at which soil gases were sampled and piezometers had the water intake.

Data_Sites.tsv

Background information on study sites, including geographic coordinates, tree height, stem diameter etc.

Data_TreeFlux_N2O.tsv

Time series of stem and forest floor fluxes of nitrous oxide in 28 trees.

Data_ForestFloorFlux_N2O.tsv

Time series of stem and forest floor fluxes of nitrous oxide in 12 forest floor plots.

Relationship between files

Site – IDs used in the different files are explained in Data_Sites.tsv

Relationship to other data not included in this dataset

None

DATA-SPECIFIC INFORMATION FOR Data_CO2_CH4_flux.tsv

License: CC0

Number of columns/variables: 9

Number of rows/cases: 2207

Explanation of missing/empty data: NA

Variable list:

Variable name	**Explanation**	**Unit / levels**
"Date"	Sampling date	YYYY-MM-DD
“Time”	Sampling time (start of the chamber closure)	hh:mm:ss
"Site"	Sampling site; for details on sites, see Data_Sites.tsv	
"Gas"	Gas	“CO2” = carbon dioxide ”CH4” = methane
“R2”	Coefficient of determination of linear regression of gas concentration against time	unitless
“T”	Temperature of sampling air	°C
"Flux"	Tree stem – atmosphere gas flux	µmol/m2/s
"MDF"	Minimum detectable gas flux	µmol/m2/s
"Shading"	Opacity of the flux chamber	“dark” = light excluded, “light” = ambient light

DATA-SPECIFIC INFORMATION FOR Data_CO2_CH4_N2O_soil.tsv

License: CC0

Number of columns/variables: 5

Number of rows/cases: 513

Explanation of missing/empty data: NA

Variable list:

Variable name	Explanation	Unit / levels
"Date"	Sampling date	YYYY-MM-DD
"Site"	Sampling site; for details on sites, see Data_Sites.tsv	
"pCO2"	Carbon dioxide partial pressure in soil	ppm
"pCH4"	Methane partial pressure in soil	ppm
"pN2O"	Nitrous oxide partial pressure in soil	ppb

DATA-SPECIFIC INFORMATION FOR Data_Tg_WL.tsv

License: CC0

Number of columns/variables: 6

Number of rows/cases: 17856

Explanation of missing/empty data: NA

Variable list:

Variable name	Explanation	Unit / levels
"Date"	Sampling date	YYYY-MM-DD
"Time"	Sampling time	hh:mm:ss
"Tg_mean"	Groundwater temperature; arithmetic mean among four wells	°C
"Tg_sd"	Groundwater temperature; standard deviation among four wells	°C
"WL_mean"	Depth to groundwater table; arithmetic mean among four wells	m
"WL_sd"	Depth to groundwater table; standard deviation among four wells	m

DATA-SPECIFIC INFORMATION FOR Data_SnowDepth.tsv

License: CC0

Number of columns/variables: 3

Number of rows/cases: 553

Explanation of missing/empty data: NA

Variable list:

Variable name	**Explanation**	**Unit / levels**
"Site"	Sampling Site; for details on sites, see Data_Sites.tsv and Data_SoilSamplingDepth.tsv	
"Date"	Sampling date	YYYY-MM-DD
"SnowDepth"	Snow depth	cm

DATA-SPECIFIC INFORMATION FOR Data_SoilSamplingDepth.tsv

License: CC0

Number of columns/variables: 4

Number of rows/cases: 25

Explanation of missing/empty data: NA

Variable list:

Variable name	**Explanation**	**Unit / levels**
“Site”	Sampling Site	
“DepthSoilGasProbe”	Depth of the soil gas probe	cm
“DepthPiezometerLower”	Depth of the lower boundary of the piezometer screening	cm
“DepthPiezometerUpper”	Depth of the upper boundary of the piezometer screening	cm

DATA-SPECIFIC INFORMATION FOR Data_Sites.tsv

License: CC0

Number of columns/variables: 9

Number of rows/cases: 61

Explanation of missing/empty data: NA

Variable list:

Variable name	**Explanation**	**Unit / levels**
“System”	Study system	Tree, Soil, Groundwater
“Instrumentation”	Instrumentation	Flux chamber Piezometer/soilgasprobe
“Site”	Sampling Site	
“HeightAboveGround”	Height of the flux chamber above the forest floor	cm
“DistanceToStream”	Distance to the stream	cm
“Lat”	Latitude	°
“Lon”	Longitude	°
“Height”	Tree height	m
“dbh”	Tree stem diameter at breast height	cm

DATA-SPECIFIC INFORMATION FOR Data_TreeFlux_N2O.tsv

License: CC0

Number of columns/variables: 7

Number of rows/cases: 109

Explanation of missing/empty data: NA

Variable list:

Variable name	Explanation	Unit / levels
"Date"	Sampling date	YYYY-MM-DD
"Time"	Sampling time	hh:mm:ss
"Site"	Sampling site; for details on sites, see Data_Sites.tsv	
"nN2O"	Number of gas samples used for nitrous oxide flux calculation	unitless
"r2N2O"	Coefficient of determination of linear regression of nitrous oxide concentration against time	unitless
"FN2O"	Tree stem – atmosphere nitrous oxide flux	nmol/m2/s
"MDFN2O"	Minimum detectable nitrous oxide flux	nmol/m2/s

DATA-SPECIFIC INFORMATION FOR Data_ForestFloorFlux_N2O.tsv

License: CC0

Number of columns/variables: 7

Number of rows/cases: 37

Explanation of missing/empty data: NA

Variable list:

Variable name	Explanation	Unit / levels
"Date"	Sampling date	YYYY-MM-DD
"Time"	Sampling time	hh:mm:ss
"Site"	Sampling site; for details on sites, see Data_Sites.tsv	
"nN2O"	Number of gas samples used for nitrous oxide flux calculation	unitless
"r2N2O"	Coefficient of determination of linear regression of nitrous oxide concentration against time	unitless
"FN2O"	Forest floor – atmosphere nitrous oxide flux	nmol/m2/s
"MDFN2O"	Minimum detectable nitrous oxide flux	nmol/m2/s