The following dataset is the primary dataset collected from various streams and rivers in the Cannon River Watershed (CRW) in southern Minnesota. Additional data were collected from Minnesota and Mississippi rivers which are outside the CRW. The data mainly includes dissolved gas, gas transfer velocity, and water parameters and represents a spot measurement (not continuously) at each site across different seasons in 2019. Based on this dataset, the following manuscript is drafted.

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| **Land use and stream order control methane and carbon dioxide emissions in an agricultural river network**  |
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| Any question related to the dataset can be forwarded to: |
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Data file header description

Each row in the data represents the information (measured or calculated) for each stream/river site. Each site is given a unique site ID based on the name of the higher stream order that the stream is part of. For eg., VER refers to the vermillion river network (the highest stream order in the network is 5 and is Vermillion river). In this study, vermillion order 1 and 2 streams were sampled, so their label would be VER 1 and VER 2.

column 1 = site\_id refers to site label assigned to each unique stream/river sampling point

column 2 = sam\_date is the day of sampling (mm/dd/yyy)

column 3 = geolocation of the site (latitude)

column 4 = geolocation of the site (longitude)

column 5 = Strahler stream order (Based on the classification determined by MN DNR, [Stream Routes with Strahler Stream Order - Resources - Minnesota Geospatial Commons (mn.gov)](https://gisdata.mn.gov/dataset/water-strahler-stream-order))

column 6 = measured dissolved gas concentration of CH4 using headspace method (umoleL-1)

column 7 = measured dissolved gas concentration of CO2 using headspace method (umoleL-1)

column 8 = measured dissolved gas concentration of N2O using headspace method (umoleL-1)

column 9 = measured gas transfer velocity (k) for CH4 (ms-1)

column 10 = measured gas transfer velocity (k) for CO2 (ms-1)

column 11 = calculated CH4 flux using measured dissolved concentration and gas transfer velocity (nmole m-2 s-1)

column 12 = calculated CO2 flux using measured dissolved concentration and gas transfer velocity (umole m-2 s-1)

column 13 = measured water temperature (deg C)

column 14 = measured water conductivity (ug\_cm)

column 15 = measured water Nitrate (NO3) (mgL-1)

column 16 = measured water Ammonium (NH4) (mgL-1)

column 17 = measured water dissolved organic carbon (DOC) (mgL-1)

column 18 = measured water dissolved oxygen (DO) (%)

column 19 = measured water dissolved oxygen (DO) (mgL-1)

column 20 = measured water pH

column 21 = ambient temperature (deg C)

Data are provided in CSV (Comma Separated Values) format.

NaN indicates either missing data or flagged data due to problems with detection.