FigShare Dataset Name: **1999 GCReW CO2xCommunity Experiment Root Biomass**

The dataset is composed of 2 files.

1. **1999 GCReW CO2xCommunity Experiment Root Biomass Assembled**
2. **Read Me**

**Information on column headings / variables:**

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| **Description of the Dataset** | |
| 1. Name | Pat Megonigal |
| 2. Dataset File Name | 1999 CO2xComm Root Biomass Data Assembled.csv |
| 3. Dataset Version | Version 1 |
| 4. Lead Investigators | Megonigal, Patrick; Drake, Bert |
| 5. Other Investigators | Kristin Fitzgerald; Gary Peresta |
| 6. Contact | Megonigal, Patrick. Email: megonigalp@si.edu, Tel: 443-482-2346 |
| 7. Start Date | 1999 |
| 8. End Date | 1999 |
| 9. Location | 38.874214°N, -76.549571°W; Smithsonian Global Change Research Wetland, Smithsonian Environmental Research Center, Edgewater, MD 21037. Known traditionally as Kirkpatrick Marsh. Adjacent to the Rhode River. |
| 10. Taxa | C3 sedge *Scirpus olneyi* (A.) Gray; the C4 grass *Spartina patens* (Aiton) Muhl.; and the C4 grass *Distichlis spicata* (L.) Greene. Other species include *Atriplex patula*, *Iva frutescens*, *Kosteletskya virginica*, *Lythrum lineare*, and *Polygonum hydropiper*. |
| 11. Keywords | global change, elevated CO2, open-top chamber, saltmarsh, long-term experiment, *Schoenoplectus*, *Spartina*, *Distichlis*, climate change experiments, roots, rhizomes |
| 12. Abstract | **Abstract**  Belowground biomass for 20 of the 45 experiment plots in the "CO2xCommunity" experiment taken in August 1999. Samples were taken after 13 years of continuous CO2 treatment. Two soil cores were taken from each ambient CO2 and elevated CO2 plot in two of three plant communities, the C3 and C4 communities. The cores were 5.1 cm in diameter and 100 cm in length. They were extracted with a piston corer in three sections at target intervals of 0-33 cm, 34-66 cm, and 67-100 cm. The roots were recovered and sorted into categories that can be interpreted as coming C4 grasses or C3 sedges to a rough approximation. The categories included living roots, rhizomes, and culms, and litter (dead roots and detritus). Detailed methods are provided below and in the Read Me file.  **Methods**  *Coring*  This dataset contains the data on the standing stock of the "CO2xCommunity" experiment started by Bert Drake in 1987. In August 1999 after 13 years of continuous CO2 treatment, we collected two replicate soil cores from each chamber in the C3 and C4 plant communities (the Mixed community was not sampled). The cores were 5.1 cm in diameter and 100 cm in length. They were extracted with a piston corer in three sections at target intervals of 0-33 cm, 34-66 cm, and 67-100 cm. The cores were stored on ice in the field then at 4 oC until they were processed. The data reported here are roots recovered from these cores.    *Sectioning and Sub-sampling*  The soil cores were sectioned horizontally by depth. Consistent depth intervals were used with the exception that the surface most interval (0-2.5 cm) was further sectioned into two intervals (0-1.25 cm and 1.25-2.5 cm) on one of the two replicate cores from each chamber (core 2). All roots were recovered from the top 15 cm of the soil core, while at deeper depths some sections were used to estimate root biomass while other sections were used for bulk density. Subsamples from 0-23 cm depth were nominally 2.5 cm thick while deeper subsamples were nominally 5.0 cm thick. The true thickness of each subsample was estimated by measuring the thickness with a micrometer at four cardinal locations and calculating the average. The volume of the subsample was calculated as the average thickness multiplied by the diameter of the corer (5.1 cm). The nominal center of each section was used as the label.  *Washing and Sorting*  The samples were wet sieved through a 1.0 mm sieve then sorted into categories defined by size, tissue type, and color. The smallest roots were subsampled by dispersing them in shallow DI water in a glass pan and randomly selecting 4 of 8 quadrants in the pan for sorting into categories that represent function (roots, rhizomes, culms) and species (based on color).  Color is a reliable indicator of species in this ecosystem. Red roots and rhizomes are from C3 sedges (Schoenoplectus americanus) and white rhizomes are from C4 grasses (Spartina patens and Distichlis spicata). White roots can be either C3 sedges or C4 grasses but are dominantly C4 grasses even in C3-dominated plan communities as shown by Saunders et al. 2006 (Saunders, Megonigal, and Reynolds. 2006. Comparison of belowground biomass in C3- and C4-dominated mixed communities in a Chesapeake Bay brackish marsh. Plant Soil 280: 305–322. https://doi.org/10.1007/s11104-005-3275-3). The categories reported here are LRT=light-colored roots; RRT=red roots; DRT=dark roots; WRH=white rhizome; RRH=red rhizome; RHC=rhizomotous culms; NRHC=non-rhizomotous culms; LITT=litter. Litter is detritus that included dead roots identified based on color, rigidity, and the condition of the epidermis.  *Data Reduction*  In core 2 of each chamber the two surface-most depth intervals (0-0.125 and 0.125-2.5) were added together to yield a single depth interval of 0-2.5 cm, matching the intervals in core 1. In cases where the roots were subsampled by counting half of the full sample, the mass was multiplied by 2.  *Experimental Design*  The experiment from which the cores were taken is a collection of 45 experimental plots across three plant communities (initially sedge-dominated, initially grass dominated, and initially mixed). Each community has 15 plots and three treatments (ambient, elevated and unchambered control). The ambient treatment chambers (n=5) are ventilated with ambient air. The elevated chambers receive enough additional CO2 to raise the concentration to approximately 700 ppm. The third treatment is a plot that is not enclosed by a chamber (i.e. no-chamber control); these which were not sampled in this campaign. |
| 13. Related Materials | None |
| 14. Related Links | <http://serc.si.edu/GCREW> |
| 15. Related Datasets | <http://serc.si.edu/GCREW> |
| 16. Research Topic | Belowground biomass response of three tidal marsh plant communities to elevated carbon dioxide. |
| 17. Study Type | Net Primary Production |

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| **Description of the variables** | | | |
| Variable Name | Variable Description | Units | Codes |
| community | plant community where each of three elevated CO2 experiments was established | none | SC=initially pure *Schoenoplectus americanus* (C3); SP=initially pure *Spartina patens* (C4); |
| plot | chamber number assigned to each plot in a community | none | none |
| treatment | carbon dioxide treatment | none | A=ambient CO2, E=elevated CO2 |
| core | replicate core 1 or replicate core 2 | none | 1=replicate 1 and 2=replicate 2 from a single chamber |
| depth\_center | depth below soil surface at the center of the sectioned subsample | centimeters | none |
| target\_width | nominal width of the sectioned subsample, as opposed to the true or measured width | centimeters | none |
| volume | Volume of the sectioned subsample calculated as the product of the fixed core diameter and the true (measured) width | cubic centimeters | none |
| washer | name of person who washed the cookie | none | none |
| plucker | name of person who plucked the roots | none | none |
| category | type of root material plucked | none | LRT=light-colored roots; RRT=red roots; DRT=dark roots; WRH=white rhizome; RRH=red rhizome; RHC=rhizomotous culms; NRHC=non-rhizomotous culms; LITT=litter |
| mass | dry mass of recovered roots, rhizomes and culms | grams | none |
| seeds | number of Scirpus seeds in subsample | none | number; -99 indicates seed data are missing because we did not attempt to recover seeds from these samples. |