About the README File Template

1. Dataset Title:cleaned soil water

2. Name and contact information of PI:

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6. Funding source: Utah Agriculture Experiment Station.

7. Project summary, description or abstract: Precipitation events are becoming more intense around the world, changing the way water moves through soils and plants. Plant rooting strategies that sustain water uptake under these conditions are likely to become more abundant (e.g., shrub encroachment). Yet, it remains difficult to predict species responses to climate change because we typically do not know where active roots are located or how much water they absorb. Here, we applied a water tracer experiment to describe forb, grass, and shrub root distributions. These measurements were made in 8 m by 8 m field shelters with low or high precipitation intensity. We used tracer uptake data in a soil water flow model to estimate how much water respective plant root tissues absorb over time. In low precipitation intensity plots, deep shrub roots were estimated to absorb the most water (93 mm yr-1) and shrubs had the greatest aboveground cover (27%). Grass root distributions were estimated to absorb an intermediate amount of water (80 mm yr-1) and grasses had intermediate aboveground cover (18%). Forb root distributions were estimated to absorb the least water (79 mm yr-1) and had the least aboveground cover (12%). In high precipitation intensity plots, shrub and forb root distributions changed in ways that increased their water uptake relative to grasses, predicting the increased aboveground growth of shrubs and forbs in these plots. In short, water uptake caused by different rooting distributions predicted plant aboveground cover. Our results suggest that detailed descriptions of active plant root distributions can predict plant growth responses to climate change in arid and semi-arid ecosystems.

8. Brief description of collection and processing of data: Volumetric water content and soil water potential measured using Decagon EC-5 and Campbell Scientific 229 sensors, respectively. Daily average values reported for measurements made in one control and one treated plot at depths of 10, 20, 30, 60, 90 and 100 cm.

9. Description of files (names, or if too numerous, number of files, file type(s): ‘Cleaned soil water’

12. Descriptions of parameters/variables

a. Temporal (beginning and end dates of data collection): 2016-2021

b. Instruments used and units of measurements: Volumetric water content and soil water potential measured using Decagon EC-5 and Campbell Scientific 229 sensors, respectively. Daily average values reported for measurements made in one control and one treated plot at depths of 10, 20, 30, 60, 90 and 100 cm.

Data recorded on Campbell Scientific CR1000 dataloggers.

c. Column headings of data files (for tabular data):

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| Column A – date (month/day/year) |
| Column B – depth (depth in cm where sensor was placed) |
| Column C – vwc\_ctrl (volumetric water content as measured by Decagon EC5 sensor cubic cm water per cubic cm of soil in one randomly selected control plot) |
| Column D - vwc\_trt (volumetric water content as measured by Decagon EC5 sensor cubic cm water per cubic cm of soil in one randomly selected treated plot) |
| Column E - wp\_ctrl (soil water potential as measured by Campbell Scientific 229 probe. Values in MPa) |
| Column F- wp\_ctrl (soil water potential as measured by Campbell Scientific 229 probe. Values in MPa) |
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d. Location/GIS Coverage (if applicable to data): 41° 36’ 53” N, 111° 34’ 1” W

e. Symbol used for missing data:NA

14. Publications that cite or use this data: Root distributions predict shrub-steppe responses to precipitation intensity. Kulmatiski A., Holdrege M.C., Chirvasa, C., and Beard K.H. Biogeosciences. Special issue: Ecosystems experiments as a window to future carbon, water, and nutrient cycling in terrestrial ecosystems.