H13J-1577 Water and carbon dynamics in an arid playa of the Chihuahuan Desert

Monday, 11 December 2023

14:10 - 18:30

Poster Hall A-C - South (Exhibition Level, South, MC)

Abstract

Ephemeral playas are unique landscapes found in arid and semiarid regions around the world. These lakebeds are often characterized by flat, grassy expanses that may be covered with salt crusts. Playas are formed in closed basins or in depressions, typically without any significant outlets for water drainage. Arid playas are often subjected to highly variable hydrological conditions. During periods of heavy rainfall, water collects in these low-lying depressions, transforming the landscape into temporary shallow lakes. However, due to the arid climate, these bodies of water usually evaporate quickly, leaving behind desiccated and cracked surfaces. Arid playas are of scientific interest due to their significance in global biogeochemical cycles. Furthermore, understanding the ecohydrological processes in these environments is essential for studying the impacts of climate change on arid and semiarid landscapes. In this study, we investigated the water and carbon flux dynamics in an arid playa of the Chihuahuan Desert using the Eddy Covariance (EC) technique. The study was conducted from June 2022 to October 2023, at the P-SMAL playa within the Chihuahuan Desert Rangeland Research Center (CDRRC). Our findings revealed substantial variations in fluxes across different seasons. During the wet season, we observed a notable increase in evapotranspiration and carbon uptake, resulting in enhanced water and carbon fluxes from the playa surface to the atmosphere. During the dry season, despite a reduced vegetation activity and evapotranspiration rate within the area of the playa, it acted also as a carbon sink, especially during the spring. Our study highlights the importance of continuous monitoring for accurately assessing the complex interplay of water and carbon dynamics in arid playas. The results can contribute to improved ecohydrological models and help decipher the role of arid playas in the broader context of regional and global climate change scenarios.

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