

# Soil Water dynamics and water balance on a tropical coral island

Shengsheng Han<sup>1</sup>, Suxia Liu<sup>2</sup>, Xingguo Mo<sup>2</sup>, Lihu Yang<sup>3</sup>, and XF Song<sup>4</sup>

<sup>1</sup>Institute of Geographic Sciences and Natural Resources Research CAS

<sup>2</sup>Institute of Geographical Sciences and Natural Resources Research, CAS

<sup>3</sup>Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences

<sup>4</sup>Institute of Geographic Sciences and Natural Resources Research Chinese Academy of Sciences

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## Abstract

Studying soil water dynamics and water balance on coral islands is important to utilize and manage the limited freshwater resources of these islands. In this study, we investigated the soil water dynamics of Zhaoshu Island, Xisha Archipelago, using observed data and the Richards equation and analyzed the water balance of this island from October 2018 to September 2019. We found a dry soil layer at depths between 40 cm and 160 cm of the soil profile from November 2018 to April 2019 (dry season) which prevented the exchange of water between upper soil layers and groundwater. Therefore, the vegetation developed deep roots to take up water from the groundwater. Precipitation is the only source of the freshwater, while approximately 38% of the precipitation infiltrated into the groundwater, 22% of the precipitation was taken up by vegetation, and 39% of the precipitation evaporated from the land surface during the entire observed year. In the dry season, evapotranspiration (ETa) was only 44 mm/month, which was 94% greater than the amount of precipitation, and approximately 14 mm/month of water was taken up from the groundwater by plants. However, in wet season, infiltration dominated the processes of soil water movement. Approximately 56% of the precipitation infiltrated into the groundwater and 37% of the precipitation was consumed by ETa. This study can help us to better understand the process of water movement on coral islands and provide references for further management to protect coral island ecology.

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Shengsheng. Han <sup>ab</sup>, Suxia. Liu<sup>ac\*</sup>, Xingguo. Mo <sup>ac</sup>, Lihu. Yang<sup>a</sup>, and Xianfang. Song <sup>ac</sup>

<sup>a</sup> Key Laboratory of Water Cycle and Related Land Surface Processes, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, Beijing 100101, PR China, <sup>b</sup> University of Chinese Academy of Sciences, Beijing 100049, PR China, <sup>c</sup> College of Resources and Environment, Sino-Danish Center, University of Chinese Academy of Sciences, Beijing 100049, PR China.

\* Corresponding author at: 11A, Datun Road, Chaoyang District, Beijing 100101, China.

\* Email address: liusx@igsnrr.ac.cn (Suxia. Liu )

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### Availability of data:

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Figure 1 Location of a) South China Sea, b) Xisha archipelago, c) Zhaoshu Island, and d) the soil water available at <https://authorea.com/users/346360/articles/481632-soil-water-dynamics-and-water-balance-on-a-tropical-coral-island>

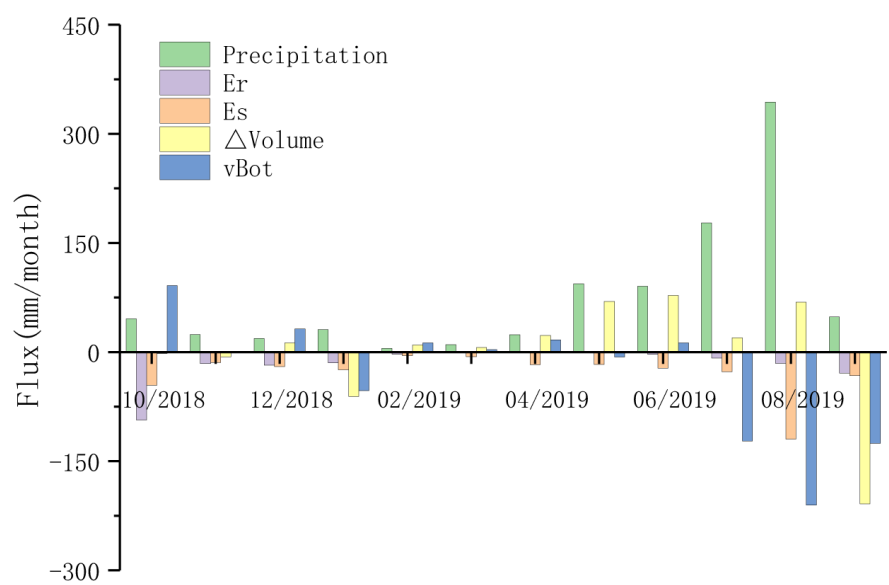
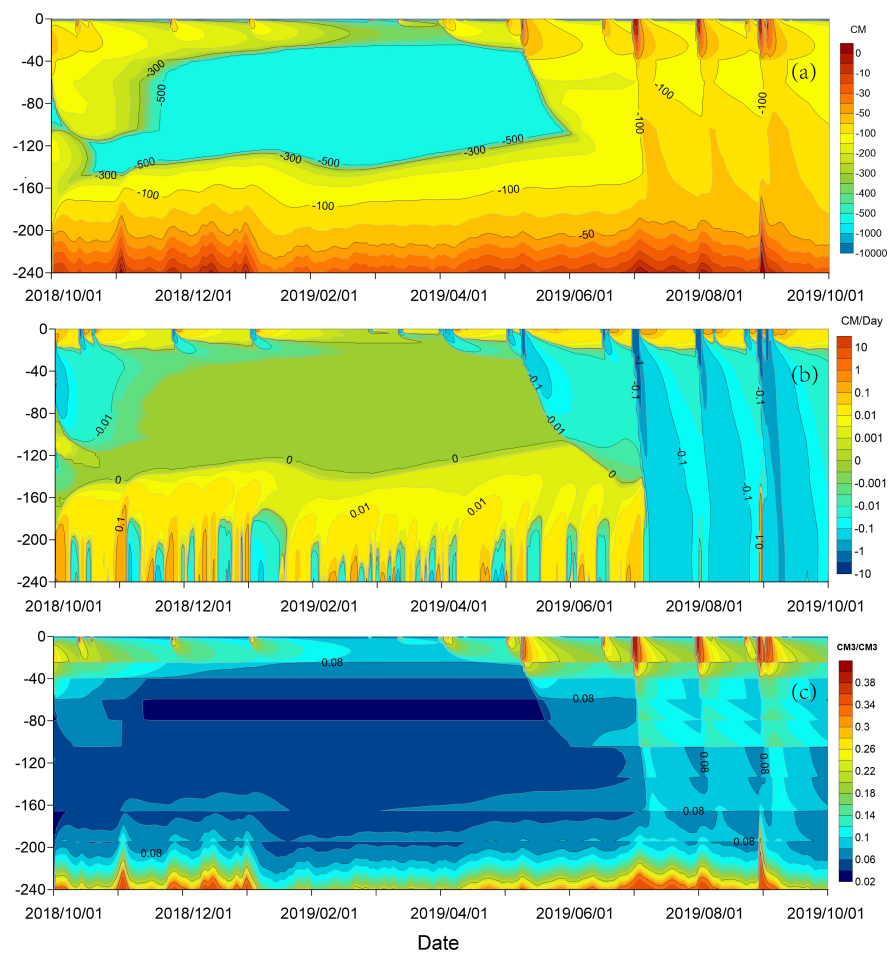


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