environmental sciences proceedings

MDPI

Proceedings

Temperature Effects in AMSR2 Soil Moisture Products and Development of a Removal Method Using Ascending and Descending Data

Kim Oanh Hoang [1,*], Minjiao Lu [1,2,*], and Agampodi Deva Thisaru Nayanathara Kumarasiri [1,*]

[1] Nagaoka University of Technology; oanh@nagaokaut.ac,jp
[2] Chongqing Jiaotong University, China; lu@vos.nagaokaut.ac.jp
* Correspondence: hoangkimoanh041171@gmail.com; Tel.: (optional; include country code; if there are multiple corresponding authors, add author initials)
† Presented at the title, place, and date.

Abstract: Soil moisture is one of the popular variables for various processes and models in hydrological research and the Earth sciences due to its high interaction among the land surface and atmosphere, land surface, and underground. Many satellite missions, such as SMAP, SMOS, or AMSR-E/2, have been launched to observe precise soil moisture in extensive or global spatial coverage, which is the limitation of in situ ones. In recent years, the satellite soil moisture products such as SMAP have also been reported to comprise errors caused by the so-called "temperature effects" found in the in situ soil moisture observed by dielectric sensors several decades ago. Though the temperature effect removal methods proposed for in situ data can apply to satellite soil moisture, there are limitations, such as global application. In this work, we also confirmed the existence of these errors in AMSR2 soil moisture products. We developed a new algorithm to remove them using satellite data at ascending and descending times. Three-centimeter depth soil water content (SWC) and soil temperature from 5th September 2016 to 31st October 2019 at the Mongolia site were used as the reference data. The correlation coefficient values between the corrected AMSR2 and corrected in situ SWC are between 0.1595 and 0.3542, while the values of the original ones range from 0.1846 to 0.3153. As well as, the values of MD, MAE, RMSE, and ubRMSE became lower in corrected data when compared to the original data. These indicate that the corrected AMSR2 products are better than the original AMSR2 products in the Mongolia network region. These results reveal that the correction method can successfully remove the temperature effects from AMSR2 soil moisture products.

Keywords: soil moisture; AMSR2; temperature effects; temperature correction, satellite product, soil water content, Mongolia

Citation: To be added by editorial staff during production.

Academic Editor: Firstname Lastname

Published: date