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Research Article

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Posted Date: May 3rd, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-477715/v1>

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Abstract

Total water storage (TWS) is obtained by the gravity recovery and climate experiment (GRACE) satellite by measuring surface density changes. TWS provides valuable information about the water cycle on Earth and can play a useful role in water resource management studies. In this study, TWS of GRACE- Follow-On (FO) satellite from 2018 to 2020 has been studied. The western and central regions of Iran are in a better situation than other regions. Northwest, North, Northeast areas have a decreasing TWS trend of more than 5 cm. The western regions of Iran show an increasing trend and its value is about 3 cm. The southern regions of Iran have an almost constant annual TWS trend. TWS 2020 is similar to 2019.

Keywords: TWS, GRACE, GRACE-FO, Iran

Introduction

The GRACE satellite provides valuable information about the hydrological cycle [1]. One of the key parameters of TWS is that ground water storage (GWS) information can be obtained with a series of mathematical operations [2]. GRACE satellite can be useful in water resources management despite the limitations of spatial resolution and band noise [3-10]. Various studies have been able to reduce the limitations of GRACE through in-depth and wavelet learning [11-15].

This study examines the TWS of the GRACE-FO satellite from May 2018 to May 2020. The spatio-temporal and annual trends of TWS Iran are studied in this study.

Results

To achieve GRACE-FO TWS, the process of Memarian et al [11, 12 and 15] is used. Figure 1 shows the values of Iran's TWS for the period May 2018 to May 2020. In May 2018, the western, southern and southeastern regions are in better condition. In May 2019, the western, central-western and part of the northeastern regions are in better condition. In May 2020, the regions of Iran are similar to 2019 and little change is observed.

Figure 1 Iranian TWS values for the period May 2018 to May 2020

To better evaluate the annual TWS trend in Iran has been estimated. Figure 2 shows the annual TWS trend in Iran. Northwest, North, Northeast areas have a decreasing TWS trend of more than 5 cm. The western regions of Iran show an increasing trend and its value is about 3 cm. The southern regions of Iran have an almost constant annual TWS trend.

Figure 2 Annual TWS Trend of Iran

Conclusion

In this study, TWS Iran in the period 2018 to 2020 has been studied. TWS 2020 is similar to 2019. The western and central regions of Iran are in a better situation than other regions of Iran. Northwest, North, Northeast areas have a decreasing TWS trend of more than 5 cm. The western regions of Iran show an increasing trend and its value is about 3 cm. The southern regions of Iran have an almost constant annual TWS trend.

Competing interests:

The authors declare no competing interests.

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Figures

Figure 1

Iranian TWS values for the period May 2018 to May 2020

Figure 2

Annual TWS Trend of Iran