

# Lake Urmia level in 2020 based on satellite altimetry

Omid Memarian Sorkhabi (✉ [omidmaryan@gmail.com](mailto:omidmaryan@gmail.com))

University of Isfahan

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## Short Report

**Keywords:** Lake Urmia, Lake Urmia Level, satellite altimetry, 2020

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# Lake Urmia level in 2020 based on satellite altimetry

Omid Memarian Sorkhabi

(omidmaryan@gmail.com)

Department of Geomatics Engineering, Faculty of Civil Engineering and Transportation, University of Isfahan,  
Isfahan, Iran.

## Abstract

In this paper, the final output of the satellite altimetry on the surface of Lake Urmia is investigated. From 1995 onwards, the level of Lake Urmia has been declining. From 2015 to 2019, it has had a steady trend and there are not many changes, the main reason being the policies of reviving Lake Urmia. After 2019, there is an increase of about 1.5 meters, which is due to good rainfall this year, and after that, a decreasing trend is observed. In the middle of 2020, with the increase of precipitation, the level of the lake increases by about 20 cm and then reaches the level of 1271.5 meters again. However, after 2015, with the policies of Lake Urmia restoration, the downward trend has been controlled and the level has remained constant. However, these policies do not seem to be sufficient and there is a need to reconsider the water resources management in the region.

**Keywords:** Lake Urmia, Lake Urmia Level, satellite altimetry, 2020

## Introduction

In total, three factors can be considered as the cause of drying of Lake Urmia, including over-withdrawal of water resources from the lake catchment area, uncontrolled development of the agricultural sector around the lake by exploiting the dams built, and perhaps finally, intensification of climate change and the occurrence of drought is along with two other factors [1-3]. Geodesy can monitor changes on Earth with mathematical tools and satellite observations [4-14].

In this paper, the final output of the satellite altimetry on the surface of Lake Urmia is investigated.

## Results

Figure 1 shows the output of changes in the Lake Urmia level from 1992 to 2020 based on altimetry observations. From 1995 onwards, the level of the lake has been declining. From 2015 to 2019, it has had a steady trend and there are not many changes, the main reason being the policies of Lake Urmia restoration. After 2019, there is an increase of about 1.5 meters, which is due to good rainfall this year [1], and after that, a decreasing trend is observed [3]. Due to the shallow depth of the lake, this level drop has led to a significant percentage of dryness of the lake surface and more than 30 billion cubic meters of its water volume has been lost due to evaporation and lack of sufficient water resources. Simultaneously with the beginning of the decline of the lake level, the southern part of the lake was almost dry in 2014.

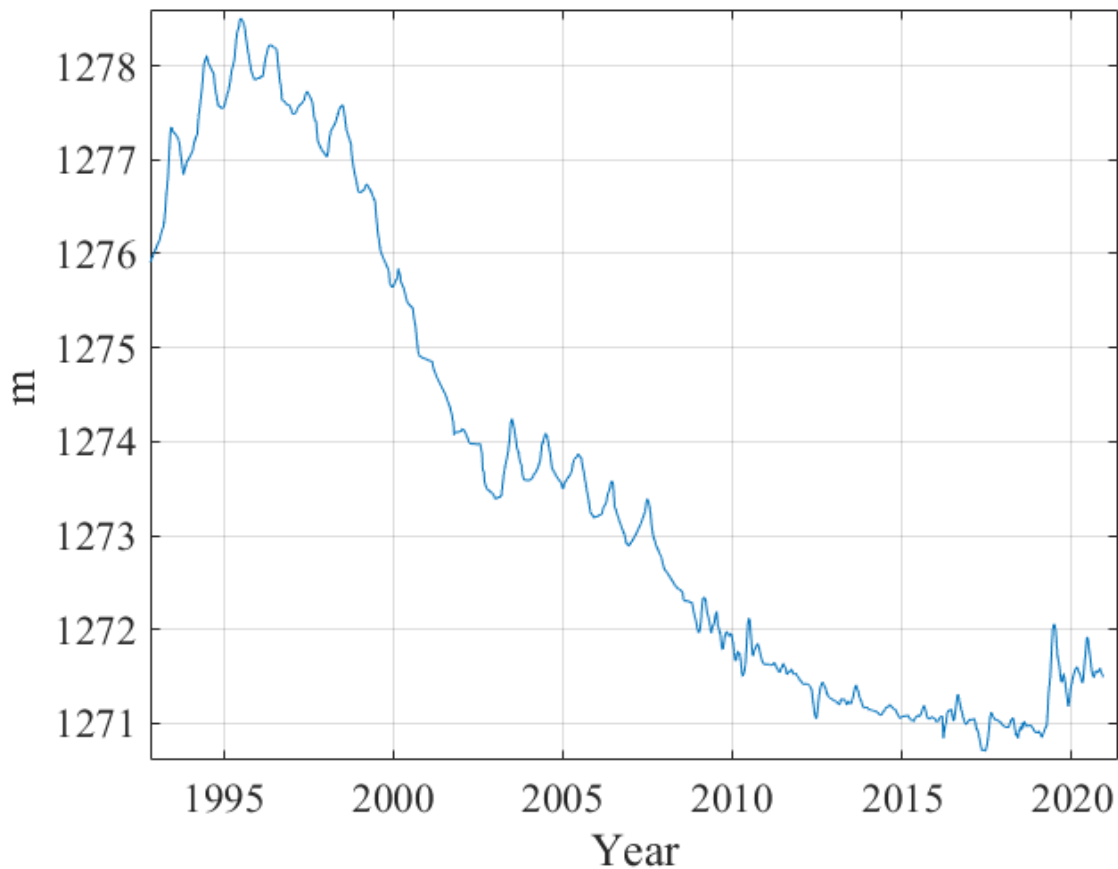


Figure 1 Lake Urmia level changes from 1992 to 2020 based on altimetry observations

Figure 2 shows the Lake Urmia level in 2020 based on altimetry observations. In the middle of 2020, with the increase of precipitation, the level of the lake increases by about 20 cm and then reaches the level of 1271.5 meters again.

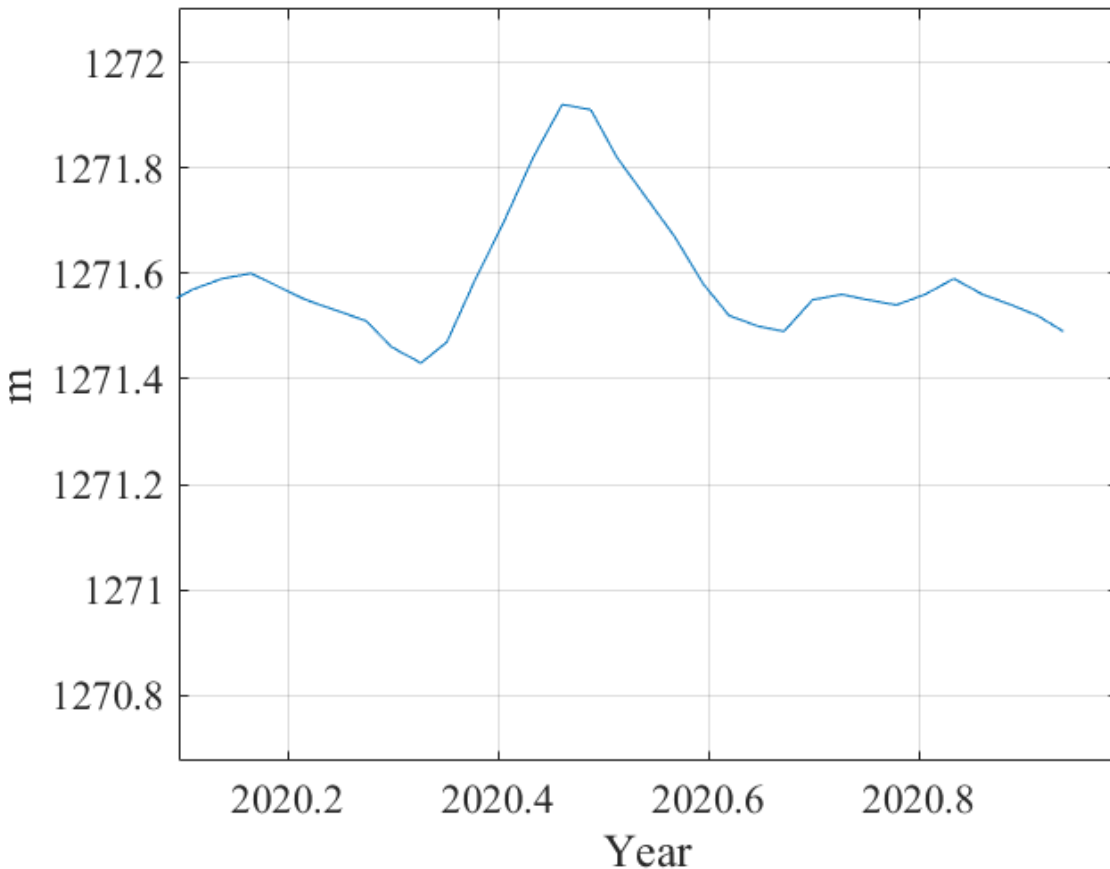


Figure 2 Lake Urmia level changes in 2020 based on altimetry observations

### **Conclusion**

In this study, satellite altimetry measurements from 1992 to 2020 on Lake Urmia were studied. The results show that the lake is about 7 meters different from 1995. The average lake has decreased by 40 cm annually in the last twenty years. However, after 2015, with the policies of Lake Urmia restoration, the downward trend has been controlled and the level has remained constant. However, these policies do not seem to be sufficient and there is a need to reconsider the water resources management in the region.

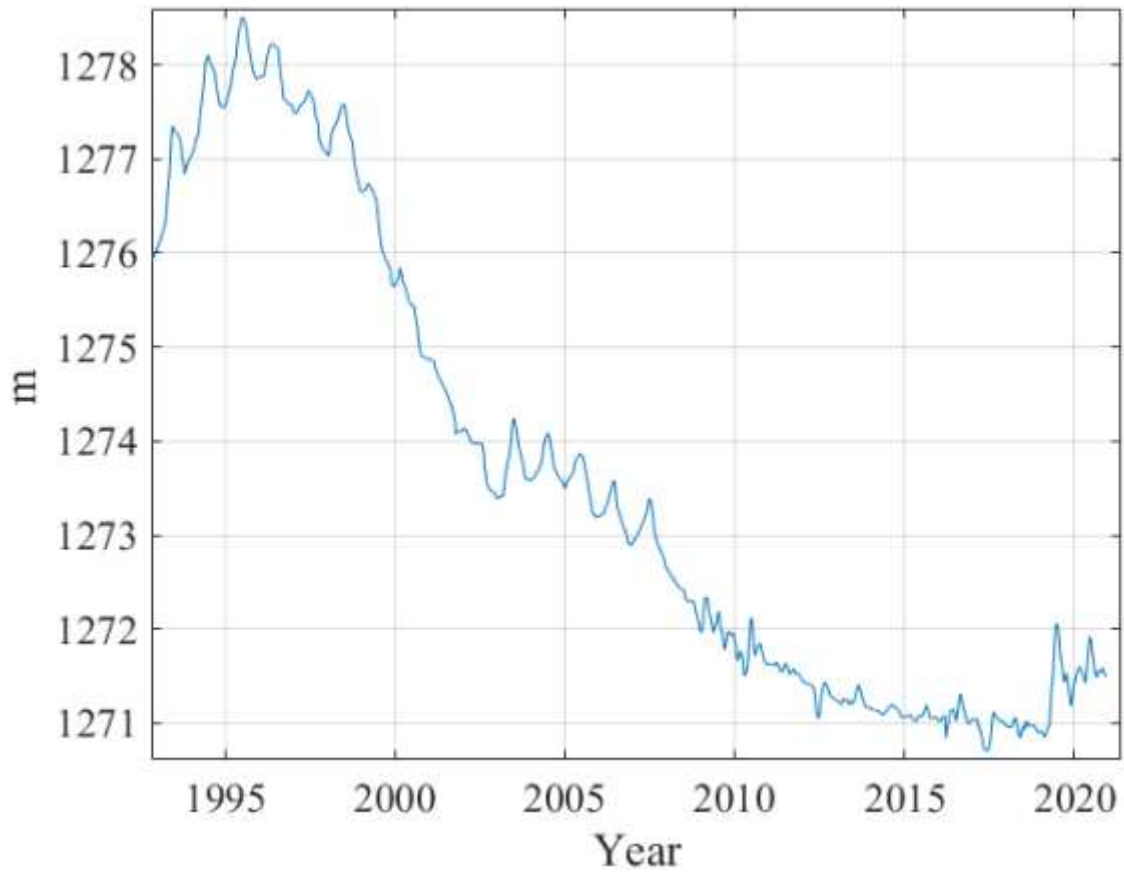
## **Competing interests:**

The authors declare no competing interests.

## **References**

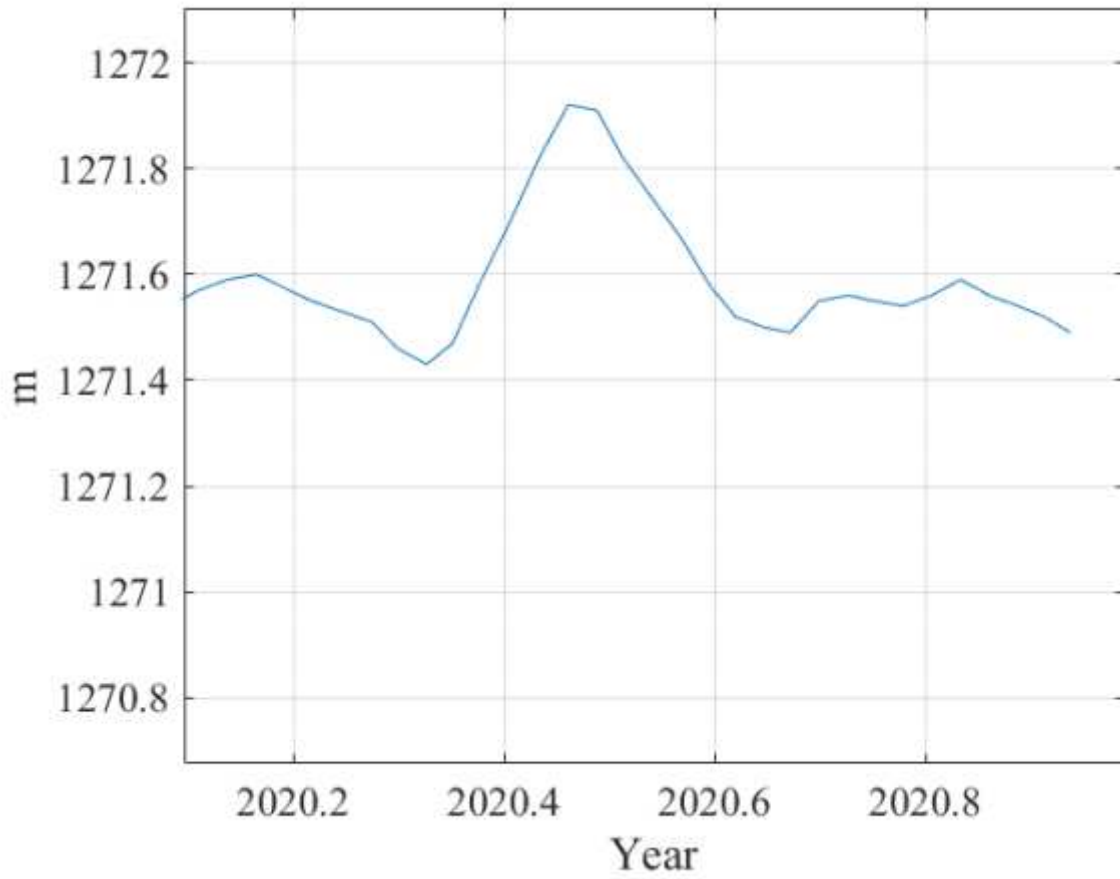
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# Figures



**Figure 1**

Lake Urmia level changes from 1992 to 2020 based on altimetry observations



**Figure 2**

Lake Urmia level changes in 2020 based on altimetry observations