Studies on tide analysis of the digital gravity observation data

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The research is mainly about a data processing method study on one-minute sampling gravity data.

As National Gravity Tide Observation Network has been established in China and Portable Earth Tide meter (PET) has been applied to these stations. The observation data have some new properties: such as digital record, higher precision and dense data sampling. Therefore, in order to fully use the information in the precise and dense sampling data, we need a corresponding new data processing method since the traditional processing method does not work any more which is valid only for one-hour data sampling.

For this purpose, we have to consider the whole data processing procedure from beginning. Firstly, based on the one-second sampling raw data, we get the one-minute sampling data by Chebyshev fitting. Then we extend the Nakai examination method from 48 data to 2880 data, the time length of the recorded data is kept the same, i.e., 2 days as one section. Similarly, to perform the harmonic analysis on one-minute sampling data, a corresponding filter is necessary. Therefore, based on the expression of gravity tide, we established a new filter. Then we applied it to one-minute sampling data to get tide factors, and compared them with the result of traditional harmonic analysis.