Dear Editor,

We have two revised the article based on the reviewers' comments and have responded to the relevant comments in the comments section.

The first modification is as follows：

1. The main focus of this paper is the analysis and experimentation of errors generated during the directional installation of instruments, and it does not involve the analysis of instrument orthogonality. During the experiments, it is assumed that the three axes of the instruments are in an ideal state of complete orthogonality. Due to the lack of detailed descriptions in the original text, there is a tendency to confuse the concepts of directionality and orthogonality. We have now added relevant explanations about the directional errors and principles of the instruments in the text and have removed the confusing statements to make the content more detailed and complete, and the expression more accurate.

2. The original text lacked an introduction to the non-magnetic rotating platform and a description of the platform's state during the experiment. Since this platform can achieve absolute level by adjusting the theodolite dial, and the measurement data are conducted based on the horizontal plane, adjusting the base screw of the instrument so that the Z-axis output values are close at different positions indicates that the Z-axis is perpendicular to the platform and therefore in the direction of geographic vertical. The original text has been supplemented with relevant descriptions.

The second modification is as follows：

1. The article cites "Guide for Magnetic Measurements and Observatory Practice" by Jankowski and Sucksdorff. See Page 4 , Line 142-144 and Page 9 , Line 297-299.

2. After calculating the D magnetic axis offset, it can be converted from nT to degrees using a formula. See Page 5 , Line 176-179.

3. Descriptions of the accuracy and installation positions of the two additional water bubbles on the sensor have been added. See Page 4 , Line 135-141.

4. During the verticality adjustment of the Z magnetic axis, an explanation was given for the result of the Z output values differing by 22nT at positions 180° apart. See Page 4,5 , Line 162-173.

5. The textual descriptions between Figure 5, Figure 5(a), and Figure 5(b) have been revised. See Page 6, Line 220-222.

6. The selection times for five quiet days and five disturbed days before and after calibration have been rephrased. See Page 6, Line 229-242. The header of Table 2 has been revised. See Page 7, Line 254-255.

7. One reference with an incorrect format has been revised. See Page 9, Line 304-305. The DOIs of two other references have been verified; the data is correct, but they cannot be accessed for unknown reasons. Should the DOI data be deleted or retained? See Page 9, Line 294-296. See Page 9, Line 320-322.

Best regards,

Xiujuan Hu