Dear reviewer,

We would like to thank you for your time and effort in reviewing our paper. We have considered each of your recommendations and we have endeavored to fully address in this resubmitted revision, as we think they contribute to improve this work. Also more specific issues were added to each part of the manuscript, improving some figures (5,6,7), and adding some graph about our data (Figure 10, 11, 12, 14). Along with the basic writing and English, we also believed that there were certain coherence and structural issues that were assessed and solved.

You can find in blue your comments and in black our response.

General comments:

The manuscript discusses the implementation of ISO 9001:2015 based on the experiences of the Teoloyucan Geomagnetic Observatory. It analyses the advantages and disadvantages of the standards for industrial quality management systems, especially in the field of regulating operational activities. Although we are informed about improvements in many areas, we do not get a clear answer in two questions: 1. The relationship of the observatory with the INTERMAGNET organization requires clarification, because according to the website https://intermagnet.org/metadata/#/imos the observatory is closed. 2. Regardless of the relationship between the observatory and INTERMAGNET, the question arises as to why the INTERMAGNET Technical Reference Manual (https://tech-man.intermagnet.org/stable/), which provides standards for geomagnetic observatory activities, is not directly mentioned? The quality management system pays special attention to external documents independent of the organization. We do not learn from the manuscript what happened in this specific case. The following sentence is important: "It is important to emphasize that implementing a QMS does not define the operating guidelines themselves, these are given by the international standards already mentioned: the purpose of a QMS is to verify that these guidelines, which are described throughout the QMS, are rigorously followed." In summary: I recommend publishing a list of international documents regulating operations and including them in the references.

After making minor revisions, the manuscript can be published.

1. The relationship of the Observatory with the INTERMAGNET organization is explained.

Line 61: The observatory has a continuous record from 1914 until now, it was part of the INTERMAGNET observatories from 2002-2008, but due to instrumental issues, it was not able to maintain data quality, even if it continued operating and sending data to INTERMAGNET until 2021. In 2022 it began operating TEO currently operates with a Ukrainian LEMI025 fluxgate (XYZ) variometer (by Lviv Center of Space Research Institute), a GSM90 Total Intensity (F) magnetometer (by GEM Systems), and a Zeiss Theo 020B DI-flux (Declination (D), Inclination (I)) theodolite with RMIs electronic, following INTERMAGNET standards

(Wienert, 1970; Jankowski and Sucksdorff, Rasson, 2004; Bracke, 2025), and relying on a quality management system to verify the implementation of these standards, with a view to applicate to INTERMAGNET.

2. The Technical Reference Manual it's an important base for the operation of the Observatory, it was cited as its described in the webpage.

   Cite as:

Line 384: Bracke, S. (Ed.): INTERMAGNET Operations Committee and Executive Council, INTERMAGNET Technical Reference Manual, Version 5.2.0, 2025.

Along with this, the following reference books and manuals are used:

-Jankowsky, J. and Sucksdorff, C.: Guide for magnetic measurements and observatory practice, IAGA, International Association of Geomagnetism and Aeronomy (IAGA), ISBN: 10-9650686-2-5, 1996.

-Leonhardt, R., Bailey, R., Schovanec, H., Fee, J., Bracke, S., Miklavec, M., and Kompein, N.: MagPy – Analyzing and displaying geomagnetic data (Version 2.0.0). https://doi.org/10.5281/zenodo.15861613, 2025.

-Rasson, J. L.: About Absolute Geomagnetic Measurements in the Observatory and in the Field. Training Booklet for the XIth IAGA Workshop on Geomagnetic Observatory Instruments, Data Acquisition and Processing, Kakioka, Japan, 2004.

Wienert, K. A.: Notes on geomagnetic observatory and survey practice, Earth Sciences, UNESCO, 5, p. 79, 1970.

Specific comments:

- Line 40: What considerations were used to select the location of the observatory? The names of several measuring instruments are listed. On what principle did the mentioned devices operate and what quantity did they measure?

Included.

Line 39: Teoloyucan site was selected due to the far location to the city, avoiding magnetic noise,

Included.

Line 51: It began its operation with Mascart variometers (D, H, Z) that belonged to the previous site. In 1923, the magnetometer Dover 123 and the inclination compasses Fauth 73, Negretti-Zambra 65, and Chasselon 64 were incorporated. Later, in 1931, the set of Eschenhagen photographic recording variometers (D, H, Z) from the Askania House, was acquired and worked until the shift to the digital era (Hernandez Quintero et al., 2018)

- Fig. 2: The figure contains abbreviations that are explained later. Perhaps if any of the abbreviations in the figure were mentioned in the paragraph, the figure could be introduced afterwards.

Line 69: Figure 2. TEO's timeline. Location and instrumental changes. Scalar magnetometers: G856(Geometrics), GSM19/90 (GemSystems), POSN129. Variometers: Mascart, Askania-Eschenhagen, LAMA (RMI), FGE(DMI). DI-flux: Ruska, Zeiss Theo 020B.

- Line 55: "In 1993, it was calibrated for the first time with a first-class standard observatory (Friedericksburg, USA). "What does here the calibration mean? Performing a rigorous calibration is unthinkable with such a large distance.

It was referred to an instrumental calibration in the Friedericksburg Observatory, but it was considered better to remove it.

- Fig. 3: The figure contains levels which are explained later. Perhaps the figure could be introduced afterwards.

On the paragraph before Figure 3, was added an explanation of the parts of the Quality Management System to have a better understanding of Figure 3.

Line 81: The documentation of the QMS could be summarized in the pyramid shown in Figure 3. Level 1-Quality manual: The mission, goals, objectives, and policy statements. Level 2-Quality system procedure: that describes quality control, validation, and process improvement. Level 3-Instructions (Standard Operation Procedures): operational work instructions and Level 4-Forms: Records, Reports, all the supporting records and forms associated with the operational procedure (Berte and Nevalainen, 1996).

- Fig. 13: The meanings of the colors are not marked and the axis labels are sometimes illegible.

In Figure 13 (now Figure 16 and 17) the meanings of the colors was added:

Line 337: Figure 17. a) Plot of the last 7 days of X (purple), Y (green) components (above), and Z (purple), and F(green) (below) components. b) Plot of the last 27 days (Carrington Rotation) of the X (purple), Y (green) components (above), and Z (purple), and F (green) (below) components.

Technical corrections:

- Line 48: The article of Berte l. et al. missing from the manuscript.

It is cited in Figure 3 and on the paragraph before this.

Line 81: The documentation of the QMS could be summarized in the pyramid shown in Figure 3. Level 1-Quality manual: The mission, goals, objectives, and policy statements. Level 2-Quality system procedure: that

describes quality control, validation, and process improvement. Level 3-Instructions (Standard Operation Procedures): operational work instructions and Level 4-Forms: Records, Reports, all the supporting records and forms associated with the operational procedure (Berte and Nevalainen, 1996).

- Line 330: The article of Kaziliūnas, A. is missing from the manuscrpit.

It was added the missing reference.

Line 204: Besides being a standard requirement, audits enable confirming if the QMS complies with both its own and the standard's requirements, as well as whether its deployment and operation are successful. Even though it could seem like a laborious process at first, having these systematic evaluations allows one to ensure that every item outlined in the technical procedure and the QMS is promptly addressed (Kaziliūnas, 2010),

- Line 35: Rasson et al, 2011 has an erroneous date (2001) in the references.

It was corrected:

Line 407: Rasson, J. L., Toh, H., and Yang, D.: The Global Geomagnetic Observatory Network, in: Geomagnetic Observations and Models, edited by Mandea, M. and Korte, M, IAGA Special Sopron Book Series 5Springer Netherlands, 1-25, https://doi.org/10.1007/978-90-481-9858-01, 2011.

- Line 60: The meaning of UNAM is not clear to me.

The meaning of UNAM was included.

Line 38: In Mexico, the only existing geomagnetic observatory is managed by the Magnetic Service of the Geophysics Institute of the National Autonomous University of Mexico (UNAM).

- Line 65: The meaning of QMS is not defined.

The meaning was added.

Line 12: Given the nature of Quality Management Systems (QMS) based on ISO 9001:2015, we consider that their implementation in a geomagnetic observatory, can be a valuable tool that allows monitoring the follow-up of international standards and ensuring their proper operation, thus guaranteeing high-quality geomagnetic data.

- Line 115: SWOT is absolutely not defined in this paragraph.

The meaning of SWOT was defined.

Line 77: continuous review of *strengths, weaknesses, opportunities* and *threats (SWOT)*