Review
Title: The countrywide historical gravity dataset of Lithuanian territory
Authors: Dominykas Šlikas and colleagues

General Assessment
This manuscript presents a digitized and homogenized historical gravity dataset for the territory of Lithuania, incorporating data from mid-20th century gravity surveys and network stations. The dataset has been transformed into modern geodetic and gravimetric reference systems (ETRS89, EVRS07, IGSN71) and is made publicly available via Zenodo. This is a valuable contribution to the field, particularly for applications in regional geoid modeling and Earth gravity field studies.

The manuscript should be published as soon as possible, but only after substantial revision in both its presentation and clarity to meet the standards of *Earth System Science Data.*

Major comments

Scientific contribution and novelty
The authors provide a robust and well-documented compilation of historical gravity data. The strength of the work lies in data preservation and accessibility, not in methodological innovation. The manuscript does not introduce any new methodology; data processing follows standard transformation and reduction formulas. This should be clearly acknowledged in the manuscript.

Use of IGSN71
The "International Gravity Standardization Net of 1971" (IGSN71) is no longer considered the most accurate or modern reference for gravity data. While still widely used for legacy compatibility (e.g., in some global gravity field models), newer systems based on absolute gravimetry and regional densifications are becoming the standard, especially in Europe.

The EUREF sub-commission, which also maintains ETRS89 and EVRS, recommends the use of absolute gravity values where available, referencing new gravity campaigns to co-located absolute stations, and avoiding continued reliance on IGSN71 unless necessary for legacy data comparison.

My suggestion: The authors should justify their use of IGSN71 and add two statements such as:
> "While IGSN71 is used here to harmonize legacy gravity data, future work should integrate absolute gravity stations in the European Absolute Gravity Reference Network."
> "If possible, transformation offsets to newer national absolute reference values should be computed and documented."

Clarity and structure of manuscript
The manuscript is overly long and detailed, with extended theoretical derivations (e.g., coordinate transformations, gravity reductions) that could be summarized or moved to supplementary material. Repetition occurs throughout (e.g., multiple restatements of the Potsdam to IGSN71 transformation), and the language would benefit significantly from professional editing for grammar, conciseness, and flow. At least for me, the tone is at times more instructional than scientific.

Figures and maps – major weakness
The figures are currently a critical weak point:

- Several maps lack coordinates (e.g., Figs. 1, 2.1, 2.4, 2.8, 2.9, 2.10), scale bars, or consistent legends.
- Different map extents and projections are used without explanation (e.g., Figs. 2.2, 2.3, 2.4–2.7), making comparison difficult.
- Important metadata (e.g., color meanings, units) are missing or unclear.
- The layout and visual clarity are insufficient for a data-focused journal.

My recommendation: All figures, particularly maps, should be redesigned for standardization. Use the same geographic extent, add graticules or coordinate grids, include legends and scale bars, and clearly distinguish between data types (e.g., second/third order stations, gravity points). Figures 2.1, 2.4, and 2.10 could be consolidated or at least harmonized.

Relevance and utility of the dataset

The dataset is well motivated, and its availability via a public repository is appropriate. The data will be useful for researchers in regional geoid computation, historical geophysics, and geodetic accuracy assessment.

A brief demonstration of a possible application, such as geoid height comparison or regional gravity model validation, would enhance the manuscript's impact.

Data format

The authors state (Section 3) that the dataset is published in DBF (dBASE) format, which is technically valid but increasingly outdated. While DBF is a well-documented and stable format, it lacks support for Unicode, long field names, and complex data types. It is also not readily used in modern data processing environments without conversion.

My suggestion: While DBF is functional, I encourage the authors to consider releasing the dataset in additional formats, such as CSV, GeoPackage, or NetCDF, which are more accessible, transparent, and compatible with current data processing tools. This would significantly enhance the reusability of the dataset.

Minor comments and suggestions

- Replace "due gravity" with "due to gravity" or simply "gravity" throughout the manuscript.
- The abstract could be made more concise.
- Section 2.2 would benefit from a table or flowchart summarizing the transformation steps.
- The DBF table (Section 3) is useful, but a sample dataset or a visual preview (e.g., GIS screenshot) would help readers better understand the structure.
- Include a graphical summary of transformation errors (e.g., histogram of residuals).
- Use SI units consistently and replace "mGal" with m/s^2.
- References are mostly appropriate, but citation style and hyperlinks should be carefully checked and standardized.

Overall recommendation: Accept with major revisions.