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Interactive comment on "Hydrometerological and gravity signals at the Argentine-German Geodetic Observatory (AGGO) in La Plata" *by* Michal Mikolaj et al.

Anonymous Referee #1

Received and published: 25 February 2019

This paper provides an overview of Level 1, 2, and 3 data products from AGGO. The paper is well written and the analysis thorough. The data are likely to be useful to researchers in several fields. The publication, including code and documentation, provides a very good template/example for similar datasets. The authors have collected an impressive dataset that appears to capture essentially all of the contributions to the gravity signal. Although I am interested in further analysis of the hydrological signal, that's probably beyond the scope of this paper. I don't have any major comments about this relatively straightforward publication.

The authors have done a very nice job providing code used in data preparation and

documentation of the code and data. I have downloaded and briefly explored the accompanying data sets and code but have not thoroughly reviewed their accuracy or the quality of the processing. It would be useful for casual inspection if the authors could include a sub-sampled (daily?) dataset in Tsoft format.

Minor suggestions and corrections:

Title: "Hydrometerological" should be "Hydrometeorological"

P1 L2: should be "equipped with comprehensive . . ."

P1 L3: "multi-compartmental" is an odd descriptor for a data set

P2 L7+: Suggest stating which data is stored in which database.

P2, L11: Change "parameters" to "observations", for consistency with line 7? I found this paragraph to be somewhat disjointed, i.e., it bounces around between a few different ideas.

P2, L27: I tend to think of model parameters when I hear parameters, but I think you are referring to observations and modeled gravity time-series. Are "local and large-scale gravity models" a parameter?

P2, L32: I would add a sentence that explicitly states what level 2 data re, e.g., "Level 2 data consist of level 1 data corrected for artefacts and gaps in the data. . ."

P3: Suggest adding the specific coordinates of the site. I was interested in seeing a satellite image but was unable to locate it using the information in Figure 1 and the text.

P3 L11: plain not plane

P4 L15: It seems you are indicating groundwater flow is to the NW, parallel to the coast and opposite the direction of flow in the Rio de La Plata? Unusual.

P5: Suggest including the time interval at which data sets are reported.

P5, L7: How were data gaps longer than 2 hours handled?

C2

P5, L14: "Own models" is awkward phrasing; suggest "Models developed for this study were those for…" or similar.

P5: I realize reporting uncertainty for each measurement is a large undertaking, but it would be helpful to have some idea of the relative uncertainties of each component. Its not necessarily within the scope of the paper.

P5 L29: SM1 and 2 refer to the soil pits, not the profiles, correct? Deep pits! "Manually dug" would imply shovels, not heavy machinery.

P6 L10: Is the mfg.'s calibration specific to the soil type? It looks like the SMT100 probes output permittivity – is it useful to compare the mfg. calibration to the Topp equation?

P6 L18: suggest replacing groundwater surface with water table, and including the depth to water.

P7: I would mention that groundwater levels were recorded with submersible pressure transducers.

P7 L7: a screen interval to 32 m depth would place it below the 30-m thick Pampeano formation (P4 L10). Can you state that the wells didn't penetrate the Puelche formation, or that the groundwater levels are a composite of the two formations? If the intent is to measure gw levels in the Pampeano, its surprising they would be screened with such a long interval, and so close to the bottom of the formation.

P7 L13: Its unclear what p is here and elsewhere. The p-value from a statistical test?

P8 L8: These SY values appear to agree very well with the gravity data, based on figure 4. At some point it would be interesting to compare those estimates, not necessarily in this paper. But you could mention the good agreement (some readers may not realize gravity data are useful for estimating SY).

P8 L17: delete "of" (1.7% missing data).

P8, L18: I only found data through March 18 in IGETS. I assume it will be updated at some point? Assuming this is a long-term site, can these data sets (from this paper and IGETS) be maintained/updated "automatically"?

P8 L21: Suggest defining "WMO" abbreviation at first use

P8 L27: Section 3.3.1 describes gravity residuals, do you mean 3.3.2 and/or 3.3.3?

P9 L1: trees not tries

P10 L12: I would state explicitly what corrections were applied, e.g. "The data set contains gravity residuals corrected for…as well as…"

P10 L20: Are Level 1, 2, 3 in this paper used the same as at IGETS? That would be worth mentioning in the introduction.

P10 L19: Here you discuss gravity time series under the heading "Gravity residuals". Maybe move the mention of Level 1 and level 2 to the general "Gravity" heading?

P10 L 21: "In this study, only Level 3 hourly gravity residuals are provided": unclear. Do you mean, gravity residuals are only provided as a level 3 product? (Do IGETS Level 2 products include residuals?)

P10 L 22: I would be interested to learn how the calibration factor was determined.

P12 L8: You could mention storm surges here as a major contributor to the non-tidal ocean loading – it took me a while (and the Oreiro paper) before I figure out what this was.

P12 L10: what exactly is the hydrological effect? (soil moisture + groundwater + precip + ET?) Its surprising daily rainfall would suffice for hourly residuals.

P12 L 30: Add "m" after 0.1

P13: I would mention specifically that code is provided as Matlab, Julia, and shell scripts (+ others?), and that the relational database is SQL. For what it's worth, I was

unable to follow the instructions for using MySQL (I don't have any experience using it). I was able to create a database and run the commands in create_hosgo_db.sql and fill_hosgo_db_metadata.sql from the SQL command prompt, but I got several errors trying to run the commands in fill_hosgo_db_data.sql, all of the form:

ERROR 1452 (23000): Cannot add or update a child row: a foreign key constraint fails ('hosgo'.'timeseries', CONSTRAINT 'timeseries_ibfk_1' FOREIGN KEY ('ts_id') REFERENCES 'timeseries_info' ('ts_id'))

Figure 1: Label elevation scale bar in meters. A satellite image in part (c) would be useful.

Figure 2: Be more specific about groundwater units, both in the y-axis label and the caption. If you are reporting negative values, it is probably groundwater elevation relative to land surface. More typical would be "Depth below land surface", with positive values and a reverse y-axis, or elevation relative to mean sea level, also in positive values.

Figure 4: Perhaps outside the scope of the paper, but I would be interested to see additional time series: the gravity effect of soil moisture, goundwater, air pressure, local loading, global loading, etc., plus the gravity residuals before applying air pressure and hydromet corrections. It appears you've simulated the residuals nearly exactly from the hydromet data and models; what does the residual look like after that correction – it must be nearly flat? What signal(s) might you see in such a time series?

References: There appears to be a formatting error in which the URL is duplicated (with slight changes) for many of the references.

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