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Interactive comment on "Homogenization of the historical series from the Coimbra Magnetic Observatory, Portugal" *by* Anna L. Morozova et al.

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Reply to Dr. Mioara Mandea (essd-2020-317-RC1)

First of all we would like to thank Dr. Mioara Mandea for her useful comments.

Unfortunately we can't follow some of the suggestions ("A physical interpretation of the results will bring more interest to this data driven manuscript" and "The long series of D and/or Y component can be used to investigate the SV behavior and geomagnetic jerks. A comparison with long series of D measurements could be used to show how COI are data in investigating these events.").

The main reason is that it is outside the ESSD journal policy which says " Any interpretation of data is outside the scope of regular articles". Thus in this manuscript we

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focus on presenting new (homogenized) data sets that, we hope, will be used later on by other researchers to study geomagnetic field variations in the European region.

Besides, we must note that the geomagnetic jerks were already studied in our 1st paper (Morozova, A.L., Ribeiro, P., Pais, M. A.: Correction of artificial jumps in the historical geomagnetic measurements of Coimbra Observatory, Portugal, Ann. Geophys., 32, 19-40, doi:10.5194/angeo-32-19-2014, 2014.) dedicated to the homogenization of the series of the D element. Since the Y element, as is shown as well in our present manuscript, is very similar to D and was always calculated from other measured elements, it has no additional value for a study of the jerks.

Below we present replies to other comments:

-Lots of information are given in the manuscript and they might be better deliver and summarized in forms of Tables.

We combined the information from the main text Table 2 and Tables S1-S3 from the supplement to make four new tables (Tables 1-4 in the revised manuscript) with the metadata and the correction values for the H (Tab. 1-2), I (Tab. 3) and Z (Tab. 4) elements updating them also with the information from the main text. Also all details about the instruments (specific names and numbers and installation options) are moved from the main text to the Supplement (Table S3). Furthermore, the Table 1 from the original manuscript is also moved to the Supplement (Tab. TS2 in the updated Supplement). Other Tables in the supplement are not changed but renumbered accordingly to the main text changes.

-The authors propose to homogenize the available magnetic data until 2015. Why not until present day, supposing data are available for mid-2020?

The set of the instruments installed in 2006-2007 is still in use at the COI Observatory. This means that, as we mention in our manuscript (sec. 1): “the addition to the corrected series of measurements done after December 2015 will not affect their

homogeneity". Thus, anyone can download COI data for 2016-2017 from, e.g., WDC open data base and add them to the homogenized series presented in our work without any correction or treatment (corresponding link is added to the revised text – sec. 5). The data for 2018 and 2019 will be soon uploaded to WDC.

-It is not clear how different noise contributions are assessed. For example, the "urban electromagnetic noise level" is noted, but no information about its value and evolution is provided.

In the presented manuscript we paid our attention only to changes of the baseline of the geomagnetic field elements. No treatment for the noise was done. The level of the urban electromagnetic noise could be devised from the variability of the data, e.g., using the month-to-month time derivative, as we mention in sec. 3.1 of the manuscript, or the standard deviation, comparing a more perturbed period vs a less perturbed period. Although, one must keep in mind that a larger part of hourly and daily noise is averaged out by the calculation of the monthly means. Corresponding sentence is added to the revised manuscript – sec. 5.

-Somehow Figure 1, has to be the last figure of the paper (with all corrections applied). This figure needs after to be discussed in details.

Figure 1 from the original manuscript is split into Fig. 1 and 9 of the revised manuscript. Fig. 1 of the revised manuscript shows the COI original (observed) series and the COV-OBS model prediction. Figure 9 of the revised manuscript (now it is the last figure of the main text) shows COI observed and corrected series (final correction to the level of 2015). Since all the differences between the observed and corrected COI series result from the corrections described in detail in the main text (Sec. 3-4) we see no need to discuss once again the differences between the original and corrected series of the geomagnetic elements.

Also, according to the comments of another reviewer, the COI data are now available in the plain ASCII format in addition to the originally uploaded XLSX files.

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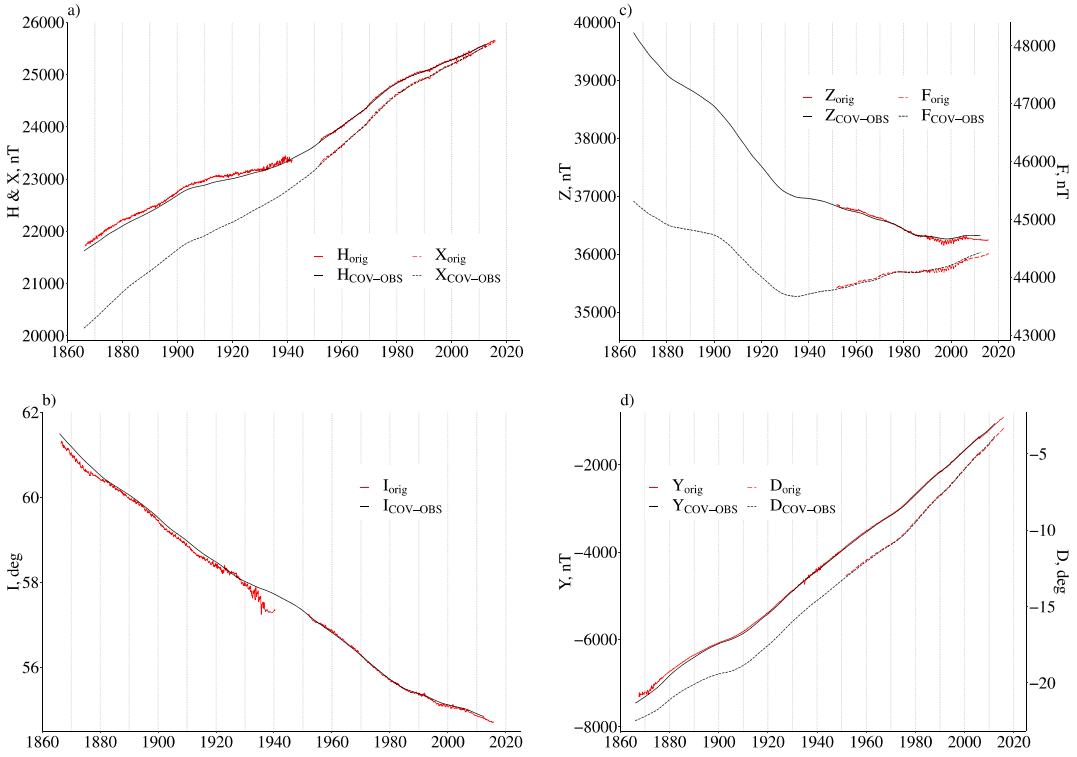

Fig. 1. new Fig. 1

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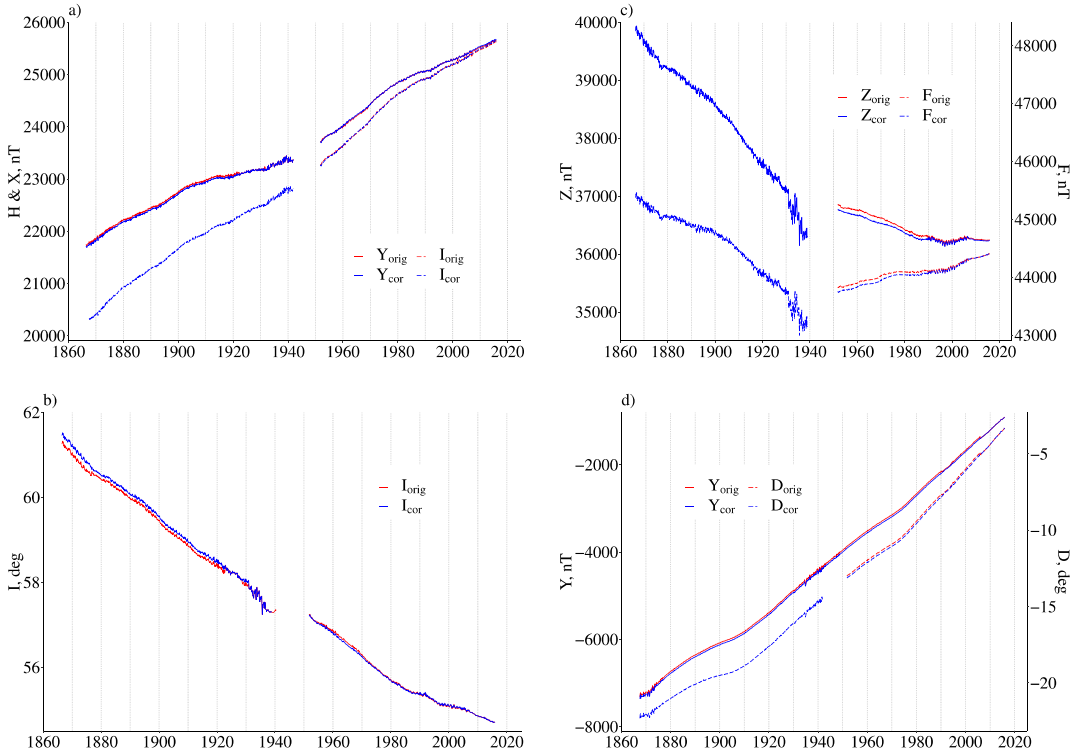

Fig. 2. new Fig. 9

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