



Comment on **essd-2020-371**

Lars Ottemöller (Referee)

Referee comment on "Complementing regional moment magnitudes to GCMT: a perspective from the rebuilt International Seismological Centre Bulletin" by Domenico Di Giacomo et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2020-371-RC1>, 2021

General comments

The manuscript gives an overview of moment magnitudes (M_w) that are reported for earthquakes globally and compiled at the ISC into their bulletin. The majority of M_w are reported by global monitoring centers, i.e. the NEIC and GCMT. The authors point out the importance of the ISC catalog with the M_w reports for many geophysical and seismological studies and applications. The particular focus in this work is to investigate and highlight the M_w contributions from other data centers that operate at either regional or global scale. The main conclusions from the work are: 1) the ISC bulletin with the integrated M_w reports is a very valuable resource; 2) complementing the global M_w reports with more regional reports allows to extend the bulletin (with M_w) to smaller magnitude; 3) reports of M_w for smaller earthquakes are still limited and observatories are encouraged to report. The manuscript provides a comprehensive overview of currently available M_w measurements. However, the authors avoid explaining possible discrepancies seen in the reports from the various agencies that may come from using different methods.

Specific comments

The manuscript is generally well written and easy to follow. The authors are inclusive and consider all possible agencies that are reporting M_w . However, the text would be easier to read by moving text on data sources that provide too few M_w reports (and are not much used in the study) to supplementary material.

While M_w is well covered in the literature, the authors could add a couple of sentences on the basic methodology used by GCMT to obtain the seismic moment, which would be useful for the non-seismologist. It also would be useful to mention limitation of M_w in not being sensitive to energy release.

The authors avoid providing details on how M_w is measured by the smaller agencies. I think it would be important to at least explain that the methodology may change when going from large to small earthquakes (where moment tensor inversion may no longer be the method that is used). Ideally, the manuscript would benefit to at least give an indication of what is done by the institutions at the regional scale, perhaps in form of a table, as this is needed to even partly understand some of the observations that are made

when comparing global and regional Mw. It is also possible that Mw is the outcome of a standard automatic procedure – in that case it would be useful if and how the results are revised.

The authors explain that NEIC reports Mw provided by other agencies and these are labelled. I am concerned if the other way around, regional agencies may also provide Mw that they took from NEIC/GCMT. There may be no issue at all, but if there was the comparison would not be meaningful for those agencies.

The authors appear to be using MS and mb to compare to regional Mw, this may require better justification. It also could be an alternative not to include non-Mw magnitudes in this work.

It is appreciated that the authors provide the data and scripts for plotting.

Technical suggestions

More detailed comments on content and language are given in the attached PDF.

Please also note the supplement to this comment:

<https://essd.copernicus.org/preprints/essd-2020-371/essd-2020-371-RC1-supplement.pdf>