# Supplemental figures (S1-S5) and tables (S1,S2)



Figure S1. Sensitivity of the two-parameter linear fitting to the regression method. For correlation coefficients RXY close to one, however, the difference between SR and POR becomes negligible, whereas for data with large scatter like in the case of JSO ML here, they differ significantly.



Figure S2. Sensitivity of the fitting to the geographical coverage of the input data. Dashed black line: global dataset (Di Giacomo et al. 2015), blue line: regional dataset (this study).

|  |  |
| --- | --- |
| a) | b) |
| c) | d) |
| e) | f) |
| Figure S3. Correlation of direct MW measurements from different agencies. | |

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| --- | --- |
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Figure S4. Effect of lower bound cut-off on the shape of the fitted curve. Only the functional form with lowest RMOSEadj for each case is plotted.

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Figure S5. Derived conversion relations for six of most common magnitude types. See Table 2 for more information. The acronyms for the agencies are based on ISC Bulletin’s naming scheme <http://www.isc.ac.uk/iscbulletin/agencies/>.

Table S1. Statistical analysis of the absolute differences with respect to ISC Bulletin’s prime solution.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **All contributing agencies** | | **GII/IPRG** | | **CSEM\*** | |
| **Percentile** | **Time (s)** | **Location (km)** | **Time (s)** | **Location (km)** | **Time (s)** | **Location (km)** |
| **5th** | 0.1 | 1 | 0.1 | 2 | 0.1 | 1 |
| **50th** | 1.3 | 12 | 1.4 | 13 | 0.7 | 5 |
| **90th** | 5.5 | 50 | 4.7 | 39 | 2.4 | 23 |
| **95th** | 9.5 | 85 | 6.2 | 53 | 3.1 | 32 |
| \*the absolute differences between GII/IPRG and ISC’s prime were almost identical to the ones between GII/IPRG and CSEM. | | | | | | |

Table S2. Contribution of each source to the unified homogenized catalog (Mw≥3), in terms of either location and origin-time or magnitude, given our hierarchy scheme (§5.2).

|  |  |  |
| --- | --- | --- |
| **Source** | **Location &**  **origin-time** | **Mw** |
| EMEC | 1% | 2% |
| EMME | 1% | 1% |
| EMSC | 1% | 1% |
| GII | 3% | 1% |
| ISC Bulletin | 92% | 93% |
| ISC-GEM | 1% | 1% |
| IRIS | 1% | 1% |