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Interactive comment on "The ISC Bulletin as a comprehensive source of earthquake source mechanisms" *by* K. Lentas et al.

K. Lentas et al.

kostas@isc.ac.uk

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We have taken the Reviewer's comments into account in the preparation of this revised version of the paper, which contains some text changes and additions, to fully address their requests. Moreover, we extended the data time period covered in this manuscript until the end of the data year 2018, as opposed to October 2018 when the manuscript was first submitted. The data added until the end of 2018 does not change the content and results discussed. Here follows our response to the Reviewer's comments and an explanation of the points that we have changed. Attached to our response is the revised version of manuscript with changes tracked in blue for the text addition/changes and in red for the text deleted.

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Discussion paper

1 Reviewer 2

1.1 “Which mechanism to use?”

Reviewer 2 mentions that the manuscript does not offer an answer in the question which mechanism to use in the case of multiple solutions for the same earthquake. In fact this question is mentioned in two out of four comments. The Reviewer claims that the current paper has tried to answer this question but the answer is not given. The Reviewer also proposed to develop the manuscript towards the direction of presenting the ISC computed focal mechanisms as more reliable, similar to the ISC event locations.

Let us first clarify that the purpose of this manuscript is an attempt to draw the Researchers’ attention on the availability of source models in the ISC Bulletin. It is true that for decades the ISC put all of the effort in analysing and relocating seismic events with the use of reported parametric data, whilst not much, if any, has been done to promote the availability of collected source models. In fact the usage of the dedicated online web search on source mechanisms in 2018 corresponds to less than 2% of the total use of the ISC web site!

In this paper we aim to acknowledge the agencies reporting source models in the ISC Bulletin, discuss the differences in techniques being used by the major contributors, and highlight the complexities in combining source models following different concepts and being determined by different techniques. For this reason we added new text in Section 3 (page 4, lines 1-18) and pages 8 (lines 24-36) and 9 (lines 4-19), also combining some of the comments posed by Reviewer 1. Moreover, in order to highlight how different agencies can act complementary to each other and provide a more comprehensive coverage in space, time and magnitude we added Figure 4 and new text in page 3 (lines 11-25).

Regarding the ISC computed focal mechanisms, we added these mechanism solutions

in the analysis of the revised manuscript (also suggested by Reviewer 1) but we cannot claim that the ISC focal mechanism solutions are more reliable than other solutions provided by other agencies, since they can be fundamentally different in comparison with them. Take as an example a centroid based moment tensor solution (see for example additional text in page 4, lines 1-18, and page 6, lines 3-22). Finally, given all the above explained complexities, we gave only general recommendations described in page 8 (lines 24-36) and page 9 (lines 4-19). Yet again, we have made clear in the manuscript that it is not our purpose to recommend the use of one data provider over another, but we provide all the information we can collect and let the Researchers to choose this with respect to the needs of their research.

1.2 “Figures”

Reviewer 2 commented that the Figures only cover statistical information and do not serve the purpose of the manuscript. We believe that enhancing the manuscript with new text, it is clearer and more obvious how the Figures presented in this paper can help readers to better understand the content of the ISC Bulletin regarding the availability of earthquake source models. The newly added Figure 4 should also help further towards this direction.

1.3 “Figure 5”

In conjunction with Reviewer’s 2 first comment, more information was requested on how to choose a proper or target mechanism solution in Figure 5 for earthquakes with multiple solutions.

To address this point we have expanded the text first by recalling the fault styles according to Zoback (1992) and secondly by summarizing how we proceeded to characterize an event when multiple solutions are available. Examples for different cases have been

given and links to real cases in the ISC Bulletin added. We believe that the revised text clarifies the scope of original Figure 5 (now Figure 6 in the revised manuscript). The revised text regards the entire page 7.

2 Additional changes

We added a few new references to the manuscript, updated the figures and corresponding captions and at times streamlined the text.

Please also note the supplement to this comment:
https://www.earth-syst-sci-data-discuss.net/essd-2018-143/essd-2018-143-AC2-supplement.pdf

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