We have revised the manuscript based on the suggestions and advice of the reviewers. The authors are very grateful for the reviews, as they have improved our manuscript considerably. An item-by-item response to their comments is enclosed. We hope that these revisions successfully address their concerns and requirements. We have enumerated all the referees' comments in the following answers to streamline the review process.

Dr. Alessandro Tibaldi:

1.1. I would only encourage the authors to add some more explanations about the seismicity showed in their web map.

- An explanation has been added at the "seismicity" block of the web map interface according to the preceding author comment AC1: "Crustal earthquakes that occurred at the AFEAD faults and recorded with the key "Seism=" in PARM field. Sources: National Earthquake Information Center (NEIC), U.S. Geological Survey and the International Seismological Centre (ISC)"

1.2. I have seen the lacking of some major active faults in the present database; for example, in Iceland very few faults have been presented in the database, respect to the available information.

Fault pattern in Iceland was considered detailed enough during the database population. However, provided data is included in the forthcoming update of the AFEAD v.2022.

1.3.

The other comments suggest straightforward corrections to the text, and we accept them.

Anonymous Referee #2

2.1. Scientific weaknesses

2.1.1 The data collection is based on bibliographical investigations, but most of the bibliographic references are quite outdated. Out of the 657 references (in the Excel file), only 13 are post-2010. Of these 13, three are classified as unpublished information. Of all 657, 55 are classified as unpublished information, most of which are as old as 1996. How reliable can be a piece of information supplied to the authors 25 years ago and never published since then?

Indeed, old and unpublished information is the least reliable source. Unfortunately, those cases cannot be considered outdated *sensu stricto* due to the absence of more relevant information. We are grateful that the referee highlighted this topic, but cannot agree that it is a scientific weakness of the database; instead, it displays a bias in active fault studies towards most active or easily accessible fault systems. Referee's concerns on the reliability have already been accounted for in the CONF (level of confidence) parameter.

2.1.2. In the last decade, several active fault databases have been published containing updated information. Below I list some of them (not necessarily exhaustively) that have significant geographical overlap with AFEAD and contain more up-to-date data than AFEAD:

Provided data will be included in the forthcoming update of the AFEAD v.2022; a portion of data has been already populated after the AFEAD v.2021 release. However, they are not comparable to AFEAD by extent or detail or both.

2.1.3. Apart from those compilations released in the last year, most of these have been around for quite a long time now. In addition to this lack of data, the relationship between the fault representation in

AFEAD and the fault representation in the source dataset is not clear. This is of particular concern for the blind faults since only criteria associated with the topographic signature are recalled. On the one hand, not considering the latest fault compilations prevents AFEAD from listing the newly recognized active faults. On the other hand, it also prevents AFEAD from eliminating those faults that were once considered active but are currently considered not active based on new evidence. Unfortunately, the CONF parameter does not consider the recency of the information.

A workflow of transferring source data to the AFEAD representation is presented in section 4. Source Data. We have expanded this section to clarify the workflow, especially in the cases of contradiction among data sources. There is no direct relation between the recency of the information and its accuracy, so any join of recent data requires a comparison of the reasoning behind older and recent objects. The result of the comparison affects CONF in either its elevation or decrease and even deletion from the database.

2.1.4. The compilation of the fault parameters also remains rather obscure in several aspects. For example, of the 47,363 faults, 22,270 (47%) have no parameter assigned (field "Parm" is NULL). Of the 25,093 faults with the field "Parm" not NULL, only 6,849 reports a "Rate=" value; how was then the Rate (rank) parameter assigned to the remaining faults?

Objects of null "Parm" are typically those collected from fault maps with no parameterization. Please note that RATE=3 means "no measured rate above 1 mm/yr" (see Table 2), so it addresses all those cases.

2.2. Technical weaknesses

2.2.1. The AFEAD is distributed as a single shapefile. Technically speaking, it is not even a database apart from the implicit relation between geographic features and their attributes. No relational table is provided between AFEAD and any of its linked information. In other words, it should be classified as a geographical flat-file, not a proper database.

According to Wikipedia, "A database is an organized collection of data, generally stored and accessed electronically from a computer system." (https://en.wikipedia.org/wiki/Database), and AFEAD satisfies this definition of a database. However, it may not meet the definition of a relation database. Depending on the editor's decision, we can identify AFEAD as a "dataset" as it affects neither its inner structure nor representation. However, our experience in hosting and distribution of tectonic data shows that user-friendly shapefile format gets better reception among the researchers. Most AFEAD use cases require basic spatial analysis and text search on the user device without DBMS software.

2.2.2. The fields in the shapefile attribute table are very poorly organized. First of all, none of the fields can be identified as a primary key. The lack of a primary key prevents the user from uniquely identifying any records and establishing their possible relations with external information. Also, the user cannot make an explicit reference to an individual AFEAD record when using it, including this review.

A primary key has been added (field "FID").

2.2.3. Both the "Auth" and "Parm" fields contain long text strings that, in the next update, could become even longer and easily exceed the limitations imposed by the shapefile format. Notice that the maximum number of characters in a text field of a shapefile is 254, see Attribute limitations in ESRI documentation at: https://desktop.arcgis.com/en/arcmap/latest/manage-data/shapefiles/geoprocessing-considerations-for-shapefile-output.htm#GUID-A10ADA3B-0988-4AB1-9EBA-AD704F77B4A2 or https://support.esri.com/en/technical-article/000012081

Even accounting for shapefile standard limitations, we consider it the best format to distribute among researchers in the field of active faulting. It requires no proprietary software but supports spatial analysis and data queries. Only few objects are close to the maximum string length in AUTH or PARM

and this could easily be resolved by removal of outdated or least relevant sources. In the current AFEAD schema, field limitations do not affect data presentation and usability.

2.2.4. These two fields are also very difficult to explore, especially the Parm field that contains very heterogeneous parameters. This poor organization makes it hard for the user to use the database. For example, selecting the faults that have a certain "depth" information would require a very complex query, which would discourage the non-experts in SQL and expose the users to uncertain results. Also, the Parm field takes up more bytes than needed by repeating within the field the word to identify the parameter type, such as "Sense=" or "Rate=" or "Depth=", occasionally also including the reference to the parameter itself.

Indeed, PARM is designated for ease of reading, not querying. Below, the reviewer proposes to "separate the "Parm" attributes into different columns, paying attention to storing single numerical values in individual columns." A schema of the spatial database of the World Map of Major Active Faults (DB96) was exactly what the reviewer suggest, and we intentionally changed this approach in AFEAD. The suggested schema leaves no room for different estimates of the same parameter and references for these estimations. A defined domain of values will distort citing of data (e.g. single numerical value is required where only value range or upper estimate is known). Finally, well above 90% of such fields will be empty, which hampers visual interaction with data. However, if any parameter, e.g. depth, becomes credible for a large amount of data, it will be recorded to an individual column (say, DEPTH), like it was done for fault sense (fields SENS1, SENS2) and uplifted side (field SIDE).

2.2.5. The use of the "+" (plus) sign in the "Side" field is unnecessary because all the non-null values are a plus. It could also be troublesome because the plus sign can be automatically converted when importing the data in other systems (try saving the attribute table into the Microsoft Excel format, for example).

SIDE is a text field, and any DBMS may handle mathematical symbols in text strings. We were unable to reproduce problems when opening .dbf attribute table in MS Excel. In active faults databases, it is common to label a downthrown side as well, so the plus sign serves as a reminder about an uplifted side.

2.3. Other issues (listed by line "L" number)

They suggest straightforward corrections to the manuscript, all of them were accepted. In AFEAD, strike-slip with unknown sense is considered equal to unknown sense (SENS1=U).

2.4. Recommendations

2.4.1. The following technical fixes are necessary to make AFEAD suitable for using it in a proper DBMS.

We consider shapefile to be the most suitable data format for the distribution of AFEAD at the moment. The provided guidelines will be essential for a redesign of AFEAD when demand for relation database managed by DBMS software increases.

2.4.2. The European plate boundary along the Mid-Atlantic Ridge should be completed to make AFEAD adhere to its name (it could be disappointing for the AFEAD user to find data in the African plate and not the complete European plate).

Faults in the Mid-Atlantic Ridge will be included in the forthcoming update of the AFEAD v.2022

2.4.3. More explanations are needed to make the user understand the source of information used to assign the Rate ranks.

Explanations have been added to the manuscript and AFEAD web map interface.

2.4.4. A justification is needed for not considering all the recent fault data compilations published in the last decade. The authors should also discuss the implications due to the lack of updated information and warn the users about the limitations in using AFEAD instead of more up-to-date regional/local data.

Explanations have been added to the manuscript and AFEAD web map interface.