

The authors thank Stephen Laubach and the anonymous referee for taking the time to review the responses provided during the first round of reviews. The comments are appreciated and have been considered.

Detailed replies to each of the reviewer's points are provided below, following the color scheme proposed in the previous replies:

- **Red** indicates lines from the revised manuscript (first round).
- **Black** corresponds to reviewer or community comments as well as the unchanged portions of the revised manuscript (first round).
- **Blue** highlights the revised sections and newly added lines in the updated version of the manuscript.

## REVIEWER #1 – STEPHAN LAUBACH

We fixed the highlighted typos:

**Original (line 75):**

... that only the fracture high enough to about or crosscut the bedding interface can be systematically sampled.

**Revised (line 75):**

... that only the fracture high enough to abut or crosscut the bedding interface can be systematically sampled.

**Original (lines 1131-1132):**

Fisher, N. I. and Best, D. J.: GOODNESS-OF-FIT TESTS FOR FISHER'S DISTRIBUTION ON THE SPHERE, Aust. J. Stat., 26, 142–150, <https://doi.org/10.1111/j.1467-842X.1984.tb01228.x>, 1984.

**Revised (lines 1040-1041):**

Fisher, N. I. and Best, D. J.: Goodness-of-Fit Tests For Fisher's Distribution On The Sphere, Aust. J. Stat., 26, 142–150, <https://doi.org/10.1111/j.1467-842X.1984.tb01228.x>, 1984.

## REVIEWER #2

Cap 4 –Authors argue that “from a methodological point of view rather than a geological one, the complexity is not primarily related to the number of fracture sets or the presence of foliations”. Beyond the problem of recognizing small, discontinuous patches, the real challenge is assigning them to discontinuities that make sense geologically. Therefore, I

disagree that the case in question is particularly complex. In truth, almost every rock mass presents fracture planes that are “not continuous along their trace, and orientation measurements that are based on small, isolated point clusters”. This is a basic problem common to all case studies. The persisting in the cases with complex geology (in terms of discontinuity network) are the reliability of the cluster predefinition and the possible forcing into classes defined either on a small amount of field data or manually mapped onto the DOM. I suggest the authors exercise caution on this point and highlight limitation of the method.

**Done.** We thank the reviewer for this comment; this is indeed a point of discussion that we had not considered. We have decided to add a sentence in the discussions (sec. 11.2) to highlight the limitations of the method applicability.

Revised (from line 922):

The applicability, and thus the quality of the results produced by the automatic feature extraction algorithm, strongly depend on the ability to distinguish and characterize each fracture set within the network. In this study, reliable results were obtained by clearly distinguishing fracture sets through the integration of field data, DOM-derived data, and clustering analysis. In more geologically complex settings, where fracture sets are less well defined, caution is advised both when applying the clustering algorithm—since the number of sets must be specified a priori—and when using the automatic feature extraction algorithm.

Conclusions: I suggest introducing a statement describing the outcrop conditions where the methodology can be applied with more complete and effective results.

**Done.** We agree with the reviewer’s comment and have added a sentence in the Conclusions (sec. 12) section to clarify the ideal conditions for applying the proposed methodology.

Revised (from line 1018):

The ideal conditions for applying our methodologies involve an outcrop that enables the collection of a statistically significant and complete dataset (depending on the scope of the work). This requires favorable orientation of the outcrop faces relative to the fracture set orientation, overall surface cleanliness (minimal debris, vegetation, or damaged zones), sufficient size to ensure adequate sampling, and the presence of at least two perpendicular exposures (horizontal and vertical). Although such conditions are challenging to achieve in natural settings, they should serve as guidelines for selecting a suitable outcrop.