

## Author response to “Interactive comment on “Correlation of core and downhole seismic velocities in high-pressure metamorphic rocks: A case study for the COSC-1 borehole, Sweden” by Felix Kästner et al.”

Anonymous referee #2

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Following the developments in resources exploration industry, scientific studies using core-log-seismic data integration were progressed gradually over three decades under the scientific drilling programs as standard use on almost every projects. However, quality of the data and integration process were limited on use of tools, operational difficulties, particularly in ocean drilling projects and for hard rocks. Hence, there are very few studies on hard rock data integration and this research is one of the few case using complete set of core, log and seismic data in high quality data as well as supported further experiment for integration.

### Author’s response

We thank the reviewer for reviewing our manuscript submitted for publication in Solid Earth. The reviewer suggested a few minor modifications of the manuscript. According to the suggested amendments, we list the reviewer comments (RC2) and our proposed changes to the manuscript (AR) in the following:

**L20:**

RC2: *Core-log-integration using synthetic seismograms requires wireline logging data and mafic lithologies.*

AR: This is correct. This sentence is perhaps not clearly formulated. We removed it.

**L167:**

RC2: Rephrase to “[...] accuracy of the pulse arrival picks [...]”

AR: Amended.

**L208:**

RC2: Remove “equals”

AR: Done.

**L244:**

RC2: Amend sentence to “[...] low values, agreeing well with the velocities measured on core [...]”

AR: Amended.

**L257:**

RC2: Insert missing comma.

AR: Done.

**L289:**

RC2: Insert “with”

AR: Done.

**L290:**

RC2: Replace “the” with “these”

AR: Amended.

**L328:**

RC2: Rocks of the present study?

AR: Here, we are referring to the rocks found in the COSC-1 lithology. However, of course, this in particular is only true for the analyzed samples. We rephrased this for clarification: “This suggests a strong structural dependence of the seismic velocities for the rocks of the Seve Nappe drilled by the COSC-1 borehole.”

**L335:**

RC2: “Here”?

AR: We rephrased this line for clarification: “The presented anisotropy-depth profile [...]”. We also added a reference to the referred figure.

**L336:**

RC2: Remove “Nevertheless”

AR: Amended sentence to: “Despite of large data gaps, [...]”

**L372:**

RC2: Respell to “mantle-driven”

AR: Done.

**L390:**

RC2: Slightly low values or low values?

AR: Because of the insufficient closure microcracks we infer slightly lower velocities for the felsic gneisses than expected. We rephrased the sentence for clarification: “[...] result in lower values for [...]”

**L444:**

RC2: “anisotrophies”

AR: We prefer to stay using the singular and respelled it accordingly to “anisotropy”.