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Interactive comment on "Folding and necking across the scales: a review of theoretical and experimental results and their applications" *by* Stefan Markus Schmalholz and Neil Mancktelow

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We thank Peter Hudleston for his helpful and constructive review.

We shortened the text concerning the work of Neurath and Smith to some extent.

We clarified our usage of the terms necking and pinch-and-swell at the beginning of the introduction following the reviewer's suggestion.

We define now competent (i.e. one having a higher mechanical strength or greater resistance to deformation) and mention that necking can also occur for non-linear rheologies other than power-law.

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Discussion paper

We corrected the misspelling and references.

We included a new figure which visualises the dependence of the dominant wavelength and maximal amplification rate on the spacing of the competent layer. The results are from Schmid and Podladchikov (2006) for embedded, linear viscous multilayers which we consider the most applicable configuration for multi-layered rocks for which approximate analytical solutions exist. For example, the dominant wavelength solution of Biot displayed in our Eqn. (33) indicates that the dominant wavelength increases continuously with increasing layer spacing (because the parameter a goes to 1 but the total thickness of the multilayer increases) and hence this formula does not capture the "real single layer" mode of Schmid and Podladchikov (2006). If the spacing is larger than the dominant wavelength of the individual layers, then the individual layers will develop the single layer dominant wavelength independent of a continuously increasing spacing.

Specific comments

Line 402. Done.

Line 412. We modified the text.

Line 569. We added the reference.

Line 627. We added two references.

Line 810-815. We would be very happy to cite Ramsay and Huber (1987) on this point but we are not sure what figure is being referred to.

Line 1000. We modified the text to make this clear.

Line 1004. The decrease in amplification rate for necking of layers embedded in a viscous matrix is rather caused by the increasing shear resistance of the embedding matrix around the necking zone. If the layer is not embedded in a matrix (free plate) then the amplification rates are actually increasing with progressive necking which agrees

with analytical solutions for necking of free plates (see e.g. Fig. 9 in Schmalholz et al., Journal of Structural Geology, 2008). We added a sentence to explain this.

Line 1273. We added a sentence stating that the authors (Adamuszek et al., Terra Nova, 2013) applied their theory to a folded sequence of alternating nodular limestone and shale.

Figure 2. Done.

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