

Interactive comment on “Surface movement above an underground coal longwall mine after closure” by A. Vervoort

Anonymous Referee #1

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The presented topic is of high significance. It addresses environmental impacts of underground coal mining after closure in terms of residual subsidence and uplift and contributes as such to after mine care and safety. The paper is well presented and structured, includes a thorough analysis of spatial data leading to new insights into mechanisms controlling vertical ground movements after mine closure.

From the reviewer's point of view, view minor changes may support the contribution:

1) It is advised to use passive voice consistently in the text, no use of we 2) Lines 143 – 146 appear to the reader a bit unclear (overlap in time zones) – this could be rewritten more clearly 3) At the beginning of section 3 the reader may already ask himself about the sequence of mining as it may likely influence the timely subsidence/uplift behaviour. Although discussed later in section 4, it may help to introduce basic mining parameters

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(depth, thickness, and mining sequence) already in the introduction section next to the description of geology. A map containing years of production of the panels may help visualising a possible link between ground movement and extraction sequence. 4) Sentence in line 185 related to EW section could be left out (Ideally, . . .), since no section is presented. 5) Formulation in line 263 appears unfortunate: Better: 'It becomes obvious that an uplift over the entire area took place' 6) General question on section 3: Does the author suspect that when using different time periods (e.g. 2010 – 2013 or before 1992) results may differ, especially with respect to the rate of residual subsidence and uplift, e.g. due to the extraction sequence? In other words, is the comparison between 2 x 5 year periods just a snapshot or can observations be generalized? A short discussion may address this issue (partly later answered in section 4.3). 7) Interpretation lines 356-359: Note that especially in the centre of the field, considered the x and y coordinates for min and extensive mining activities are rather close. From the map the distance appears to be less than the area of influence. Movements may be superimposed and the ground movement behaviour at a min location is most likely affected by the subsidence from a neighbouring panel. Thus the ground movements of points which are close to each other may not interpreted independently. Conclusions drawn can be associated with some fuzziness, which would reflect the limit of this study by not taking the spatial nature (i.e. angle of draw of 45 degrees and superimposition of effect of multiple panels) into account. 8) Conclusions: One main conclusion is that there is obviously no one-to-one relation between some parameters and the effects of residual and uplift. A suggestion may be added to further research on this multi-variate problem using techniques including unsupervised learning and supervised learning. 9) Note on line 492: Much research has been conducted and published (mostly in German or Polish language) on complex mining geometries and multi-seam mining in the Polish and German hard coal industry by e.g. H. Kratzsch or A. Sroka. Only some references are available in English language.

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