Authors response to Reviewer 3 (RC3):

Supplement (detailed list of corrections)

Text:

Lines 50, 53, following your suggestions we have added additional references: Zimmer and Wessely, 1996; Adámek, 2005; Wessely, 2006; Myśliwiec et al., 2006

Line 112, we have supplemented this part of the text, according to your corrections:

The Upper Jurassic carbonate buildups in southern Poland display a large diversity of reef types, from siliceous sponge mounds to microbial-sponge buildups and coral reefs, as all of these types were commonly found in Europe where reefs were most widespread in the Late Jurassic (Kiessling et al., 1999; cf. Leinfelder et al., 1996; Gliniak et al., 2005; Matyszkiewicz et al., 2012; Krajewski et al., 2018). Outside of Europe reefs occurred less commonly in Late Jurassic, and they represented mainly coral-dominated reefs and biostromes (Kiessling et al., 1999). Common carbonate buildup types that can be recognized from the seismic data in Poland are bioherms (e.g. Gliniak and Urbaniec, 2001, 2005; Gliniak et al., 2005). Worldwide, these organic structures can be found in all latitudes between 45°S and 52°N (Kiessling et al., 1999); in southern Poland they often developed as large microbial-sponge biohermal complexes (e.g. Matyja and Wierzbowski, 2006).

Line 326, we have added here new paragraph, devoted to velocity pull-up effect observed on the analyzed seismic data. Additionally, we made here a brief comment on the studies from Luconia, Malaysia and NW shelf of Australia where the problem of velocity pull-ups was also raised (appropriated citations were added), as suggested. The entire new text is shown below:

The velocity pull-up effect observed beneath the carbonate buildups (cf. Fig. 13) results from lateral seismic velocity contracts between the massive and stratified (bedded) carbonates. The interval velocity of the massive limestones, drilled by modern Chopin-1 and Belvedere-1 wells, is about 5000–5000 m/s and is significantly higher in comparison to seismic velocity obtained from the Michałów-3 or Lipówka-1 legacy wells for the corresponding stratified deposits that are in order of ca. 3800-5000 m/s. However, it should be taken into account that velocity information from these old wells should be treated only tentatively, due to their uncertainty resulting from the lower quality of older well-logging data. Expected lateral seismic velocity variations between the massive and bedded carbonates often exceed 10% and might be responsible for producing some velocity pull-ups beneath the seismically faster carbonate buildups. Then, it is probable that at least for some of the morphological heights situated beneath the carbonate buildups in the analysed time seismic data, velocity pull-ups might have distorted their true geometries. The similar role of high-velocity reefal intervals in production of velocity pull-up effects beneath the carbonate buildups was described for time seismic data characterising the large Miocene buildups in Luconia, Malaysia (e.g. Zampetti et al., 2004; Rankey et al. 2019) or numerous isolated buildups from the north-west shelf of Australia (Saquab and Bourget, 2016).

*we are referring to line numbers of the original manuscript version

References:

Following your suggestions, following citations were added to the reference list:

Adámek, J.: The Jurassic floor of the Bohemian Massif in Moravia–geology and paleogeography, Bull. Geosci., 80, 91–305, https://doi.org/10.3140/bull.geosci.2005.04.291, 2005.

Kiessling, W., Flügel, E., and Golonka, J.: Paleoreef Maps: Evaluation of a Comprehensive Database on Phanerozoic Reefs, AAPG Bull., 83, 1552–1587, https://doi.org/10.1306/E4FD4215-1732-11D7-8645000102C1865D, 1999.

Myśliwiec, M., Borys, Z., Bosak, B., Liszka, B., Madej, K., Maksym, A., Oleszkiewicz, K., Pietrusiak, M., Plezia, B., Staryszak, G., Świętnicka, G., Zielińska, C., Zychowicz, K., Gliniak, P., Florek, R., Zacharski, J., Urbaniec, A., Górka, A., Karnkowski P., and Karnkowski, P.H.: Hydrocarbon resources of the Polish Carpathian Foredeep: Reservoirs, traps, and selected hydrocarbon fields, in: The Carpathians and their foreland: Geology and hydrocarbon resources, edited by: Golonka, J., and Picha, F.J., AAPG Memoir, 84, 351–393, https://doi.org/10.1306/ 985613M843073, 2006.

Wessely, G.: Geologie von Niederösterreich (in German only), Geologische Bundesanstalt, Wien, 416 pp., 2006.

Zimmer, W., and Wessely G.,: Exploration results in thrust- and subthrust complexes in the Alps and below the Vienna Basin in Austria, in: Oil and gas in Alpidic Thrustbelts and Basins of Central and Eastern Europe, edited by: Wessely, G.,and Liebl, W., EAGE Special Pub., 5, Geol. Soc., London, 81–107, https://doi.org/10.3997/2214-4609.201410141, 1996.

Figures and figure captions:

Figure 2, according to the suggested correction, we have annotated (by subsequent numbers 1, 2, 3 etc.) the location of previous seismic interpretation studies/papers on the Upper Jurassic carbonate buildups and we added the particular references in the figure caption, including suggested citations from Austria and Czech Republic.

*we are referring to line numbers of the original manuscript version

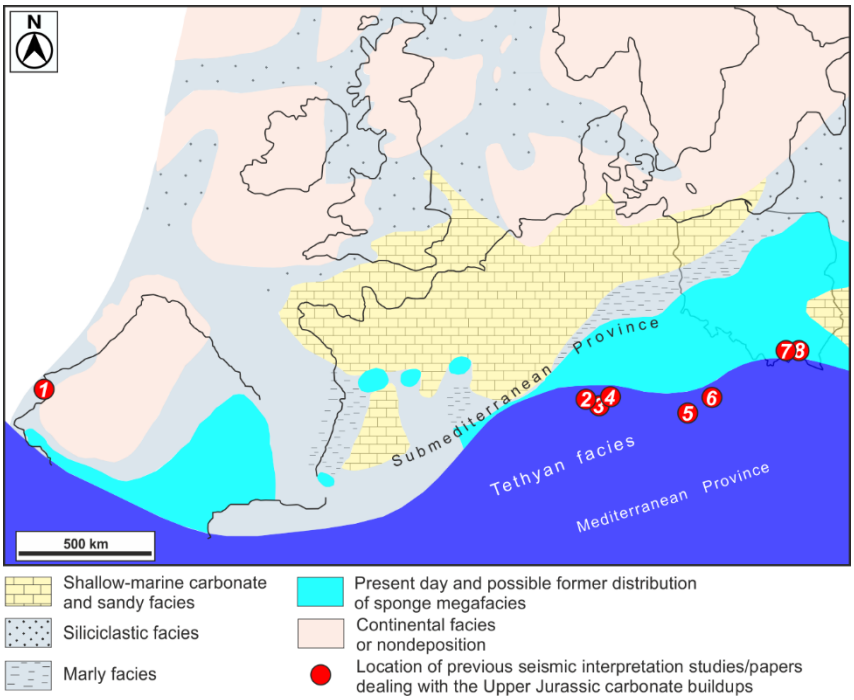

Figure 2. Simplified paleogeographic sketch map of central and western Europe for the middle–late Oxfordian (after Wierzbowski et al., 2016); red points show location of the previously published seismic interpretation studies/papers dealing with the Upper Jurassic carbonate buildups from the northern Tethyan shelf margin and adjacent areas (1. Ellis et al., 1990; 2. Bunes et al., 2010; 3. Hartmann et al., 2012; 4. Lüschen et al., 2014; 5. Zimmer and Wessely, 1996; 6. Adámek, 2005; 7. Gliniak and Urbaniec, 2001; 8. Gliniak et al., 2005; see text for more details).

Figures 8–10, for each figure we added zoom of identified carbonate buildups; also, the figure captions have been modified accordingly.

*we are referring to line numbers of the original manuscript version

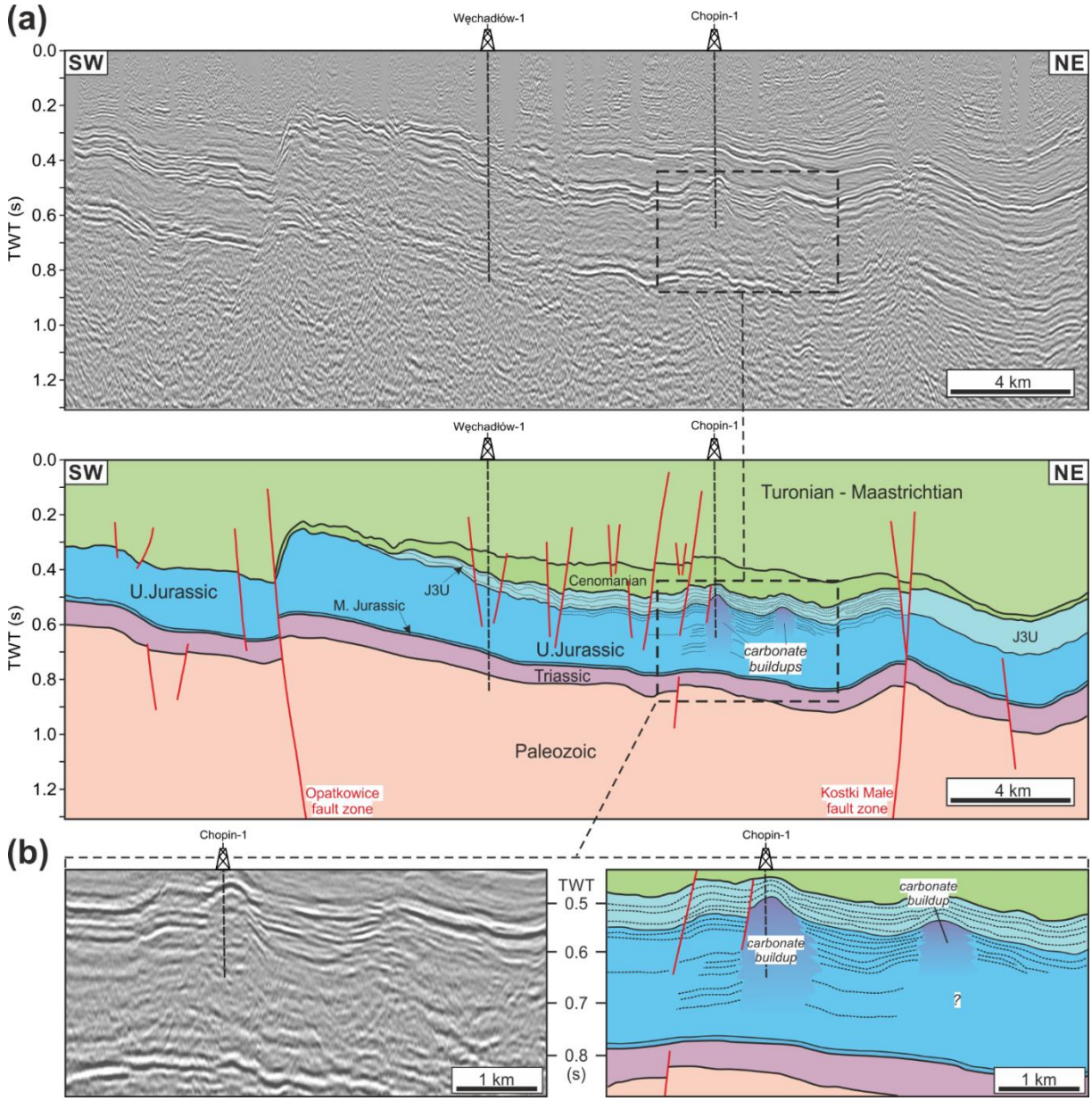

Figure 8. (a) Uninterpreted and interpreted seismic profile (12-5-92K) from the Miechów Trough, see Figure 5 for location. Major NW-SE oriented Opatkowice and Kostki Małe fault zones are rooted in the Paleozoic basement and associated with inversion anticlines developed within the Mesozoic cover; **(b)** Two carbonate buildups were identified in this profile; one of them was partly drilled by the SLE Chopin-1 well.

*we are referring to line numbers of the original manuscript version

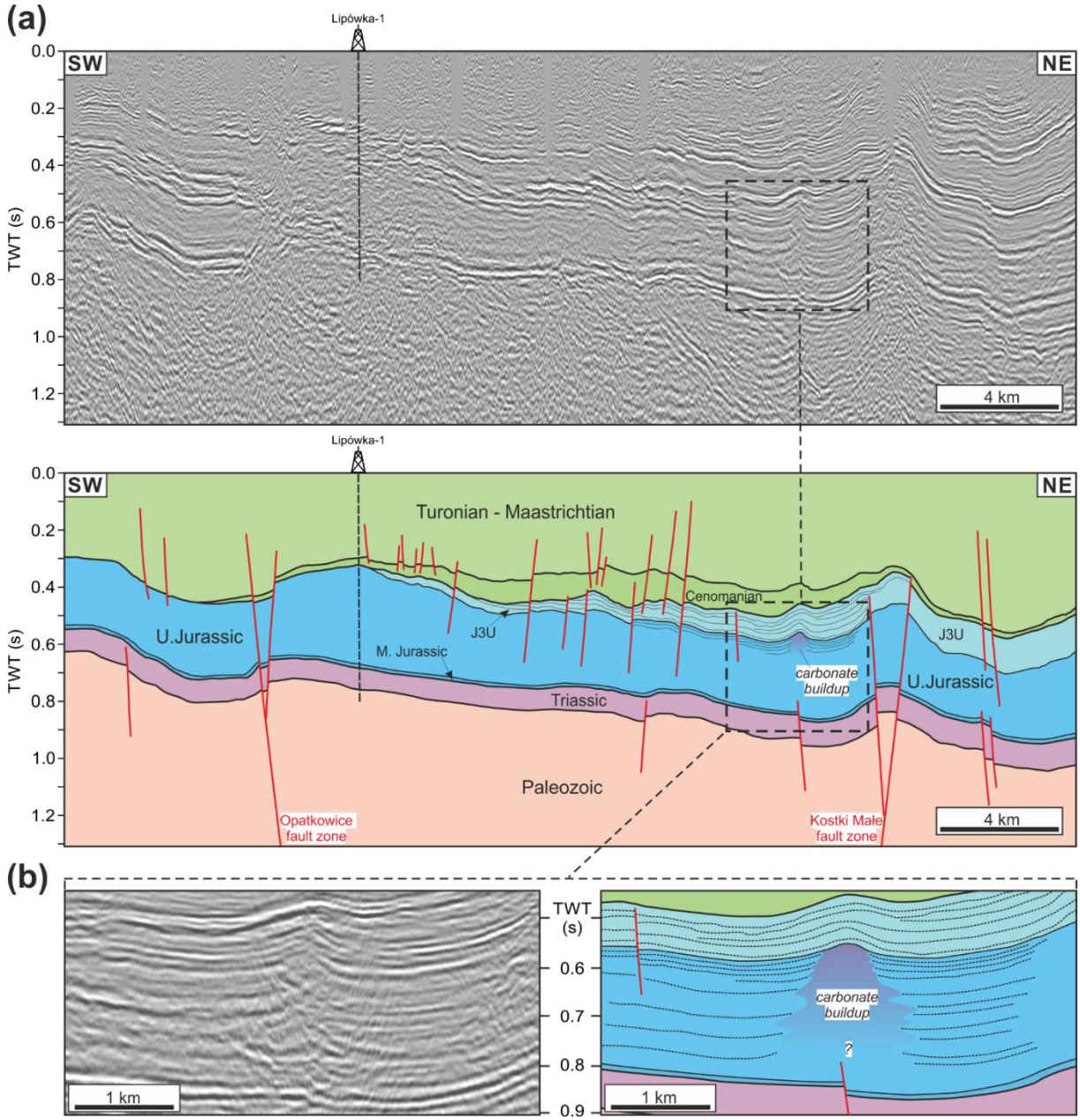

Figure 9. (a) Uninterpreted and interpreted seismic profile (11-5-92K) from the Miechów Trough, see Figure 5 for location. Major NW-SE oriented Opatkowice and Kostki Małe fault zones are rooted in the Paleozoic basement and associated with inversion anticlines developed within the Mesozoic cover; **(b)** One isolated carbonate buildup was identified in this profile.

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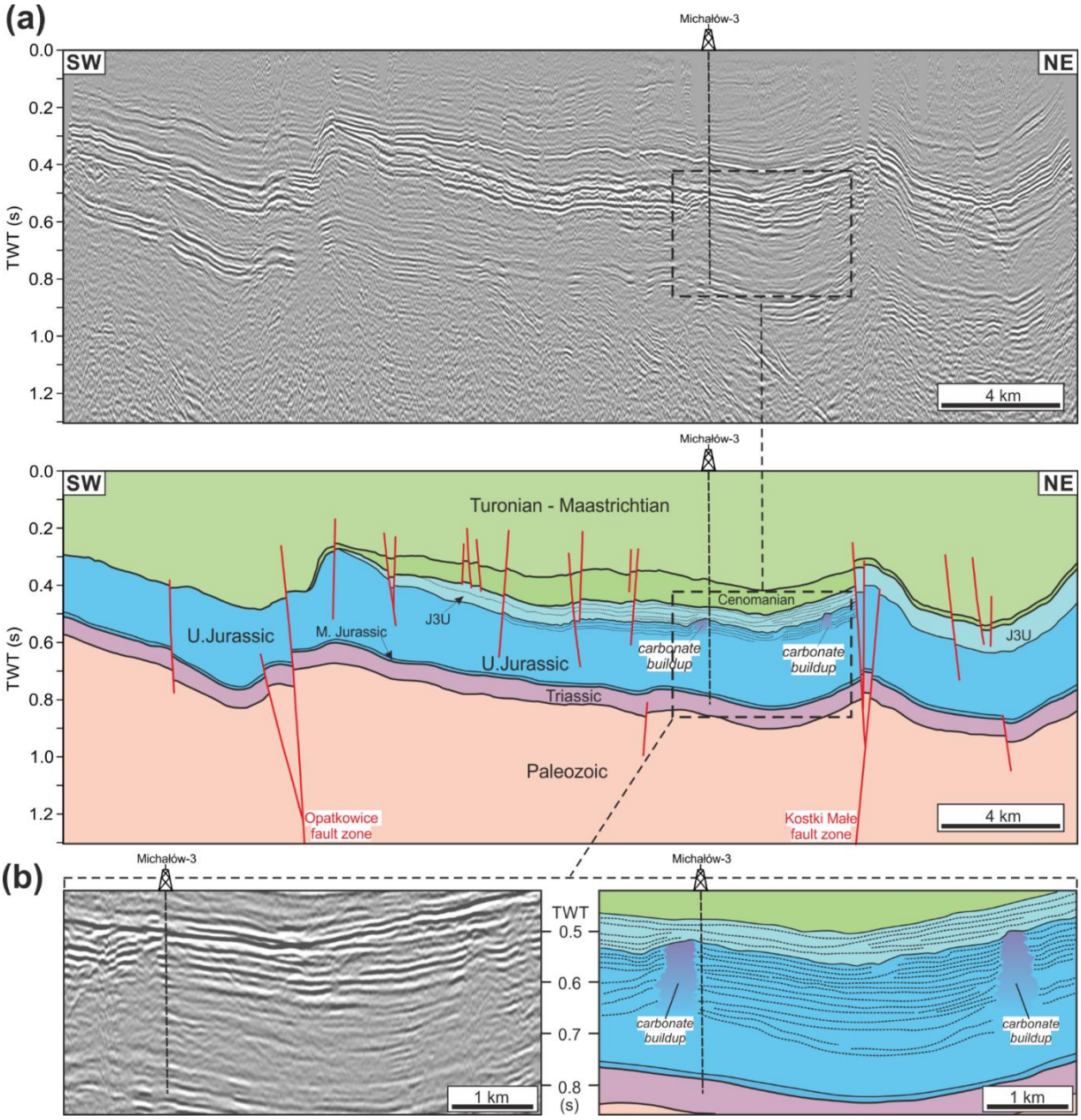

Figure 10. (a) Uninterpreted and interpreted seismic profile (10-5-92K) from the Miechów Trough, see Figure 5 for location. Major NW-SE oriented Opatkowice and Kostki Małe fault zones are rooted in the Paleozoic basement and associated with inversion anticlines developed within the Mesozoic cover; **(b)** Two carbonate buildups were identified in this profile.

*we are referring to line numbers of the original manuscript version

Figure 16, we dropped this figure entirely together with the related part of the text in the Discussion (lines 396–410). Also, we removed the appropriate sentence in the Introduction which concerned this part of our analysis (lines 68–71), as these considerations will be no longer element of this paper. Due to fact that the outcrop examples from Figure 16 were removed from the text, we also removed location of the Młynka Quarry from Figure 3.

Łukasz Słonka
(on behalf of the authors)

*we are referring to line numbers of the original manuscript version