Review file for "Re- assessment of Arthropleura from the Moscovian of Northern France: new anatomical information and adaptations to terrestrial environments" by Mickaël Lhéritier, Bruno Vallois, Claudie Durand, published in *Open Palaeontology* 

This file contains the editorial and reviewer comments for the two rounds of review for this manuscript. Confidential comments to the editor and marked up/tracked changes documents are not included.

### **Round 1 of reviews**

Dear Mickaël Lhéritier, Bruno Vallois, Claudie Durand,

We have reached a decision regarding your submission to Open Palaeontology, "Reassessment of Arthropleura from the Moscovian of Northern France: new anatomical information and adaptations to terrestrial environments".

Our decision is to: Resubmit for Review

Thank you for your submission, and for your patience while we collected the reviews. In addition, we are sorry that one reviewer was unable to see the figure captions in the initial review stage, and this led to a further delay. We have talked with the reviewer, and the issue seems to be a compatibility issue with text boxes in .docx files and Open Office. For the revised version, please can you submit a .pdf in addition to the .docx, so that all the reviewers will be able to see the manuscript in the format and style that you prepared it in.

All three reviewers made constructive comments on the manuscript, and highlighted its interest and importance for our understanding of *Arthropleura*. I have uploaded a new file 'collated reviews' to the Review Files section, which includes additional comments from Reviewer 2.

The main concerns of the reviewers that need to be addressed are:

- details in the introduction and discussion that could be moved to the materials and methods, or removed as they are not closely aligned with the new findings of the study

- additional information required on the geology and lithology and depositional environments, issues with the sedimentology interpretations

- additional information on the morphology (e.g. the head region)

- checking the scales and sizes reported for specimens (figures and text)

When you submit a revision of your manuscript, please provide:

- a revised version of the manuscript with tracked changes

- a 'clean' version of the manuscript (with no tracked changes)

- a document with a point by point explanation of how you have revised your manuscript in response to each item raised by each reviewer

Thank you for your submission to Open Palaeontology. If you have any queries, please do not hesitate to contact us,

All the best

Stephen Pates, s.pates@exeter.ac.uk

All reviewers have also uploaded .docx files with additional small comments and suggestions.

# **Reviewer 1, Anthony Shilito**

The authors describe specimens of *A. mammata* from the Bashkirian-Moscovian of France, and discuss their significance. This is a valuable addition to the literature on *Arthropleura*. The quality of the figures, both illustrations and photo plates, is very high although the colours on the geological map in figure 1 would benefit from some changes as the Cretaceous and Carboniferous are too similar. There are minor issues with language at some points that have been highlighted in the attached document, and a lot of typos, some of which I may have missed, but these are easily fixable. There are a few more significant issues which need addressing, detailed below.

- The "geological setting" section as it stands is extremely brief and other than mentioning coal seams doesn't discuss the sedimentological context of the fossils at all. As one of the aims of this manuscript is to discuss the habitat of A. mammata, additional sedimentary context is necessary. I would recommend including a short, well referenced paragraph outlining the sedimentology to support any claims of depositional setting in which these animals were living.
- Some of the ages reported in the discussion (congruence extensions in European localities) differ from those reported in the cited papers and other reviews. All of these should be checked to make sure they are correct and consistent.
- There are some issues with the sedimentology in "implications for chronostratigraphy". Schist is mentioned on multiple occasions and from the context this seems highly unlikely. The presence of sedimentary cycles doesn't necessary imply that conditions were changing rapidly, some environments will have a record that appears cyclic at any given point whilst overall conditions broadly stay the same, e.g. due to progradation of the coastline. The marine transgressions being talked about are occurring on a totally different timescale to the lifecycle of *Arthropleura* and the changing position of the coastline over thousands to millions of years would have been irrelevant to individuals living alongside the change.
- There is an issue with the interpreted size of the animal from specimen MHNGr.PA.39321. In figure 3, the scale bar shows the head to be 39 mm long. However, in figure 6 the scale bar shows the head to be 52 mm long. This is a 33.3% increase in size from the specimen to the model, exaggerating the total estimated length of the animal. One of these scale bars must be incorrect and this should be fixed. If figure 3 is correct, the estimated length of the whole animal would be closer to 80 cm than the 110 cm mentioned in the text.

# **Reviewer 2, Carolin Haug**

The introduction is partly unclear and needs to be rephrased in certain aspects. It starts rather abruptly, then provides some historical information, but part of it sounds like it better belongs to the results part (possibly also to the material and methods part). I provided some more details in the uploaded annotated manuscript.

Figure 1: The map in panel C has a too low resolution and needs to be replaced by a higher-resolved version.

The figures are not called out in the correct order in the text.

In addition to the comments I uploaded in my original review, I would like to add that the discussion appears a bit lengthy to me. It is clear that the authors need to compare their new findings with older literature, but the here presented fossils do not provide new information for all discussed aspects, for example there is no new information on the feeding habits (and also previous publications were mostly speculating on this aspect). Therefore, I recommend that the authors shorten those parts of the discussion where their fossils do not provide new information.

# **Reviewer 3, Grzegorz Pacyna**

This is an interesting article providing interesting data to understand Arthropleura. It does require some significant corrections, however.

The introduction needs improvement, it contains unnecessary detailed information that should be moved to the materials and methods chapter. The chapter on geology lacks important information on lithology and depositional environments. Some interesting new observations should be described in more detail, e.g. head morphology, ventral sclerites in head, tubercles with openings (respiratory system). In comparisons you refer to an unpublished doctoral thesis (Wilson 1999), I (and other readers) cannot compare your specimens with those described there.

I corrected a lot of minor errors regarding fossil plants.

My comments on the text and figures are included in the manuscript.

# **Response to Round 1 of reviews**

Dear Editor and reviewers,

Thank you for the positive feedback, and acceptance of our manuscript. We have addressed all reviewers' comments. Major updates include stylistic and linguistic corrections suggested by Reviewers 1, 2 and 3 and two new paragraphs on the sedimentology of the localities in the "Geological context" section as suggested by Reviewers 1 and 3. The main modifications are highlighted in red.

Regarding text modifications, major changes were addressed following the suggestions of Reviewers 1, 2 and 3. Following the remarks of Reviewer 1, the parts implicating that *Arthropleura* adapted to marine transgressions were removed because the lifespan of these animals was on a smaller scale than transition/regression cycles. We also rescaled the possible full size of the Bruay *A. mammata* throughout the paper. Based on comments of Reviewer 2, we added more arguments that suggest a terrestrial lifestyle for *Arthropleura*. Following the remarks of Reviewer 3, we added additional text in the "Systematic Palaeontology" to describe more in details the ventral plates and the K-plates.

Figure 1 was improved in quality and in colour contrasts as suggested by Reviewers 1 and 2. Following the remarks of Reviewer 2, we changed the order of the figures (Figure 6 became Figure 4, Figure 4 became Figure 5 and Figure 5 became Figure 6) and corrected figures references throughout the text. As suggested by Reviewer 3, elements of the ancient Appendix 2 was added to Figure 2 and the typical ornamentation pattern of *A. mammata* was added to the reconstitution (Figure 4 previously Figure 6).

Following the recommendations of Reviewer 3, elements of Appendix 2 was added to Figure 2 thus Appendix was deleted. Because of that and based on the comments of Reviewer 2, some parts of the discussion ("Comparisons with other *Arthropleura* species and extension" and "Diet") were moved to Appendix thus making a new Appendix 2.

Mickaël Lhéritier

## **Reviewer 1, Anthony Shillito**

The quality of the figures, both illustrations and photo plates, is very high although the colours on the geological map in figure 1 would benefit from some changes as the Cretaceous and Carboniferous are too similar.

We changed the contrast of colours of Figure 1 in order to have the Carboniferous green more distinguishable from the Cretaceous green.

There are minor issues with language at some points that have been highlighted in the attached document, and a lot of typos, some of which I may have missed, but these are easily fixable.

#### The different typos and minor errors are listed below.

May need to be changed as there is an issue with consistency between the scales in figure 3 and figure 6.

Corrected to 50 cm in length (lines 28-29).

Represent present tense

Line 34: corrected.

Three consecutive sentences start with "these"

Lines 54-55: the phrases were modified in order to avoid repetition.

Evidence doesn't need to be pluralised with an "s"

Line 59: corrected.

Of

Line 59: corrected.

Has

Line 62: corrected.

This and other uses of "extension" would better be written as "extent".

Line 242 and throughout the paper: corrected.

Extent

Line 244: corrected.

Seems

Line 246: corrected.

This doesn't make sense as you're conflating rocks with environments. The area it lived wasn't "stratigraphically restricted", its occurrence in the rock record is.

Line 248-249: the phrase was changed to explain that *A. mammata* was restricted geographically in terms of living area and stratigraphically in terms of occurrence in the fossil record.

Not quite the right word if you're referring to coal mining times as written, "discoveries" is better. In the context of the previous sentence it seems you might mean it was rare during coal "swamp" times, in which case the end of the sentence should be changed so that is clear.

Line 257: corrected. The sentence meant to say that even during the coal exploitation period during which most *A. mammata* specimens near Anzin were found, there was not a lot of specimens found. The sentence was rephrased at lines 258-259 to better express this meaning.

Possibly

Line 264: corrected.

Congruent extensions

#### Line 271: corrected.

Deposits with Arthropleura from the Silesian basin may be as old as Serpukhovian.

These occurrences were added at lines 287-288.

Not ideal phrasing – does this mean the most reported occurrences came from the Moscovian?

Yes. We changed "maximum of recording" to "maximum of recorded occurrences" at line 298.

Based on dating in the paper these are Kasimovian

Corrected. This citation was deleted.

Variscan?

Corrected. At line 309

Occurrence

Corrected. Line 311

This is better written as "All plant... ... Anzin Formation are also present..." – the uncertainty of the if is unnecessary as I assume it is known.

Corrected. At lines 323-324.

paleosol

Corrected. At line 333

Is schist definitely the word you're looking for here? A schist is typically too high grade to be rich in fossils – without an image I can't be certain but shale/slate seems more likely.

We agree with the reviewer. Schist is a bad naming for the Carboniferous of the HBNPC. We agree with the reviewer to name them shales instead (see lines 333 and 342).

Again, don't think you mean schist and if you do it's not through diagenesis but metamorphic processes. Diagenesis generally isn't the correct term when considering siliciclastic rocks.

Corrected like said previously. As we meant to speak about shales thus sedimentary rocks, diagenesis is a correct term.

The timescale of this sea level change is a different order of magnitude to the life cycle of any animal and would be completely irrelevant due to its gradual nature.

This part was deleted following the advises on the reviewer. Parts mentioning variations of habitat range throughout the paper were deleted as they were deduced from this part.

This is a misrepresentation of the cited paper and it's unclear how the authors reached this interpretation of it.

Corrected. We meant to say that the old articles implied that *Arthropleura* was only found in the eastern part of the Anzin-Valenciennes (Valenciennes basin) during the Bashkirian. These old articles have been used by more recent articles to describe *Arthropleura* occurrences in Anzin only during the Bashkirian/Westphalian B (like in Daviès *et al.* 2021 in Table 1 data number 15 and in Moreau *et al.* 2021 In Table 1). We rephrased the sentence to highlight that we meant the old articles (lines 348-349).

Unclear what "whole stratigraphic column" is referring to here – does it mean the full stratigraphy of the basin from Bashkirian to Moscovian?

Yes. This was rephrased at lines 351-352.

Remove "of"

Corrected.

As the WE substages are the same durations as the stages and you've mostly used stages so far, it would be better for clarity and consistency to say Westphalian B instead of Duckmantian.

Corrected at line 360.

Reword as "ending"

Corrected at line 361.

This sentence is unclear

The sentence at lines 363-366 was rephrased.

Conflation of rocks with environments – the swamps aren't the Bruay Formation they are recorded by it.

Corrected. The part "in these swamps" was deleted.

Database

Corrected (in Appendix 2 now).

"be" not "have been"

Corrected (in Appendix 2 now).

Incorrect tense - should be "surely came" not "are surely coming"

Corrected (in Appendix 2 now).

mentioned

Corrected (in Appendix 2 now).

swampy environments weren't in the mountain range, they existed in the location that is now a mountain range.

Corrected, "swampy environments of the Hercynian [...]" was changed to "swampy environments near the Hercynian [...]" to insist that these environments were present along the mountain range during the Carboniferous (now in Appendix 2).

Mountain

Corrected (in Appendix 2 now).

Bashkirian

Corrected at line 412.

"By" not "of" – as written implies the sea was submerged.

Corrected at line 425.

"Lived" past tense

Corrected at line 468.

The "geological setting" section as it stands is extremely brief and other than mentioning coal seams doesn't discuss the sedimentological context of the fossils at all. As one of the aims of this manuscript is to discuss the habitat of A. mammata, additional sedimentary context is necessary. I would recommend including a short, well referenced paragraph outlining the sedimentology to support any claims of depositional setting in which these animals were living.

Two paragraphs were added at lines 81-105 presenting the sedimentological context of the Bruay Formation.

Some of the ages reported in the discussion (congruence extensions in European localities) differ from those reported in the cited papers and other reviews. All of these should be checked to make sure they are correct and consistent.

We checked the ages reported in the subsection "Congruence extensions in European localities" and corrected if necessary.

There are some issues with the sedimentology in "implications for chronostratigraphy". Schist is mentioned on multiple occasions and from the context this seems highly unlikely. The presence of sedimentary cycles doesn't necessary imply that conditions were changing rapidly, some environments will have a record that appears cyclic at any given point whilst overall conditions broadly stay the same, e.g. due to progradation of the coastline. The marine transgressions being talked about are occurring on a totally different timescale to the lifecycle of Arthropleura and the changing position of the coastline over thousands to millions of years would have been irrelevant to individuals living alongside the change.

Like said in previous corrections, the term schist were replaced by shale which is the true lithology of the studied Bruay deposits. The parts mentioning *Arthropleura* following marine transgression and regressions were removed accordingly.

There is an issue with the interpreted size of the animal from specimen MHNGr.PA.39321. In figure 3, the scale bar shows the head to be 39 mm long. However, in figure 6 the scale bar

shows the head to be 52 mm long. This is a 33.3% increase in size from the specimen to the model, exaggerating the total estimated length of the animal. One of these scale bars must be incorrect and this should be fixed. If figure 3 is correct, the estimated length of the whole animal would be closer to 80 cm than the 110 cm mentioned in the text.

The scale bar from Figure 6 (now Figure 4) was effectively incorrect and was modified to 120 mm, making the reconstitution 50 cm long. The size was changed in the "Size and ontogeny" subsection (line 378).

#### **Reviewer 2, Carolin Haug**

There are several language issues, the text is therefore partly unclear.

We improved the language of the manuscript, following the comments of Reviewer 2 and the two other reviewers.

The introduction is partly unclear and needs to be rephrased in certain aspects. It starts rather abruptly, then provides some historical information, but part of it sounds like it better belongs to the results part (possibly also to the material and methods part). I provided some more details in the uploaded annotated manuscript.

#### The different changes are listed below.

tracheal systems also occur in aquatic insects, so this is no clear signal for (at least exclusively) terrestrial life

The sentence "combined with other anatomical factors" was added in the abstract at lines 35-36 to show that the presence of tracheae is not the sole argument for the terrestriality of *Arthropleura*. The other anatomical arguments were added in the subsection "Respiration" at lines 455-461.

The start is rather abrupt, maybe add 1-2 sentences on the general geographical occurrence of Arthropleura.

Some sentences were added at lines 38-48 to introduce *Arthropleura*, its time range, its distribution as well as a small presentation on *A. mammata*. The distribution of *Arthropleura* was not developed like suggested because we already developed it in the subsection "Congruent extents in European localities".

Are there also findings from other genera than Arthropleura in these locations? If not, I suggest to write Arthropleura, also in other occasions in the text where this is the case.

#### Corrected at line 53 and throughout the paper when necessary.

I do not think that genitive s fits here. There is in general an excessive use of genitive s in the entire text, which sounds to me slightly colloquial. As I am no native English speaker, I recommend an English check.

Corrected. Genetive s were deleted throughout the paper when it was not necessary.

Which re-assessment is that, the one in the current manuscript? Then this should not be part of the introduction, but of the results.

The re-assessment was made by previous authors and the curator of Gosselet collections. These precisions were added at lines 131-132 and the sentence was moved to the section "Material and Methods".

Who described it as that?

Sources were added at line 63.

Sentence grammatically not correct, needs to be rephrased.

The sentence was rephrased at lines 66-69

Is that a reference to a paper?

Yes, it is as reference to a monography. It was modified at line 65, throughout the paper and in the Bilbiography.

Figure 1: The map in panel C has a too low resolution and needs to be replaced by a higher-resolved version.

Corrected.

The figures are not called out in the correct order in the text.

The order of the figures was changed accordingly. Figure 6 (Reconstitution of *Arthropleura mammata*) became Figure 4, Figure 4 (*Arthopleura mammata*, other specimens from La Bruay Formation) became Figure 5 and Figure 5 (*Arthropleura mammata*, specimens from the Anzin and Bruay formations) became Figure 6.

Why are the figure panels referred to in this unusual way, e.g. Fig. 7AC? Is that journal style?

It was a mistake of the authors, we added commas or dash in figure references when necessary.

In addition to the comments I uploaded in my original review, I would like to add that the discussion appears a bit lengthy to me. It is clear that the authors need to compare their new findings with older literature, but the here presented fossils do not provide new information for all discussed aspects, for example there is no new information on the feeding habits (and also previous publications were mostly speculating on this aspect). Therefore, I recommend that the authors shorten those parts of the discussion where their fossils do not provide new information.

Sections "Comparisons with other *Arthropleura* species and extension" and "Diet" were moved to a new Appendix (Appendix 2) as they are just putting things into context. The other sections were kept as they include new information based on the new Bruay specimens. The section "Ancient extension" was kept despite being focused on old known material because the material was redescribed and its context is necessary for the following section "New extension".

## **Reviewer 3, Grzegorz Pacyna**

The introduction needs improvement, it contains unnecessary detailed information that should be moved to the materials and methods chapter.

See comments below for the change done with the introduction.

The chapter on geology lacks important information on lithology and depositional environments.

Following this comment (and the ones of Reviewer 1), two paragraphs on the lithology and depositional environments was added at lines 81-105.

Some interesting new observations should be described in more detail, e.g. head morphology, ventral sclerites in head, tubercles with openings (respiratory system).

In the description of the specimens, a sentence on the number of tubercles on the head was added at lines 208-210. The ventral sclerites were more described in details at lines 211-213. The number of pierced tubercles on each part of the K-plates, their shape and their diameter as well as the diameter of the tracheal openings were added at lines 237-240.

In comparisons you refer to an unpublished doctoral thesis (Wilson 1999), I (and other readers) cannot compare your specimens with those described there.

We completely understand the problem posed by this. However, the specimen from Mazon Creek with the reticulated structures that we discuss in the "Respiration" section was only described and figured in the thesis of Wilson in 1999. I (the corresponding author) contacted Paul Maye,r one of the curators of the Field Museum of Natural History in Chicago (where this specimen should be deposited based on Wilson 1999) about this specimen and it seems that they don't know this specimen and where it could be. It is because of that and because the thesis of Wilson is unpublished that we have the photo of this specimen in Figure 8 (8D). We added "Fig. 8D" at line 445 to remind that even if the specimen is figured in an unpublished document, the readers can still see it in our paper. We also added Kraus & Brauckmann 2003 in our reference at line 441 to give a reader an accessible document that also discusses on elements and notions on *Arthropleura* respiration that are presented in this paper.

I corrected a lot of minor errors regarding fossil plants.

We deeply thank the Reviewer for these corrections.

My comments on the text and figures are included in the manuscript.

The different changes are listed below.

These detailed information should be in the chapter Material and methods

Corrected. The mentioned part was moved to the section "Material and methods" at lines 130-138.

What about lithology, depositional environments? Please add some information about this

See answers made above for Reviewers 1 and 3.

What does this word mean here? do we mean similarity in plant sequences?

Yes thus we changed "homology" to "similarities" at line 109 to be more accurate.

Is this the original diagnosis? Or modified by you? Please write.

It was modified after Salter 1863. This was added at line 201.

Genus Goniatites ? or goniatids (order Goniatitida) ?

Genus Goniatites, we passed it in italic at line 284.

variscan?

Corrected (also following the comments of Reviewer 1) at line 309.

Paripteris linguaefolia is a seed fern

Seed fern was added like suggested at line 325.

there is no such group of pteridosperms, marattialeans are true ferns

Corrected. We switched "non-marattialeans" to ferns and just kept "pteridosperms" at lines 356-357.

Are you talking about insects from the Neuropterida group or neuropterids - seed ferns with leaves of the *Neuropteris* type? Neither of these groups are indicators of the marine environment.

We meant the neuropterids. This phrase was badly written. We intended to explain that there was no *Arthropleura* occurrence in the western part of the coal basin before the Moscovian surely because it was a marine deposit at this time. It is during the Moscovian that we observe *Arthropleura* along with neuropterids. The phrase was rewritten at lines 415-419.

Pecopteris belongs to true ferns, mainly Marattiales

Corrected (now in Appendix 2).

is this the species Alethopteris serlii (Brongniart) Goeppert 1836?

Yes. Corrected (now in Appendix 2).

Please write something more about tubercles with openings (dimensions, etc.), because this is a new observation concerning Arthropleura specimens from Europe. In comparisons you refer to an unpublished doctoral thesis, I cannot compare your specimens with those described there.

See answers made above.

The Appendix 2 figure is much better and should be placed here instead of this one. There are no Bibliographical references in Appendix 2, only citations. The items listed are not included in the references.

Figure 2 was modified with elements of Appendix 2 and Appendix 2 was deleted. "References" was changed to "citations" in Figure 2. Hennion et al. 2015 and Schneider et al. 2022 that were mentioned in Figure 2 were added in the bibliography at lines 591 and 706.

This reconstruction would be much better if you included the diagnostic tuberculation pattern characteristic of Arthropleura mammata. Now the tuberculation pattern is very faintly visible.

Corrected. Figure 4 (previously Figure 6) was modified with the reconstruction now including the ornamentation pattern of *A. mammata*.

# **Round 2 of reviews**

Dear Mickaël Lhéritier, Bruno Vallois, Claudie Durand,

We have reached a decision regarding your submission, "Re- assessment of Arthropleura from the Moscovian of Northern France: new anatomical information and adaptations to terrestrial environments", to Open Palaeontology.

Our decision is to: Accept Submission.

ACCEPT (with minor revisions)

Thank you for your submission, and for your patience while we collected the reviews.

Following reviewers' reports, we are please to accept your submission for publication in Open Palaeontology. The final reviewer comments are in the Review Files section of our submission platform (2 documents).

Please review the minor revisions suggested by the reviewers. One reviewer provided these as an annotated version of your R1 manuscript. The second provided comments with references to line numbers in your submitted manuscript.

Please do a final review of your submission. It is your responsibility to make sure that you are happy with the spelling, grammar, images, etc. in this submission.

When you submit a final version of your manuscript, please provide:

- a revised editable version of the manuscript with tracked changes,
- a revised 'clean' version of the manuscript (with no tracked changes),
- all necessary supplementary files

If you would like to, please transfer your manuscript to our Overleaf LaTeX template (<u>Overleaf LaTeX template</u>). This will help speed up the production process. If you are unfamiliar with LaTeX or would rather not do this, please let me know and the editorial team will do it.

Thank you again for your submission to Open Palaeontology. If you have any queries, please do not hesitate to contact us.

Best wishes

Steve Pates

#### **Reviewer 1, Anthony Shillito**

The authors addressed all concerns I had with the previous version of the manuscript, so I'm happy to recommend it is accepted following correction of a few minor issues in the newly added text.

Line 44 – should be "members" plural.

Line 70 – probably don't need to call figure 1 again here as it's called at the end of the previous sentence.

Line 82 - "sediment" not "sedimentary" accumulation.

Line 83 – "contractive" isn't really used typically in tectonics, "compressional" would be more usual. Should also be "a" rather than "an".

Line 83-87 – this sentence is overly convoluted for the point I think you're trying to make. I'm also unsure what you mean by "detritic series". I think what you're trying to say is something like "The growth of the Variscan mountain ranged increased sediment supply to the basin due to syn-orogenic erosion, leading to thick sediment accumulations during the Westphalian (Corsin & Corsin 1970)."?

Line 95 – rather than "thrived", "was most abundant" as this avoids conflating rocks and environments.

Line 97 - instead "between the Anzin and Bruay Formations".

Line 95-99 – whilst I've suggested some minor changes to this sentence it may instead benefit from being broken up into two as it is very long.

Line 100 – I think this should be "within" rather than "which".

Line 101 – "responsible for" or rather than "which will create".

Line 102-105 - I don't know what this sentence is trying to say, so I would encourage the authors to rewrite it to improve the clarity.

Line 237 – "Multiple" singular.

Line 264 - instead of "be extending also", just "extend".

Line 323 - associated "with" not "to".

Line 455-461 – this is too long for a single sentence and should be split up so it's easier to read.

Line 456 – remove "which".

#### **Reviewer 3, Grzegorz Pacyna**

The authors took into account the corrections suggested by me and other reviewers and did a lot of additional work to improve this article. However, there are still many minor deficiencies in the revised parts of the article that require further correction. I have marked my suggested corrections on the attached manuscript.