Thanks for your advices. We have taken full consideration of your suggestions and made the following answers:

General comments:
1. The first paragraph: "…I wish they had only worked on a greater number of specimens, both fossil and modern. It would have greatly helped the manuscript, strengthening their conclusions."

We cannot find more *Nageia* fossils, but we successfully get more modern specimens. Hopefully the new results would be acceptable for the reviewers.

2. The second paragraph: "…So, the major claim of this paper of present day levels of pCO_2 during the late Eocene may not be unfounded, but the limited dataset and relatively narrow scope of this manuscript are not enough to provide a potent argument against relatively more elevated pCO_2 conditions in the late Eocene…"

Thanks for the nice papers.

3. The third paragraph: "…Adding more samples to the small number of modern specimens used in the developing the modern calibration (*Nageia motleyi*) will help with statistical power.

Yes, we have added more specimens (please see supplement file)

The lack of a stomatal index (SI) response to pCO_2 comes from the fact that the stomatal complexes are lined up in rows. The SI metric works only when stomata are randomly dispersed. Royer noted that the authors should try the approach independently developed by McElwain and Kouwenberg (separate papers), termed the "stomatal number per length" (SNL) approach. This was applied to many gymnospermous genera, highly appropriate to this genus in the Podocarpaceae. Given the lack of SI vs. pCO_2 response, I would highly recommend the authors make this effort. The response in SD seems to come from how "densely" packed are the stomata in rows, so I think that SNL should respond by decreasing with increasing pCO_2. It would be relatively simple to make the calculations on the existing images.

Thanks for the advice, we have tried this method and made some comparison and discussion in the manuscript.

4. The fourth paragraph: "…If *N.motleyi* is an appropriate NLE (not fully justified from a taxonomic perspective; better from an ecological standpoint), then this inverse regression approach is usually the first approach taken, but these results are not discussed in the text. These values (369 and 331 ppm do not match with their estimates closer to 390 ppm. Also, these *Nageia* species are amphistomatous (stomata on both leaf surfaces). This is an unusual case (most are hypostomatous–stomata on

one surface), and may be the first time an amphistomotous species has been used to reconstruct pCO$_2$ in deep time.

The *N.motleyi* was selected as a NLE species not only based on the distribution of the stomata, but also on the characteristics of the ordinary epidermal cells.

The stomatal response is at the leaf-level, and the authors need to explore the response of SD (and possibly SI) at the level of each leaf, potentially averaging SD values for the adaxial and abaxial surfaces together to make their pCO$_2$ estimates.

We prefer to use the response at the specimen-level representing the same tree.

I have outlined a novel approach, which may not work, but the authors should at least make a greater effort to assess how the amphistomatous morphology of *N.motleyi* affects the relationship of SD in the modern. Without explaining why they did not conduct the inverse regression, the authors jump to the stomatal ratio approach.

We have added the result based on the regression equation.

They choose *N. motleyi* over *N. wallichiana*, presumably because the fossil has a similar distribution of stomata on both adaxial and abaxial surfaces as *N. motleyi* (though not explicitly stated). They choose one sample as their modern example because it is closest to their regression equation, although Royer points out that there is another value that is even closer. It may be more appropriate to use the regression equation itself to determine the ratio of SD to pCO$_2$ values. It incorporates the whole dataset, rather than an individual value that is not actually on the regression line. Taken as is, the authors seemingly only use the adaxial value of one specimen to define the SD for the modern analog, yet apply it to both the adaxial and abaxial sides of the leaf when estimating late Eocene pCO$_2$ levels (Page 2623, line25). The adaxial SD value is lower than for the abaxial surface, so would produce different pCO$_2$ estimates. Also, an attempt to replicate the stomatal ratio values presented in Table4 and 5 proved unsuccessful, so either the authors don't just use one sample SD value (mean=45.89 from No.bb.40798), or follow an approach to the SR methodology that is not described properly in the text. As noted by Roth-Nebelsick, applying a 95% confidence interval to the SR methodology is inappropriate, and not part of the original methodology outlined by McElwain.

We have checked the problems you and Roth-Nebelsick mentioned and made corresponding change.

We calculate all the individual data separately and got the 95% uncertainty bands at last. They are not taken into the function directly.

Special comments:

Most the points have been fixed as suggested except for the following ones:
(1) Page 2617, line 16: References for these proxies need to be cited here, not as a Table (T6).

Here we want to give the reader more clear and brief information at the

beginning and state the details later.

(2) Page2623, line25: Am I to assume from this paragraph that you used the SD value from this specimen, and then used it to calculate the stomatal ratio (SR) for all of the SR values in Table 4 and Table 5?

Yes, that is. When calculating the SR value, a corresponding modern CO_2 concentration is need. So we must choose one modern specimen rather than using the average values of all modern specimens. Dr. Royer D.L. also mentioned this problem, so we will take both yours and his suggestions into consideration by using the specimens from 1932 (because it is closest to the fitting linear).

(3) Table 6. In my opinion, this table is not necessary. The different types of proxies should be referenced in the text on page 2617, where they are not referenced at all.

We prefer to keep the table to show the proxies and corresponding references much more clearly.

(4) Please also note the supplement to this comment:
http://www.clim-past-discuss.net/11/C1538/2015/cpd-11-C1538-2015-supplement.pdf
Thanks for the good supplement and we have made change as suggested.

Figure 3. Correlation between SD and SI versus CO_2 concentration for modern *Nageia motleyi.* (a) Trends of SD with CO_2 concentration for the adaxial surface. (b) Trends of SD with CO_2 concentration for the abaxial surface. (c) Trends of SI with CO_2 concentration for the adaxial surface. (d) Trends of SI with CO_2 concentration for the abaxial surface. (e) Trends of SD with CO_2 concentration for the combined data of both the leaf surfaces. (f) Trends of SI with CO_2 concentration for the combined data of both the leaf surfaces.
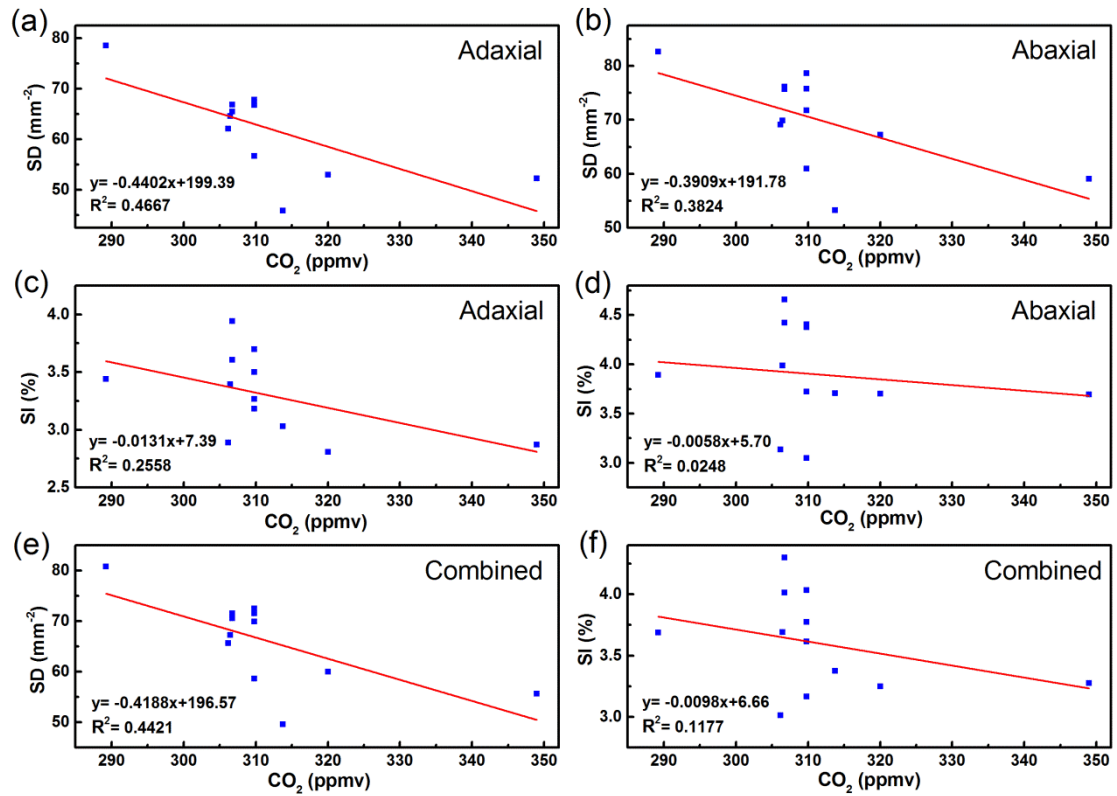
Figure 4. Correlation between SNL, SDL and TSDL versus CO_2 concentration for modern *Nageia motleyi.* (a) Trends of SNL with CO_2 concentration for the adaxial surface. (b) Trends of SDL with CO_2 concentration for the adaxial surface. (c) Trends of TSDL with CO_2 concentration for the adaxial surface.

(a)

y= -0.0168x+15.029
R^2= 0.0643

(b)

y= -2.8164x+1203.6
R^2= 0.3154

(c)

y= -6.6677x+3303.6
R^2= 0.0788