

We would like to appreciate referee #1 for the valid comments, which we believe has instructed us to improve the quality of this manuscript. In this document, all of the comments were responded one by one. Some material which is helpful to address the comments was also provided as attached files.

### **Responses to Referee #1**

Anonymous Referee #1

Received and published: 10 August 2017

Huang et al. studied the relationship between the plant derived long chain *n*-alkane contribution and the composition of the microbial community, specifically alkB degrading bacteria in three habitats of a subtropical rainforest. Their results show that the composition of the microbial community and the relative abundance of the alkB degrading bacteria are controlled by the *n*-alkane input of higher plants with higher amounts of alkB degrading bacteria in habitats with higher amount of litterfall, i.e. higher *n*-alkane contribution of plants.

I think the results are very interesting and a valuable contribution to the BG community. However, some improvements need to be done before the final publication of the manuscript.

General comments:

-the language needs further improvement. I am not a native speaker, but I would encourage the authors to consider that an expert may revise this manuscript, I think it would benefit a lot.

[Reply]

The manuscript will be revised by professional academic writing agency to meet the writing standard of native English speaker once the contents of manuscript were settled. All the words which have been remarked by referees have been entirely rephrased and replaced as suggested throughout the manuscript.

-The “*n*” in *n*-alkanes should be italic

-The plural of *n*-alkane is *n*-alkanes

[Reply]

The changes have been made accordingly throughout the manuscript.

Specific comments

-page 1, line 10: its *n*-Alkanes, the ‘*n*’ should be italic, adapt it in the whole manuscript

[Reply]

The changes have been made accordingly throughout the manuscript.

-p1, L12: I don't think levels is the right word, change it to 'concentrations' or 'amounts' or something more suitable

[Reply]

The word 'concentrations' was used as suggested.

-p1, L15: I would advise you to stay in present tense when writing about your results, they still show or demonstrate or . . .

[Reply]

We agree with the reviewer. The results were stated in present tense as suggested.

-p1, L30: please add long chain *n*-alkanes with odd/even predominance

[Reply]

We rephrased the sentence as follows.

"In non-contaminated habitats, long chain *n*-alkanes with odd/even predominance are produced by plants or algae as chemo-attractants or as protecting agents against microbial invasion or water loss."

-p2, L3: change 'inactive' to 'stable' or 'inert'

[Reply]

The word 'stable' was used as suggested.

-p2, L7: Maybe you can add what the end-product of the degradation is. Especially or researchers using *n*-alkanes as geochemical fossils it would be interesting to know which compounds were built from the *n*-alkanes.

[Reply]

We rephrased the sentence as follows.

"The first step of *n*-alkane oxidization is the catabolizing to the corresponding primary alcohol by alkane terminal hydroxylases. This step is crucial since the activation of the alkane molecule requires an enzyme system that is much less widespread (Rojo, 2010). The products can be further oxidized to the corresponding aldehyde and fatty acid, which could be digested by most microorganisms."

-p2, L13 studies have shown. This occurs quite often in this manuscript, adapt it

[Reply]

The sentence in -p2, L13 was revised as “Previous studies indicated that...”. Many words such as “showed” and “shown” in the manuscript have been replaced by the synonyms.

[-p2, L18: Giebler et al. \(2013\)](#)

[Reply]

The “(2013)” has been added accordingly.

[-p2, L20 skip the citation here](#)

[Reply]

The change has been made accordingly.

[-p2, L20: alkane degrading bacteria](#)

[Reply]

The phrase “alkane degradation bacteria” has been revised to “alkane degrading bacteria”.

[-p2, L20: might be](#)

[Reply]

The “be” has been added accordingly.

[-p2, L23: the relationship... is more](#)

[Reply]

The word “are” has been revised to “is” accordingly.

[-p2, L24: it was shown](#)

[Reply]

The sentence in -p2, L24 has been rephrased as “It was showed that the dynamic changes of alkB degrading bacteria were also driven by many factors such as different sources of alkane and soil type.”.

[-p2, L27: change ‘researches’ to ‘studies’](#)

[Reply]

The sentence in -p2, L27 has been rephrased as “..., studies on their dynamic changes are largely lacking currently and should be established.”

[-p2, L32-p3L1: Please rephrase](#)

[Reply]

The sentence in -p2, L32-p3L1 has been rephrased as

“Among them, three plots aroused our attention, namely plot I (120° 50' 51" E, 22° 04' 54" N), plot II (120° 50' 36" E, 22° 04' 52" N) and Lanjenchi plot (120° 51' 38" E, 22° 03' 23" N). Ravine habitat located across plot I and plot II, while leeward and windward habitat located at plot III. Surveys conducted from past decade have shown that the annual amount of litterfall in ravine habitat was higher than in the windward and leeward habitats.”.

-p3, L2: change ‘applicable’ to ‘possible’ or something else

[Reply]

The sentence in -p3, L2 has been rephrased as “Since the litterfall in those habitats was different, it was possible to investigate the effects of litterfall on the corresponding level of microbial community in these habitats.”.

-p3, L10 change ‘employed’ to ‘used’

[Reply]

The word “employed” has been changed to “used” accordingly.

-p4, L11-14: So basically, your quantification and identification based on external standards? If so, then state it here

[Reply]

We agree with the reviewer. The sentence in –p2, L11-14 was rephrased as follows. “The *n*-alkanes between C14-C35 were identified and quantified by external standards that contained known concentrations of all of the *n*-alkanes of interest (Dr. Ehrenstorfer), 5 $\alpha$ -cholestane, and squalene.”

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p4, L14: What was the recovery of the cholestane? Also, if you did not plan to correct your results for the recovery of the standards, why did you use them at all?

[Reply]

The recovery of the 5 $\alpha$ -cholestane is 99.3 $\pm$  6.9 % in the section results and discussion (page 7. line 19). We move the sentence of “The concentrations reported in this study were not corrected by the recoveries of the standards” to results section and rephrased as follows.

“The recovery rates from the surrogate of 5 $\alpha$ -cholestane were ranged from 70% to

108% and averaged  $99 \pm 7\%$ , suggesting satisfactory extraction efficiency. The *n*-alkane concentrations reported in this study were not corrected by the recoveries.”.

-p7, L3: annual should be written in small letters

[Reply]

The letter, Annual, in -p7 L3 has been changed in lowercase letters.

-p7, L19/20: odd/even occurs two times, delete one of them

[Reply]

The redundant words, “ odd/even” in -p7, L19/20 has been deleted.

-p7, L22: at the beginning of a sentence the ‘n’ in *n*-alkanes is written in small letters and the ‘A’ is written in upper case letters (*n*-Alkane)

[Reply]

The mistake has been corrected in the manuscript.

-p8, L1: which environmental parameters? Give some examples.

-p8, L2: reference?

[Reply]

An example has been given at –p8, L1.

“For example, temperature and relative humidity affect the composition of *n*-alkanes in both Acacia and Eucalyptus in Australia (Hoffmann et al., 2013).”

-p8, L6: why?

[Reply]

In our pilot study, we estimated the variation of leaf *n*-alkane concentration within the same species through GC *n*-alkane analysis. Samples of up to 20 identified species from different stands or habitats were tested for comparison. We found the differences of leaf *n*-alkane within the same species was less than 15% of standard error. As showed in revised figure 2, the measurements of *n*-alkane concentrations in *Iles rotunda* from each habitat are similar. On the other hand, the differences in *n*-alkane concentration between species were large. For example, the *n*-alkane concentration in *Iles rotunda* is 2694 ( $\mu\text{g/g}$ ), while it is only 123 ( $\mu\text{g/g}$ ) in

*Alniphyllum pterospermum*. There are 20 times differences between these two species. Therefore, it is reasonable to assume that the variable of *n*-alkane concentration within species can be ignored when compared with the variable between species. We rephrased the paragraph starting from the last two words at – p8, L4 as following.

“In a pilot study, the *n*-alkane variation in concentration within plant species is less than 15% of standard error through analysis of several samples from stand-to-stand and habitat-to-habitat for the same species. Besides, the ranges of leaf *n*-alkane concentration between species were from 2694 ( $\mu\text{g/g}$ ) in *Iles rotunda* to 123 ( $\mu\text{g/g}$ ) in *Alniphyllum pterospermum*. This evidence provided the basis that the variable of *n*-alkane concentration within species can be ignored when compared with the variable between species. When comparing the plant vegetation and the leaf *n*-alkane concentration, the plant with leaves of high *n*-alkane concentration tends to grow at the ravine habitat, such as *Iles rotunda*, *Ficus benjamina* L and *Celastrus kusanoi* to name a few.”

-p8, L16/17: skip the last sentence. There is no further statement that hadn't been said before.

[Reply]

The mistake has been corrected in the manuscript.

-p11, L2-5: Delete the first two sentences

[Reply]

The first two sentences will be deleted in the manuscript.

-Figure 2: change 'traces' to 'chromatograms'. Also, why do you show the solvent peak?

[Reply]

The word 'traces' has been replaced by 'chromatograms' and the solvent peak has been deleted. To illustrate that the differences between samples in the same plant species are ignorable, we revised the figure 2. The chromatograms of *Iles rotunda* from each habitat was showed in revised figure 2.

-Figure 3: delete 'dynamic', change 'changes' to 'concentrations'

[Reply]

The words have been corrected as suggested.

Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2017->

161, 2017.

**Rojo, F.** (2010). *Handbook of Hydrocarbon and Lipid Microbiology*. Springer-Verlag Berlin Heidelberg.