

Reviewer #1:

General comments

The Authors of the manuscript 'Plant functional traits determined the latitudinal variations in soil microbial functions: evidence from a forest transect in China' (bg-2018-499) by analyzing numerous parameters in forest soils located along North-South Transect of Eastern China (NSTEC) tried to answer the questions if: (1) the profiles of soil microbial substrate use varies along a latitudinal gradient, (2) biogeographical patterns of soil microbial substrate may be limited by climate and plant functional traits, and (3) the associations between soil microbial community and function could show functional dissimilarity. The Authors have found that soil microbial community structures and functions were significantly correlated along NSTEC and that plant functional traits may influence patterns of soil microbial substrate. Moreover, based on analysis of relationships between soil microbial community structure and functions they concluded that there was functional dissimilarity.

In my opinion, the study is interesting and has merit; however it needs major revision. The methods have been properly designed and the results are reliable.

Specific comments

Major points:

(1) The Authors must include section 'Chemicals' in which all compounds used in this study will be described including their name, purity/activity, place of purchase

Response: We have added the Chemicals used in this study as follow: The Biolog-ECO plates were purchased from Biolog Company in America. The substrates for BG, NAG, AP, and LAP were 4-MUB- β -D-glucoside, 4-MUB-N-acetyl- β -D-glucosaminide, 4-MUB-phosphate, and L-Leucine-7-amino-4-methylcoumarin, and were stored at -20°C. The standard liquid for BG, NAG, and AP enzymes was MUB and AMC for LAP enzyme. All substrates and standard liquid were purchased from Sigma Company. The reagents used for soil nutrients were the analytical reagents. (P8, Line 200-205)

(2) The paper suffers from 'Abbreviations' section in which all important full and shortened names must be included. This will help the Authors to read the text.

Response: we have added "Abbreviations" sections including all important full and shortened names as follow (P3, Line 53-80):

Abbreviations:

NSTEC North-South Transect of Eastern China

AWCD Average well color development

RDA Redundancy analysis

Soil microbial community

PLFAs Phospholipid fatty-acids

G⁺ Gram positive bacteria

G⁻ Gram negative bacteria

F/B Fungi/Bacteria

Soil enzyme activities

BG	β -glucosidase
NAG	N-acetylglucosaminidase
AP	Acid phosphatase
LAP	Leucine aminopeptidase

Soil properties

SMC	Soil moisture content
SOM	Soil organic matter
SOC	Soil organic carbon
TN	Total Nitrogen
DOC	Dissolved organic carbon
MBC	Microbial biomass carbon
Silt	Soil silt fractions (<53 μ m)

Plant functional properties:

CWM	Community-weighted means
SLA	The specific leaf area
LDMC	Leaf dry matter content
Leaf C	Leaf C concentrations
Leaf N	Leaf N concentrations

Minor points:

(3) Page 3, line 51, '....functional diversity to understand ..' functional diversity

(of what?), please add

Response: we have rewritten this sentence as “We need robust information about soil microbial functional diversity to understand the role of microbial communities in different environments (Preston-Mafham et al., 2002)” (P4, Line 84-86)

(4) Page 3, line 61-62, correct this sentence

Response: we have rewritten this sentence as “For example, Tian et al. (2015) have found that the soil microbial metabolic activity and functional diversity were spatially dependent in their study of Changbai Mountain in China.” (P4, Line 95-97).

(5) Page 3, line 73-74, correct to: ‘reflectphosphorous and pesticides concentrations over ...’

Response: we have rewrite this sentence as “For example, the geographic patterns of soil microbial activity are mainly reflected by the climate, soil pH, and total phosphorus concentrations over large spatial scales (Cao et al., 2016)”. We have read this paper again and the authors have not refer to the word “pesticides concentrations”. (P4, Line 108-110).

(6) Page 5, add section: ‘Chemicals’

Response: We have added the Chemicals used in this study (P8, Line 200-205).

(7) Page 12, line 297, write ‘positively’ instead ‘negatively’

Response: The correlation coefficient in the Figure 4 refers to the correlations

between the environmental properties and the RDA1 or RDA2. Silt and SMC were negatively correlated and Leaf N, Leaf C, and LDMC were significant positively correlated with RDA1, MAP, SOC, and TN were significant correlated with RDA2. The RDA1 represent the major variance of soil microbial carbon use efficiency.

(8) Page 13, line 336, correct to: 'species'

Response: DONE (P16, Line 438).

Technical comments

(9) Write (for example) '20 °C' instead of '20°C'.

Response: DONE (P7, Line 178-179).

(10) English of the paper should be corrected in some places

Response: According to the comments and suggestions, we have carefully revised our manuscript. We rewritten the long sentences all through the text. In addition, we have our revised version manuscript professionally edited by a native English speaker colleague, Dr Deborah Ballantine from the United International College, Beijing Normal University-Hong Kong Baptist University.