Dear Authors

I would kindly ask you to take action on the following points, when revising your manuscript.

General

Bibliography needs improving: Update references and when possible chose peer-reviewed journals over other non-peer-reviewed sources (e.g. Davidson 2014, versus bulletins, or proceedings). There are useful references for your research that are not cited (Ringeval et al. 2010, Montzka et al. 2010, Melton et al. 2013, Wania et al. 2013, Davidson 2014, Tian et al. 2015)

Please summarize and select core information exposed in the entire manuscript. Expose it in a coherent way that allow readers follow up our text easily. Subdivide the information into sections.

INTRODUCTION

Your introduction can be improved by clearly exposing what is the importance of your research (both for China and for the region, but also for the atmospheric contribution to the world---how much does Chinese emissions represent in the regional and global budget?, what are the uncertainties?), what is known about your research topic in China, what are the current limitations and gap knowledge on long term assessments of CH4, how do you propose to advance the current scientific knowledge with your research (how is your research different to what has already been done?). Could we have some information on the scale of wetland emissions in China compared to paddy rice emissions, are we talking about a large flux? Please put your research into a CH4 national context.

Please clarify the definition of wetland in the introduction and abstract (which wetlands are included?, why?, are paddy rice areas included?) One can argue that river and lakes (inland waters) CH4 emissions have particular CH4 dynamics, different than wetlands (e.g. supersaturation processes through soluble carbon and complex drainage systems (Borges et al. 2015, Raymond et al. 2013). Eventhough you separate their estimates through different methods, merging inland waters to wetlands brings certain level of confusion/ complexity (methodological and argumental). Please justify why you have chosen to merge these categories of land and water classes.

Please eliminate confusing sentences:

While the majority of CH_4 sinks remain relatively stable, variations in atmospheric CH_4 have been attributed to these sources.

A remote sensing study presented a comprehensive map of the change in natural wetlands that occurred between 1978 and 2008 in China (Niu et al., 2012).

Goal: The objectives of the present study are to analyze the spatial and temporal changes in CH_4 emissions across China's natural wetlands to quantify the impact of climate change and anthropogenic activities on CH_4 emissions from the natural wetlands in different regions of China

METHODS
Please reorganize the methods into subsections that separate:

1. Study area with a characterization of your regions (e.g. soils, temperature, precipitation, human pressures). Please include a clear definition of wetland types and justification of choice (some of it should have already been presented in the introduction)

2. Data sets (create subsections for each data set) with a clear description of the temporal thresholds of each data (eg. what happens with wetland area from 1950 to 1978?, climate data used goes from which year to which year?).

3. Methods subdivided by inland waters (lakes and rivers) and by other wetland types. Lakes and rivers need a methodological explanation by its own, since they are extrapolated from existing data

4. Separate methods for wetland <u>area</u> estimates from CH4 <u>emissions</u>.

5. A brief, comprehensive description of what models are you using (and their modifications), their variables, and their known limitations, would be useful (please complement Figure 1 to make it more complete). Move discussion section of models to here (and summarize). Do not rely on supplementary to expose core functioning of your models and the impacts on the final estimates.

6. Rethink and focus the model parameterization and calibration at national scales, right now it reads like the merging of not too well connected sentences. What is important to parametrize, calibrate, and extrapolate to national levels, what have you done, and what is missing. Right now it reads as a not too well connected, anecdotic sequence of sentences.

7. Uncertainties: Estimating the extreme conditions exposes a measure of variability, but classical uncertainty methods use methods like Monte Carlo. Please expose better your uncertainty approach, and please explain how have you produced the Baseline estimates and the 8 simulations (what are these?)

"We set the maximum and minimum values of the input data to be 10% of the baseline 25 values. Eight simulations were performed to estimate the uncertainties"
"

8. Uncertainty in wetland CH4 emissions has been reported to mainly depend on wetland area (Ringeval et al. 2010) but in your uncertainty analysis you do not consider area variation. Please justify.

RESULTS
9. "In this section, we analyze the climate change-driven interannual variations in CH4 fluxes from the inland wetlands and the coastal wetlands from 1950 to 2010".-------what happens with the other categories (lakes, rivers)?

10. Create subsections in the results where you separate the results of wetland decrease trends from CH4 emissions

11. Tibetean Plateau, justify your results:

"On the Qinghai Tibetan Plateau (Region II), the simulated CH4 fluxes exhibited the lowest fluxes (Fig. 3b), with an average annual mean of 6.2 gm□2"

Against

Chen et al. 2013

"Natural wetland estimates were slightly higher than the other estimates owing to the higher CH4 emissions recorded within Qinghai-Tibetan Plateau peatlands."

DISCUSSION
The discussion needs to enhance the importance of your results under a national level, a regional level and a global level. It should expose what are the new scientific achievements, what is still missing (research gaps), and possibly conclude with next steps and/or offer some management and conservation tips. Please consider when rewriting.

Regarding the discussion text as it is written:

12. Plants physiology is not linked to the research presented before. It should go out. Model and parameters should be summarized and go to methods (sections 4.1 and 4.2 are too general and not well connected to your research focus)

13. Please cite all statements you make.

14. Cites on other emission rates need to explicitly expose their comparability in terms of spatio-temporal scales: are we talking about the same areas and wetlands?, and over the same time period?

15. How do these emissions compare to human CH4 emissions from paddy rice?

16. Management alternatives, role of wetland conservation?