Dear Editor:

Thank you for your letter and for the comments concerning our manuscript entitled "Direct radiative forcing of light-absorbing carbonaceous aerosol and the influencing factors over China". Those comments are all valuable and very helpful for revising and improving our paper. We studied the comments carefully and made corrections which we hope meet with approval. Revised portions are marked in the revised manuscript with changes marked. The additions are shown in red, and the deletions are shown in grey and marked with strike-through. We also submit a revised manuscript with no changes marked. The responses to the editor's comments are as follows:

Respond to Editor:

Public justification (visible to the public if the article is accepted and published):
Dear authors,

Thanks for your going through the review process of your manuscript. Thanks to the reviewers for their valuable contributions.
As you have addressed all the points raised during the revision process, your manuscript is about being accepted. However, the abstract need some more editions to fit the guidelines of ACP manuscript. Please make sure that your abstract has at most 250 words in total. Please note that all acronyms use in the abstract must be properly defined at the first use, as the abstract must stand alone and completely comprehensible and understandable.
Once these two minor points will be handled in the sufficient way, we will be able to proceed further.

Regards

1. **Please make sure that your abstract has at most 250 words in total.**
   Response: Thanks for the careful checking. To ensure that the abstract section does not exceed 250 words, we revised this section as follows:

   Black carbon (BC) and brown carbon (BrC) are the dominant light-absorbing carbonaceous aerosols (LACs) that contribute significantly to climate change through absorbing and scattering radiation. We used GEOS-Chem integrated with Rapid Radiative Transfer Model for General Circulation Models to estimate LACs properties and direct radiative forcings (DRFs) in China. Primary BrC (Pri-BrC) and secondary BrC (Sec-BrC) were separated from organic carbon and modeled as independent tracers. LACs Chinese anthropogenic emissions and refractive indexes were updated. Additionally, we investigated the impacts of LACs properties and atmospheric variables on LACs DRFs based on principal component analysis. It showed that BC exerts a warming effect at the top of the atmosphere, while Pri-BrC and Sec-BrC induce a cooling effect. At the surface, they collectively lead to surface cooling, whereas within the atmosphere, they all can contribute to atmospheric heating with 1.848 ± 1.098, 0.146 ± 0.079, and 0.022 ± 0.008 W m^{-2}, respectively. The atmospheric shortwave DRFs of BC and Pri-BrC were proportional to their corresponding concentrations, aerosol optical depth (AOD), and absorption aerosol optical depth (AAOD), and inversely proportional to single scattering albedo, surface albedo, and ozone concentration in most regions. The surface longwave DRFs for the LACs showed negative correlations with water vapor in most areas. The highest atmospheric warming effect of LACs was observed in Central China, followed by East China, owing to the high LACs concentrations, AOD, and AAOD and low surface albedo and ozone concentration. This study enhances our understanding of the climatic impacts of LACs.

2. Please note that all acronyms use in the abstract must be properly defined at the first use, as the abstract must stand alone and completely comprehensible and understandable.

Response: Thank you for the kind reminder. We have ensured that all acronyms used in the abstract are properly defined at the first time they are used, please refer to the abstract section.