The manuscript employs a hybrid method to estimate brown carbon (BrC) radiative effects using a combination of aethalometer measurements of aerosol absoprtion, an optical separation method, simulated BrC optical properties, and a radiative transfer model. As BrC is still poorly characterized in the field and largely ignored by many chemical transport models and climate models, the presented results contribute to our understanding of its radiation and climate significance. The manuscript fits the scope of ACP very well. I have some comments below for the authors to address.

1. Line 143-145: the authors set the AAE_{BC}=1 to calculate the absorption contributions of BrC at different wavelengths. However, existing research suggests that the AAE of BC in the atmosphere varies within a certain range due to factors such as mixing state and morphology (Lack and Cappa, 2010; Zhang et al., 2020b). To comprehensively assess BrC's absorption contributions, different AAE_{BC} values could be set, and some sensitivity analyses are needed to evaluate the impact of this parameter on the study results.

   Lack, D. A. and Cappa, C. D.: Impact of brown and clear carbon on light absorption enhancement, single scatter albedo and absorption wavelength dependence of black carbon, Atmos. Chem. Phys., 10, 4207–4220, https://doi.org/10.5194/acp-10-4207-2010, 2010.
   Zhang, X., Mao, M., Yin, Y., and Tang, S.: The absorption Ångstrom exponent of black carbon with brown coatings: effects of aerosol microphysics and parameterization, Atmos. Chem. Phys., 20, 9701–9711, https://doi.org/10.5194/acp-20-9701-2020, 2020.

2. Line 178-179: In the optical closure calculation, a three-component aerosol model (BrC, BC, and pure-scattering components) was chosen with the assumption of an external mixing state. However, internal mixing between chemical components has been confirmed as a crucial factor influencing aerosol optical properties. It is recommended that the authors consider the internal mixing state to comprehensively evaluate the aerosol optical properties. Alternatively, the authors could explicitly state the reasons for choosing the external mixing model. This discussion will enhance the reliability of its results.

3. Line 209-210: In this study, it is crucial to address whether the Mie numerical simulation is based on the spherical assumption, as this may introduce biases in optical calculations for non-spherical particles. Particularly, a spherical Mie model tends to significantly overestimate the light absorption of fractal BC particles. The numerical simulation of aerosol optical properties is intricately linked to the accuracy of mass distribution among different components. It is recommended that the potential biases introduced by the spherical assumption should be discussed.

4. As shown in Figure 4, the uncertainty in the Refractive Index of BrC is notable. The authors should provide additional details explaining the reason for choosing the RI reported by Shamjad et al. (2016). It would be beneficial to illustrate the factors such as the similarity in organic aerosol composition and sources between the two cities. This additional information will enhance the understanding of the selection criteria for the RI values.

5. Line 205-207: The data utilized in the study are relatively dated, and it is recommended to

consider relevant data from recent studies. The inclusion of more recent data would enhance the timeliness and relevance of the findings.

6. Line 207: The density of BC is commonly reported as 1.8 $g \cdot cm^{-3}$ in the literature. It is advised to verify the accuracy of the statement indicating a density of 1.0 $g \cdot cm^{-3}$ for BC in this context.

7. The calculation of radiative forcing (RF) in this study is unclear regarding whether it considers only direct radiative forcing or also includes indirect radiative forcing. Some clarification is needed.

8. English language needs to be further polised. Some necessary edits in the abstract:
    - L15, convenience -> efficient, concise -> available
    - L23, BrC induces a warming effect with an average instantaneous radiative forcing (RF) of 6.4 ± 3.4 W m-2, corresponding to 29.2% of the BC RF.
    - that of black carbon (BC).
    - L26, you may want to say “PAR attenuation”.