In this work the authors try to quantify the brown carbon contribution to the atmospheric energy budget with a combination of instruments deployed during a multi-month cam-
paign in the Pearl River Delta region. Using measured aerosol size/composition in-
formation together with optical constants derived from the literature and a radiative
transfer model, the brown carbon radiative forcing efficiency is estimated for a range of
single-scattering albedos. The coordinated effort to combine these measurements is
impressive and many of the justifications for calculations are well-supported. However,
the uncertainty in $\text{AAE}_\text{BC}$ is replaced by a calculation in which the number size dis-
bution of the BC core is assumed to be a scaled fraction of the overall number size
distribution. Also as pointed out by the other reviewer, this seems to be a questionable
assumption; in addition, the scaling factor is derived as a volume fraction - so if applied,
it would be the volume size distribution that should be scaled by this number. Given
the large uncertainty in black carbon forcing based on actual size distribution and par-
ticle morphology (core-shell or not - e.g., Cappa et al., doi:10.1126/science.1223447,
2012), it’s unclear whether the BrC forcing can be satisfactorily constrained, even with
this accomplished suite of instruments, without additional information from an SP2 or
chemical transport modeling simulations. I believe that there is good data for a paper,
but the question to be answered may have to be more restricted in scope. For this rea-
son, I propose that the manuscript not be accepted for publication in its present form,
but encourage the authors to resubmit with a different hypothesis.

Interactive comment on “Light absorption property and potential source of particulate brown carbon in the Pearl River Delta region of China” by Zhujie Li et al.

Anonymous Referee #2

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