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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Unravelling airborne polycyclic aromatic hydrocarbons (PAHs) in southern China using tree-rings of 100-yr old *Pinus Kwangtungensis*" *by* Y. W. Kuang et al.

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Million thanks for the valueable comments on this paper.We will ask a native speaker to improve the English writing of this manuscript. For the choice of the disc at the tree height of 1.3 m above ground, it is very conventional to choose the tree disc at the breast height (about 1.3 m above the ground for Asia) in dendrochronological research. The 23 chipping samples (tree-ring samples) represent the formation period of the tree tissue (more than 100 yr history). The first chipping representing 15 year growth ring (1883-1895) were sliced from the pith of the disc, the last chipping were sliced with 2 year intervals (2006-2007), the other 21 chipping were sliced with 10-year

intervals. We will clarify it in the revised version. FOr Page 27371-lines 15-18: It's true that there are three samples (1981-1985, 1986-1990, and 1991-1995) with FL/Pyr value lower than 1. Most of the samples showed the FL/Pyr value greater than 1.0. The ratio values of PA/Ant and FL/Pyr were one of additional proof supporting the results revealed by the ratio values of LMW-PAHs/HMW-PAHs and ΣCOMB/ΣPAHs. So we carefully stated that "The plots shown in Fig.3c and d provided additional evidences of the predominance of combustion-originated PAHs. . ." rather than "...the dominance of combustion-originated PAHs. . ." For the PCA results: As mentioned by Ho and Lee (2002), Fang et al. (2003) and Larren and Baker (2003), principal component analysis (PCA) is the oldest and most widely used multivariate statistical technique in the atmospheric sciences. The principle of PCA is to transform the original set of variables into a smaller set of linear combinations that account for most of the variance of the original set. The primary function of this analysis is the reduction of the number of variables while retaining the original information as much as possible, and thus variables with similar characteristics can be grouped into factors. Results of PCA can show which factors are able to explain the main part of the data variance, therefore individual PAHs in this study representative of each factor are chosen as source tracers. By critically evaluating the factor loadings, an estimate of the chemical source responsible for each factor can be made. Numerous researchers have applied PCA to particle associated PAHs (Guo et al., 2003; Bourotte et al., 2005; Esen et al., 2008). One possible source could be indicated by more than one PAH components in different literatures. For example, the contributors of wood combustion were indicated by components of Ant, Phe, FL, and Pyr by Khalili et al. (1995), component of Fl, BbF, BaP, IND and BghiP by Randolph and Joel (2003), component of Nap, Acpy, Flu, and Ant by Fang et al. (2004), and BaP, BbF, Phe, and BghiP by Sharma et al. (2007). Randolph and Joel (2003) used BkF and Acpy as responsible for diesel combustion, while Bourotte et al. (2005) used Chr as the indicator of diesel combustion. In addition to PCA, diagnostic ratios were also employed to determine the possible origins of PAHs in the tree-rings in this study. We would like to rewrite the interpretation by considering most of the components in

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reaching the conclusion of the possible tracer in the revised version.

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