Dominance of unintentionally-produced PCBs in the air of China

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Though polychlorinated biphenyls (PCBs) were not widely manufactured or used in China before they were banned internationally, they are still of great concern in China and frequently detected in the Chinese environment. Recent work has shown they may reach China with imported wastes, and that there are considerable unintentional sources of PCBs. Therefore, we hypothesized that the source inventory and profiles of PCBs may be different or unique in China. A significant question to explore here is that “what is the contribution of UP-PCBs in the Chinese atmosphere ?”.

In this study, we conducted a complete survey of all 209 PCB congeners and assess the contribution of unintentionally-produced PCBs in the atmosphere of China, using passive air samplers deployed across a wide range of Chinese locations, followed by statistical analysis. Our results indicate that unintentionally-produced PCBs have become the dominant sources in the atmosphere of China, mainly contributed by pigment/painting sources and metallurgical industrial/combustion sources. But for Aroclor-PCBs, e-waste sources still dominate. In addition, The transect profile of PCBs among urban, rural and remotes sites has been shifted under the impact of human activities. In terms of concern on human health, the movement of intensive thermal industrial sources from urban region to suburban and rural regions driven by government policy, leads to some potential hot spots of UP-PCBs in the rural area and thus higher risk than urban region. Our finding is helpful for policy makers to set up better reduction strategies on PCB emissions to protect human health and support China’s commitment to the Stockholm Convention.