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The impact of monoaromatic hydrocarbons on OH reactivity in the coastal UK boundary layer and free troposphere

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The impact of monoaromatic hydrocarbons on OH reactivity in the coastal UK boundary layer and free troposphere.

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1 Supplementary Information

1.1 Investigation of WAS canister stability

The stability of many lighter hydrocarbon species has been investigated in previous studies and was found to give good stability for extended periods (Ochiai et al., 2002; Chu-Chin Hsieh and Liao, 2003). The compounds of particular interest in this case are the heavier species ($> C_7$) as these species are less volatile and so may exhibit some loss to the canister walls over time.

A WAS canister was filled with zero grade air (BOC, UK) and was spiked with NPL30 ozone precursor mix (National Physical Laboratory, Teddington, UK). The canister was sampled and the NMHCs quantified. The canister was then analysed on subsequent days for seven days. A plot of the mixing ratios for selected hydrocarbons can be found in Figure 1. Error bars denote injection repeatability for replicate standard analysis of the corresponding compound for comparison.

Figure 1 shows that for the compounds monitored during the week long stability test there was no notable loss observed and so stability should not be an issue. The canister samples taken during this study were analysed within three days of sampling

1.2 Investigation of cold finger losses

Cold fingers have been used in many previous studies (Hopkins et al., 2006, 2011; Apel et al., 2008; Lewis et al., 2013) but some of the less volatile species investigated in this study may exhibit losses. Replicate injections of the NPL30 ozone precursor mix were analysed with and without a cold finger in line. The data for selected compounds can be observed in Figure 2. No significant losses were observed.

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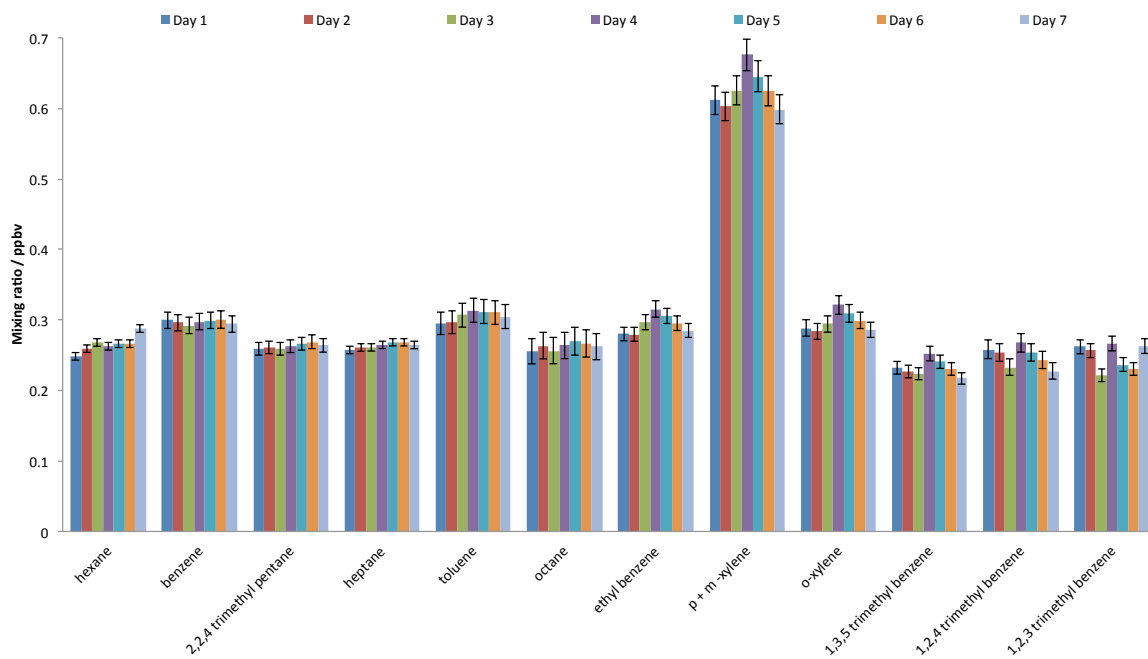


Fig. 1. WAS bottle stability for selected compounds

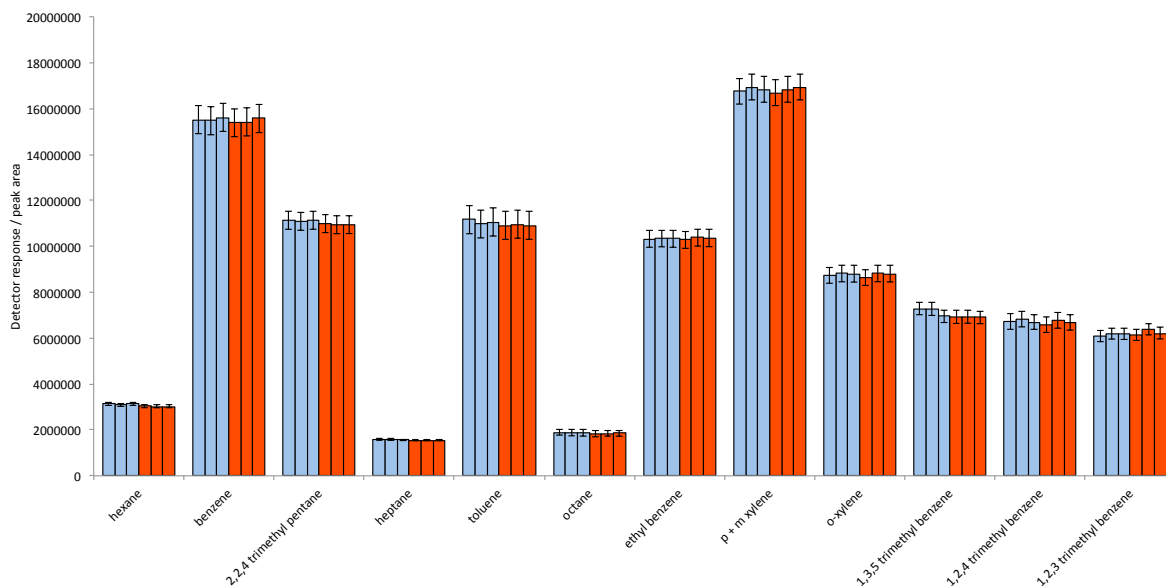


Fig. 2. Replicate analysis of the NPL30 with and without a cold finger. Blue = Analysis performed using a cold finger. Red = Analysis performed without a cold finger fitted