



Anthropogenic hydrocarbon ratios as indicators of photochemical processing

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When judiciously selected and interpreted, measured ratios of atmospheric hydrocarbons emitted from anthropogenic sources provide useful indicators of the photochemical processing that has occurred in the sampled air parcels carrying those emissions. Here we will investigate the net production or destruction of ozone resulting from the photochemistry occurring during intercontinental transport at northern mid-latitudes over the Atlantic and Pacific Oceans. These two marine regions present an interesting contrast, with ozone production dominating over the Pacific and ozone destruction dominating over at least the central Atlantic. Further, there is evidence for a significant change in the photochemical environment over the Pacific during the past two decades. In effect, this analysis uses hydrocarbon ratios as “photochemical clocks”. We will discuss the limitations imposed on the use of such clocks by atmospheric mixing of air parcels and variations in emission ratios from different source categories or regions.