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Constraints on Cl concentrations in the polluted marine boundary layer provided by hydrocarbon concentration patterns

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It is generally agreed that the primary loss mechanism for hydrocarbons in the troposphere is through reaction with the hydroxyl radical, OH. However, reaction with Cl atoms provides a potential additional loss process that may have importance in specific regions of the troposphere, such as the marine boundary layer. Since the relative rates of reaction with OH and Cl vary widely among hydrocarbons, the patterns of measured hydrocarbon concentrations provide indications of the relative contribution of these two oxidation pathways. Here we examine the hydrocarbon concentration patterns in air masses sampled during the 2004 ICARTT study in the western Atlantic and the 2002 ITCT 2K2 study in the eastern Pacific. The goal of this examination is to derive constraints on the Cl concentrations in the marine boundary layer downwind of continental emission sources. Mixing of air masses of differing histories confounds simple interpretations. The age spectra of continental emission tracers calculated by the particle dispersion model FLEXPART provide a means to control for this confounding effect.