Atmospheric hydrogen cyanide (HCN): biomass burning source, ocean sink?

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Abstract

The observed seasonal amplitude of atmospheric HCN concentrations measured in tropical regions and at northern midlatitudes implies an atmospheric lifetime of a few months for HCN, much shorter than is commonly assumed from oxidation by OH (a few years). We propose that ocean uptake may provide the missing sink, and show with a global 3-D model simulation that the observations of atmospheric HCN can be roughly reproduced in a scenario where biomass burning provides the main source (1.4-2.9 Tg N yr^{-1}) and ocean uptake provides the main sink (HCN atmospheric lifetime of 2-4 months). Such a budget would imply that HCN is a sensitive tracer of biomass burning on large scales, of particular value because of it is readily observed from space. The ocean sink hypothesis can be tested with measurements of HCN concentrations in marine air and seawater.