Atmos. Chem. Phys. Discuss., 3, S1884–S1886, 2003
www.atmos-chem-phys.org/acpd/3/S1884/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "New insights in the global cycle of acetonitrile: release from the ocean and dry deposition in the tropical savanna of Venezuela" *by* E. Sanhueza et al.

R. Holzinger

holzing@nature.berkeley.edu

Received and published: 14 November 2003

We thank the referee for thoroughly reviewing the paper. A stronger case for the hypothesis is demanded, which is that acetonitrile is being released from the ocean. Two major questions have been raised:

(1) Can the influence of biomass burning really be excluded? The referee points out that global fire datasets do show some biomass burning during the period of measurements. In the revised version of our paper we will present a more detailed map (Figure 1, unfortunately it is not possible to submit it along with this comment...) indicating fires detected during the period of measurements. Less than 10 fires have been detected which potentially could have influnced the site. For comparison we will also present

Full Screen / Esc
Print Version
Interactive Discussion
Discussion Paper

fires that were detected during a second field campaign at he same site (Calabozo, April 2000) in the dry season (average acetonitrile levels of 245 +/- 69 pmol/mol; 226 pmol/mol median; range 158-387 pmol/mol;these results will be included to Table 1). Several hundred fires were detected which clearly influenced the site! The instrumentation of the NOAA 12 satellite is sensitive enough to detect firefronts of 30m length and as narrow as 0.5m; so from the new Figure 1 it is clear that influence from biomass burning is very minor. The second objection is that small scale biomass burning like cooking fires or agricultural waste burning might cause the high acetonitrile levels. Referring to this we are pointing out that some 10 kilometers downwind of the site is the provincial capital Calabozo with a population little less than 100000 people. During nights occasionally the steady northeasterly winds broke down and air from the populated area was advected to the site, resulting in plumes of typical anthropogenic compounds like CO, benzene and toluene (see also Holzinger et al., Atmos. Environ., 35, 4917ff, 2001). However, no plumes of acetonitrile have been observed; a fact which also becomes manifested in almost equal levels of the average (212 pmol/mol) and the median (211 pmol/mol) mixing ratio. We assume that the region around Calabozo is typical for the Venezuelan plains and so we conclude that small scale fires do not play a significant role in acetonitrile mixing ratios. Venezuela is a petroleum producing country, so this fuel is predominantly used in contrast to many other tropical countries.

(2) Can the observed diurnal variation be simply explained with entrainment of free tropospheric air containing high levels of acetonitrile and dry deposition? Theoretically, yes. BUT: What would cause the homogenously high mixing ratios in the planetary boundary layer with no evidence of biomass burning? The referee cites results from two other campaigns where high acetonitrile mixing ratios have been reported, the INDOEX and the LBA-CLAIRE campaigns. During the INDOEX campaign biomass burning emissions were transported from the Indian sub-continent and contributed a lot to the pollution encountered over the Indian Ocean. Some biomass burning influence was also observed over the tropical rain forest over Suriname. From the LBA-CLAIRE database we evaluated all data below 1000m and found acetonitrile mixing ratios of

ACPD

3, S1884–S1886, 2003

189, 74, 176, and 108-362 pmol/mol for average, standard deviation, median, and the range, respectively. The bias between average and median mixing ratio is indicative for biomass burning. During two flight lags in the marine boundary layer average mixing ratios of 173 and 175 pmol/mol have been recorded; giving neither evidence of oceanic uptake nor of an oceanic source. The mixing ratios reported in this paper are significantly higher than what would be expected at a location far from biomass burning influence. This has to be explained! We argue that oceanic release is the most reasonable explanation for this.

We concede that these points have not been sufficiently discussed and we will gratefully include this discussion in the revised draft.

Interactive comment on Atmos. Chem. Phys. Discuss., 3, 5275, 2003.