

Posting type	Advisory
Subject	Shift in EC/OC split with 1 January 2005 TOR hardware upgrade
Module/Species	C/ EC, OC; OC1, OC2, OC3, OC4, OP, EC1, EC2, EC3
Sites	entire network
Period	2005 and later
Recommendation	Distinguish between 1988-2004 and later TOR data
Submitter	W.H. White, white@crocker.ucdavis.edu

Supporting information

After [extensive testing](#), new hardware for IMPROVE_A Thermal/Optical Carbon (TOR) analysis has been used for samples collected on or after 1 January 2005 (Chow et al., *J. Air & Waste Management Association* 57:1014-1023, September 2007). The improvements provide better control and greater repeatability of the analytical protocol. With the statistical power available from 2+ years of routine data, unforeseen differences can now be identified between the fractionation data from the old and new instruments. The differences are not the same at all sites (Figure 1), but the new data generally identify a higher proportion of total carbon (TC) as elemental (EC) and a lower proportion as organic (OC). The EC/OC distinction is operationally defined, and the differences are not fully understood.

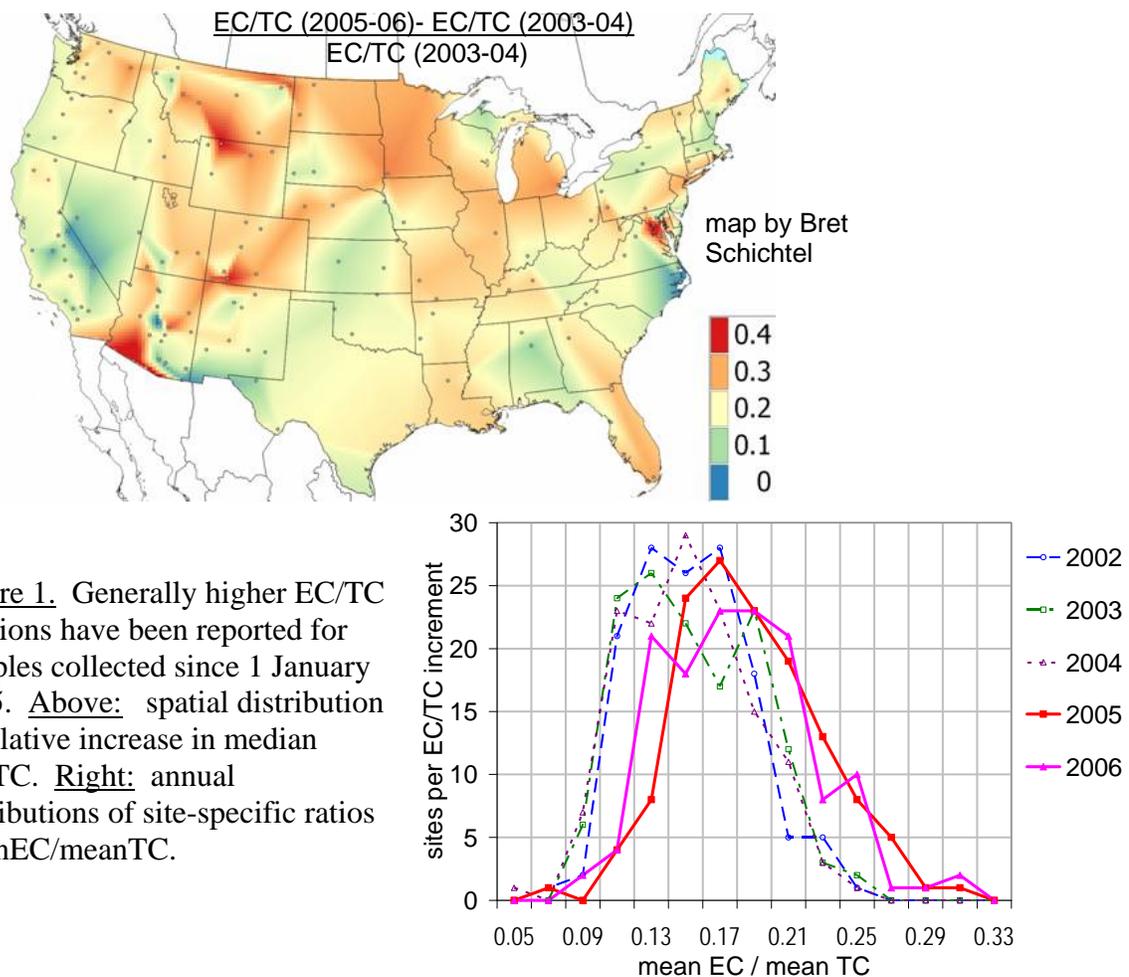


Figure 1. Generally higher EC/TC fractions have been reported for samples collected since 1 January 2005. Above: spatial distribution of relative increase in median EC/TC. Right: annual distributions of site-specific ratios meanEC/meanTC.

MEDIAN AND INTERQUARTILE RANGE ENTIRE NETWORK, ALL VALID DATA

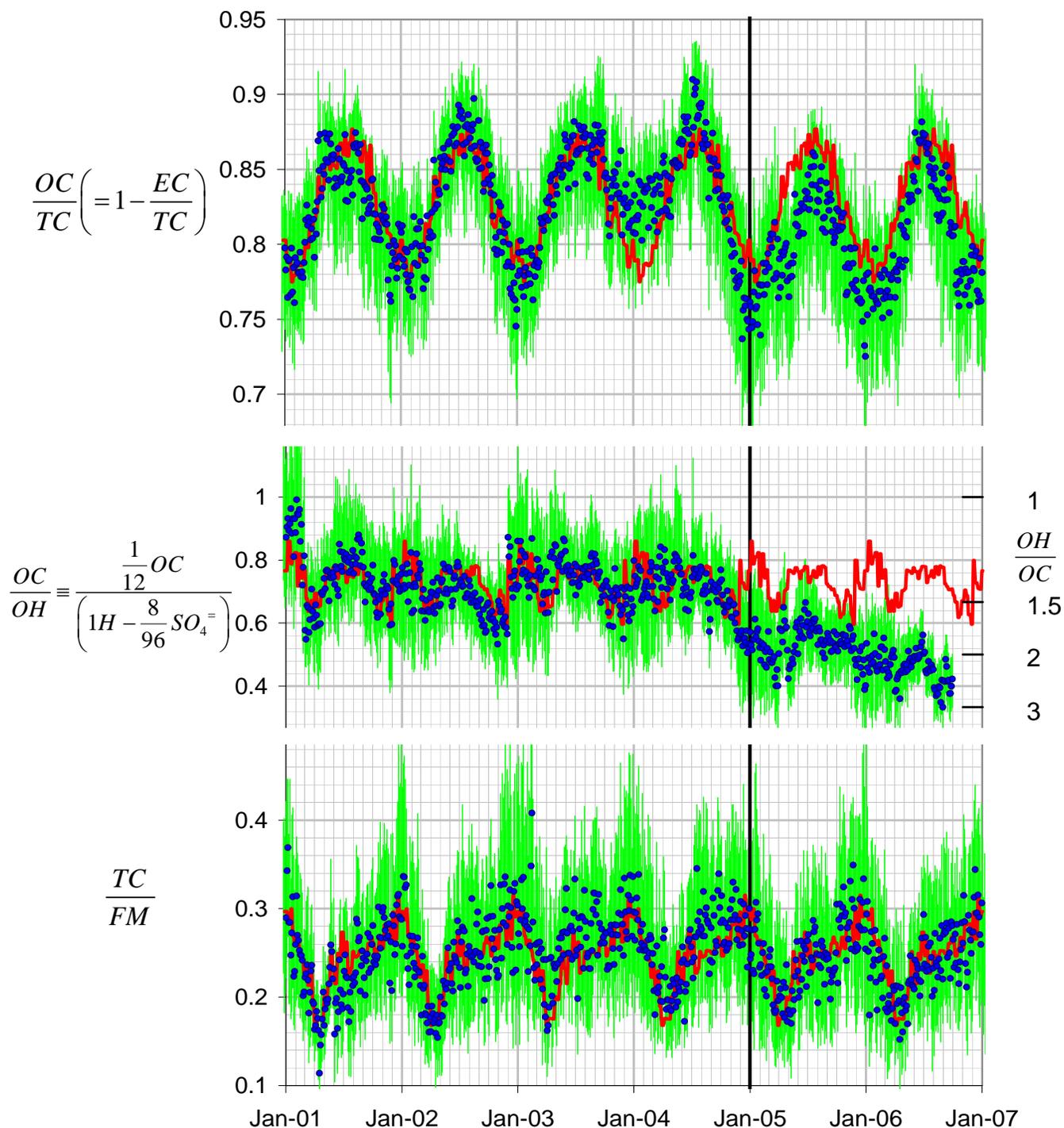


Figure 2. Network-median OC/TC ($= 1 - EC/TC$) dropped after 1 January 2005, as did the ratio of OC to the portion of hydrogen that can't be attributed to ammonium sulfate. This "organic" hydrogen is independently estimated from measurements on modules A ([hydrogen by PESA](#)) and B (sulfate by IC). The split between EC and OC changed, but not the total; no difference is evident in the ratio of TC = EC+OC to gravimetric fine mass. Each blue point shows the median of all observed ratios on the indicated day, vertical green bars show the 25th %^{ile} – 75th %^{ile} range, and red curves indicate 2002-4 weekly "norms" for visual reference.

MEDIAN AND INTERQUARTILE RANGE FOR ENTIRE NETWORK.

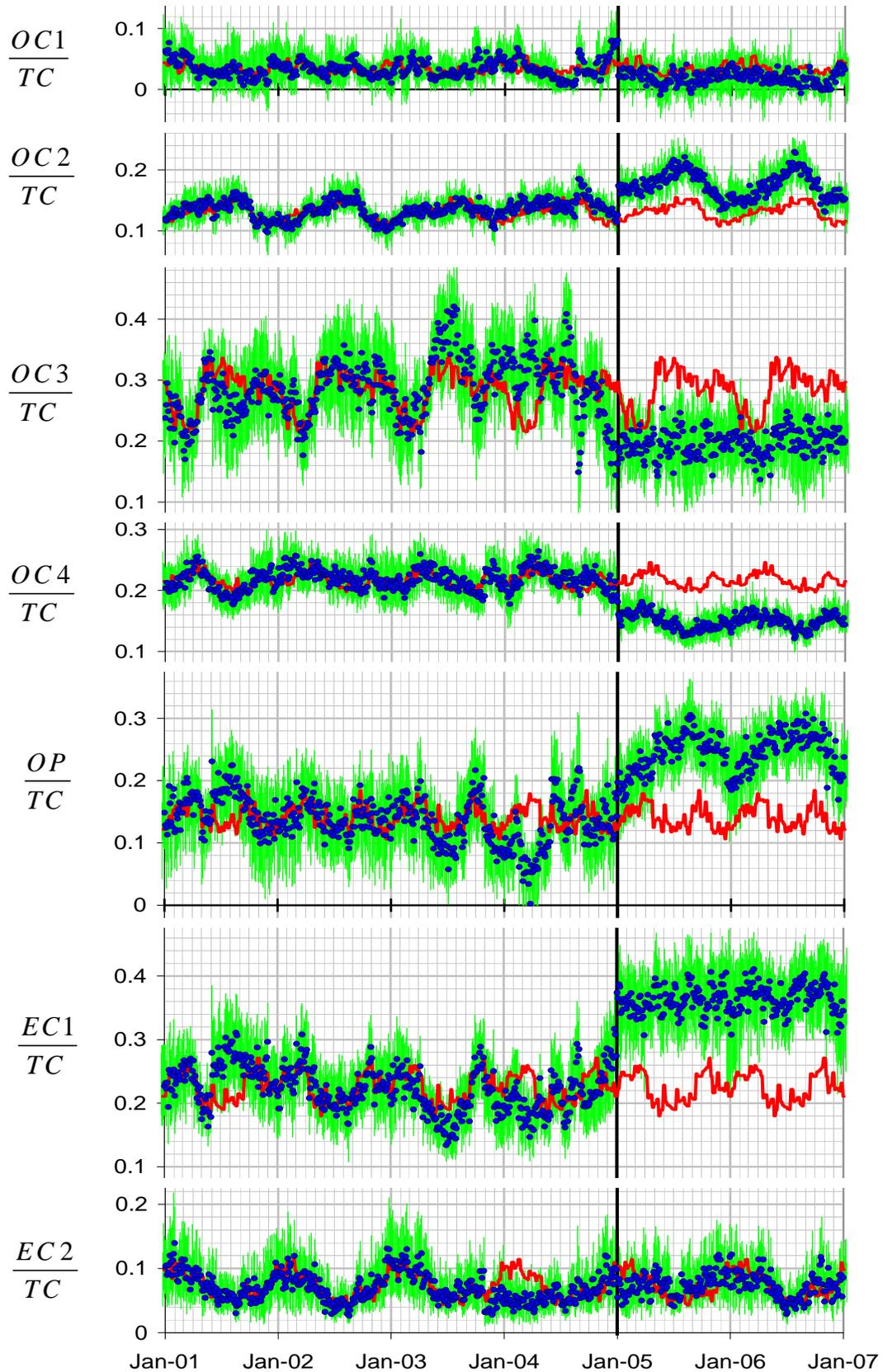


Figure 3. Reported values for some individual TOR fractions changed abruptly on 1 January 2005. EC3 is not shown because it is undetected in most samples.