Description file for C130filt.txt

Submitted by Steven Howell for Barry Huebert.

This is a PRELIMINARY data set. See the caveats below.

If you wish to use this information in any publications, we would appreciate
citations and/or acknowledgements. In addition, it would be wise to check
whether the final version of the data has been released!

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The data here are derived from filter and single-stage impactor
samples drawn through the Community Aerosol Inlet. Filter and impactor deposits
were analyzed by ion chromatography for common inorganic ions and
methanesulfonate.

There are 26 columns of data:

1) Flight number (1-33)
2) Yearday of sample start (304-357)
3) Time of sample start in 24 hour notation (HHMM)
4) Sample end time (HHMM)
5) Substrate:
     S is impactor Substrate (a Tedlar film). The impactor has a cut size
       of 1 micron. Losses within the impactor rise with particle size
     and are roughly 50% for 4 micron particles, though this is not a
     sharp size cut. Inlet characteristics of the CAI are not yet known.
     The impactor was generally used only in the boundary layer, as
     pressure drop precluded its use in the free troposphere.

     T is a Teflon filter (Gelman Zefluor). In the marine boundary layer,
       this was a backup filter for the impactor, so it collected only
     particles smaller than 1 micron (this serves to increase sensitivity
     to non sea-salt sulfate, found primarily on submicron aerosols).
     When no impactor was used, the filter collected all incident
     particles. Please note that the only reliable way to determine
     whether a filter sampled all incident aerosol or just particles
     less than 1 micron is to find whether an S substrate sample
     occurred at the same time in the same sampler.
6) Sampler (A or B). We had two samplers mounted in the CAI. One was
   usually used for organic analysis (not reported here), though there
   are instances when both were used simultaneously for inorganic ions.
7, 8) Methanesulfonate concentration and estimated error bounds.
9, 10) Chloride concentration and errors. Note that HCl is volatile, so there
       is some possibility that aerosol chloride can be collected, then
       evaporate during the sampling period. Conversely, gaseous HCl can
       deposit on basic aerosols (such as sea salt).
11, 12) Nitrate concentration and errors. This has the same caveats as HCl,
       above, since HNO3 is volatile.
13, 14) Sulfate concentration and errors.
15, 16) Sodium concentration and errors.
17, 18) Ammonium concentration and errors. Since ammonia is volatile,
       evaporation artifacts are possible as for chloride and nitrate.
19, 20) Potassium concentration and errors.

12, 22) Magnesium concentration and errors.
23, 24) Calcium concentration and errors.
25, 26) Non Sea-Salt Sulfate (NSS) concentration and errors. Defined as
        SO4 - 0.06020*Na (on a molar basis).

All concentrations are in picomoles of analyte per mole of air drawn
through the filter (parts per trillion on a mole basis). Errors are
calculated from detection limits and variations in procedural blanks.
Given the assumption of normally distributed errors, error bounds are
95% confidence limits.

CAVEATS:

We noticed a discrepancy between flow meter voltages recorded by our
data logger and the NCAR RAF data system during flight 4. We have not
yet had the time to establish the cause.

In addition, we recently discovered a bug in our chromatogram analysis
software that occasionally identifies the wrong peak. This bug appears
to occur only when some analytes have no detectable concentrations,
and is thus a problem chiefly in the blanks (not reported here, but
mean procedural blank values were subtracted from sample values).
We believe that most of these instances have been identified and
corrected, but have not had the time for an exhaustive search.