Separation of OC and EC for ^{14}C analyses of carbonaceous aerosols

Separation of organic and an elemental carbon (respectively OC and EC) is widely method-dependent, as shown in various intercomparison exercises listed by Watson et al., 2005.
Among these methods, the Sunset EC/OC analyzer enables speciation of OC and EC through temperature and atmosphere control whereas an optical feature corrects for pyrolytically-generated carbon formed during analysis.

Our radiocarbon-based source apportionments of EC and OC fractions have so far relied on two methods: whereas quantification of OC and EC has been performed by means of a Sunset instrument, isolation and partial recovery of each fraction for further ^{14}C-analysis has been carried out according to the method described by Szidat et al., 2004.

We intend now to combine quantification and recovery in a single method by running the Sunset in a pure oxygen, charring-minimising atmosphere.
The first results show that avoiding OC charring on original material, even under pure O_2, is not realistic, but can be achieved on water-extracted filters. A future procedure could be to quantify and recover water-insoluble OC and EC from water-extracted filters and to analyse the water-soluble OC in a separate run, which would in addition bring information about the origins of water-soluble and –insoluble OC.

References

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