

Electronic Supplementary Material to: Refractory Black Carbon Results and a Method Comparison between Solid-state Cutting and Continuous Melting Sampling of a West Antarctic Snow and Firn Core

Luciano MARQUETTO^{1,2}, Susan KASPARI¹, Jefferson Cardia SIMÕES², and Emil BABIK¹

¹Department of Geological Sciences, Central Washington University, Ellensburg, Washington 98926, USA

²Polar and Climatic Center, Federal University of Rio Grande do Sul, Porto Alegre, Rio Grande do Sul, 91509-900, Brazil

ESM to : Marquette, L., S. Kaspari, J. C. Simões, and E. Babik, 2020: Refractory black carbon results and a method comparison between solid-state cutting and continuous melting sampling of a West Antarctic snow and firn core. *Adv. Atmos. Sci.*, **37**(4), <https://doi.org/10.1007/s00376-019-9124-8>. (in press)



Table 1. Particle masses selected in the CMPA for the SP2 internal calibration and analysis time for each (see section 3 in the manuscript).

Particle Mass (femtograms)	Analysis time (minutes)
10	30
40	30
1	30
3	30
0.7	30
70	60
20	30
0.8	30
8	30
2	30
30	30
0.5	30
14	30
6	30
5	30
50	60
60	60
90	60
100	240
200	240
400	240
600	360
800	360

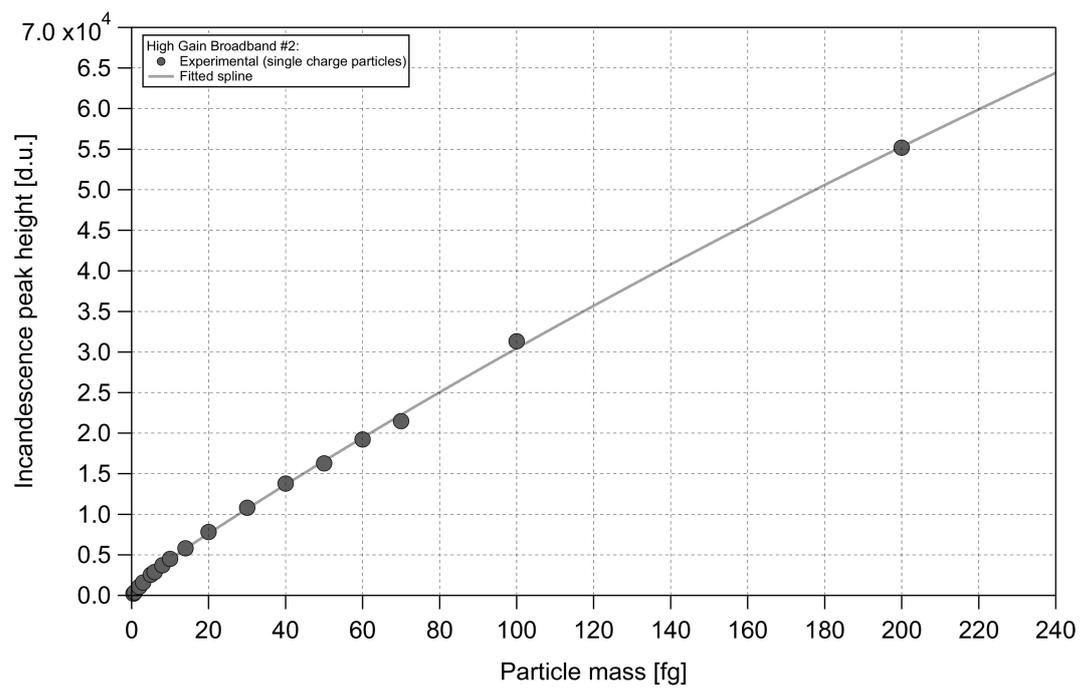


Fig. S1. Calibration curve for the B2HG channel, obtained from the internal calibration carried out.

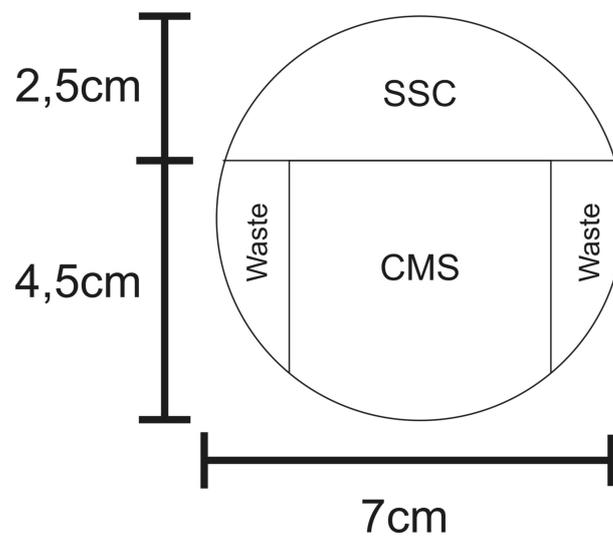


Fig. S2. Cut plan for TT07 core. After cutting in the bandsaw, sections for SSC and CMS were hand scraped with a ceramic knife to remove the external layer (2–4 mm).

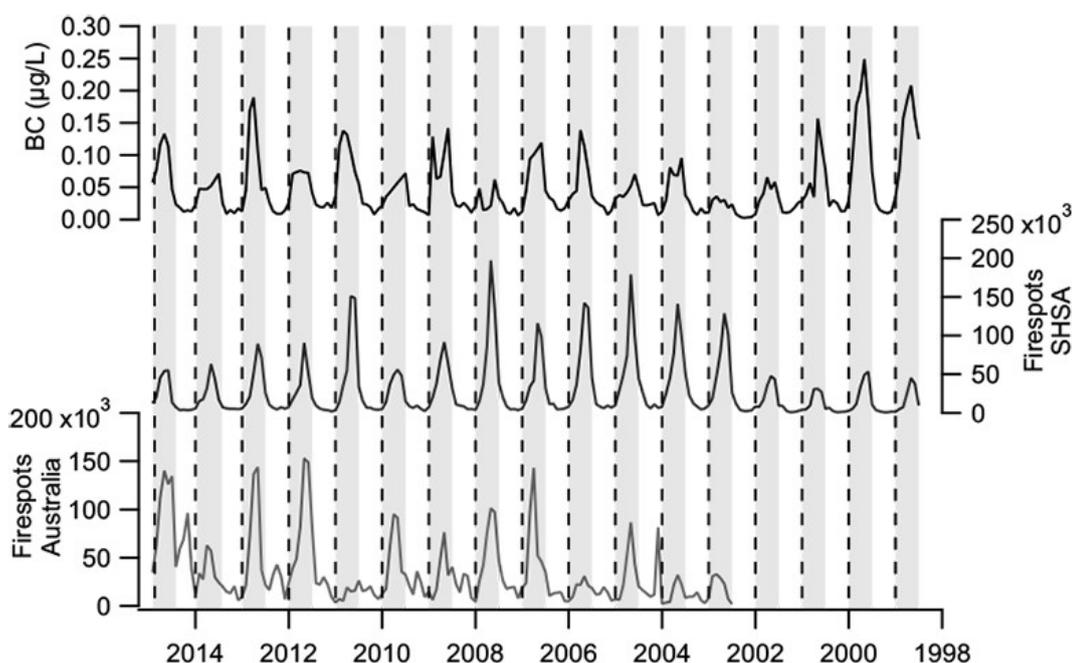


Fig. S3. TT07 rBC record (rescaled to monthly resolution) compared to Southern Hemisphere South America (SHSA) and Australian/New Zealand firespot records.

Methods S1

Wilcoxon-Mann-Whitney Test

The nonparametric Wilcoxon-Mann-Whitney two-sample rank test was calculated using Igor Pro v. 7. Here H_0 is that the data in the two input datasets are statistically the same. Improved normal approximation was used due to increased sample size and significance level was set to 0.01. Calculation details are provided below:

StatsWilcoxonRankTest/ALPH=0.01/TAIL=4/APRX=2 'BC_SSS', 'BC_CMS'

Mann-Whitney Wilcoxon Test:

m = 307

n = 343

totalPoints = 650

U_statistic = 54458

Up_statistic = 50843

Two tailed P-value is: 0.449758

As P-value (0.449758) is greater than p (0.01), H_0 must be accepted. For details on algorithm and formulas, see IgorProManual chapter V-861 (StatsWilcoxonRankTest), available at <http://www.wavemetrics.net/doc/igorman/IgorMan.pdf>.

For details of interpretation, see https://www.wavemetrics.com/products/igorpro/dataanalysis/statistics/tests/statistics_pxp34.