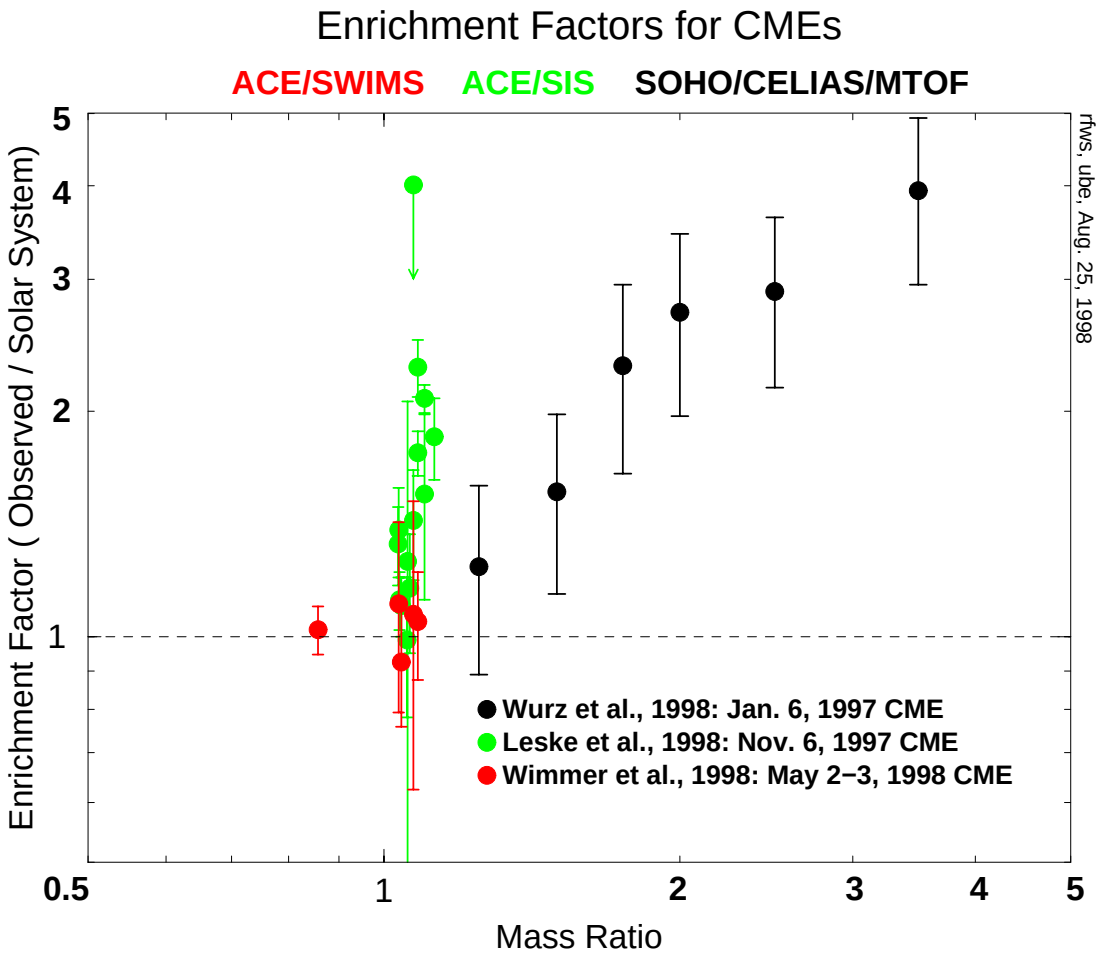

Figure 1: Mass-dependent fractionation in the solar wind has been known to occur for CMEs. This plot compares the results of for the January 1997 CME with results for the solar wind related to the May 1998 CME, as well as measurments of solar energetic particles of the November 1997 events. The data for the January 1997 event are from SOHO/CELIAS/MTOF, the May 1998 solar wind data from SWIMS on ACE, and the November data from SIS on ACE. The plot shows that there was little mass fractionation for the May 1998 event, and that the isotopic composition of Mg and Si was consistent with the solar (or terrestrial) value for this time period.

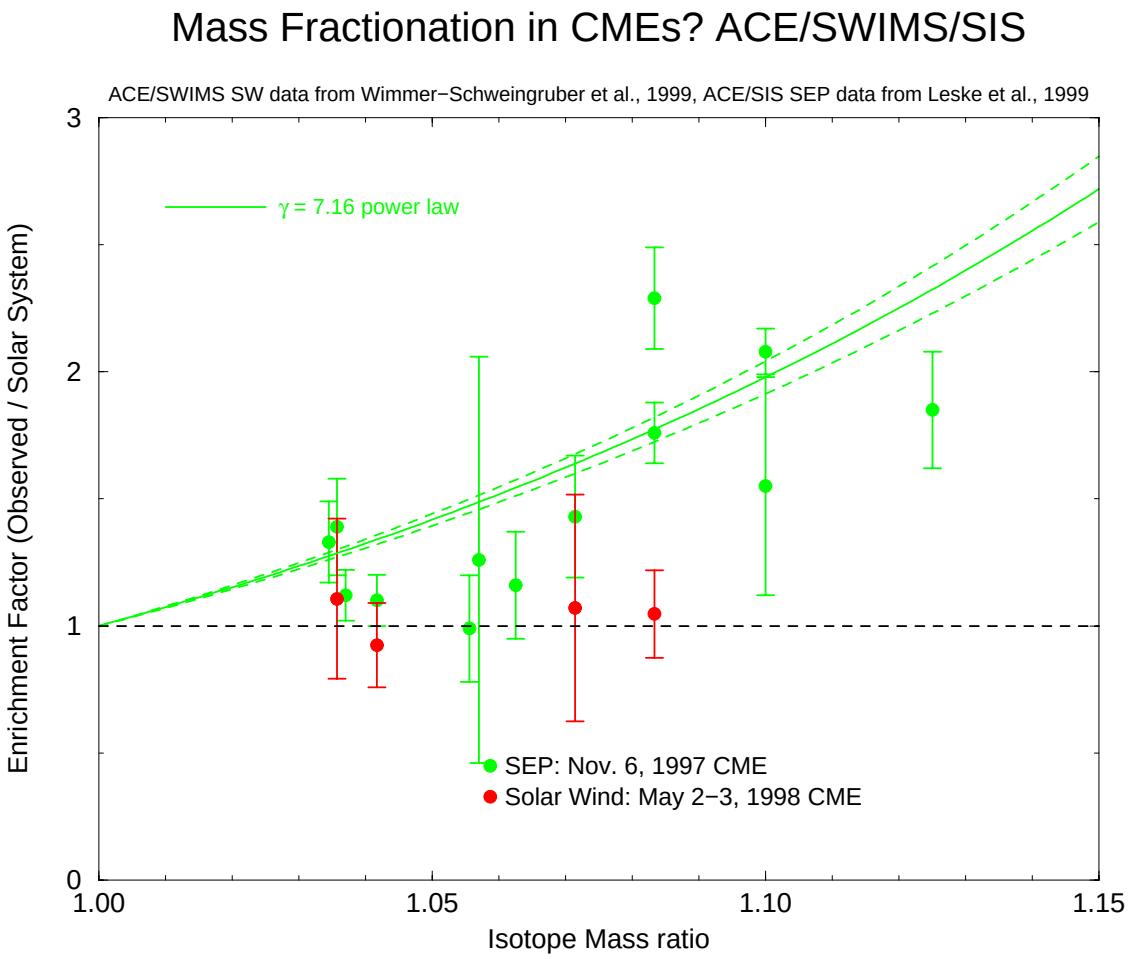

Figure 2: Comparison of the solar wind data from the May 1998 CME with solar energetic particles from the November 1997 events. Both were acquired with instruments on ACE. The SEPs observed with ACE/SIS showed a power-law enrichment with mass, while the solar wind shows no dependence at all. Although the two events are unrelated, this observation confirms expectations that the SEPs are strongly fractionated in the acceleration process and not just due to some very unusual source population in the solar wind.

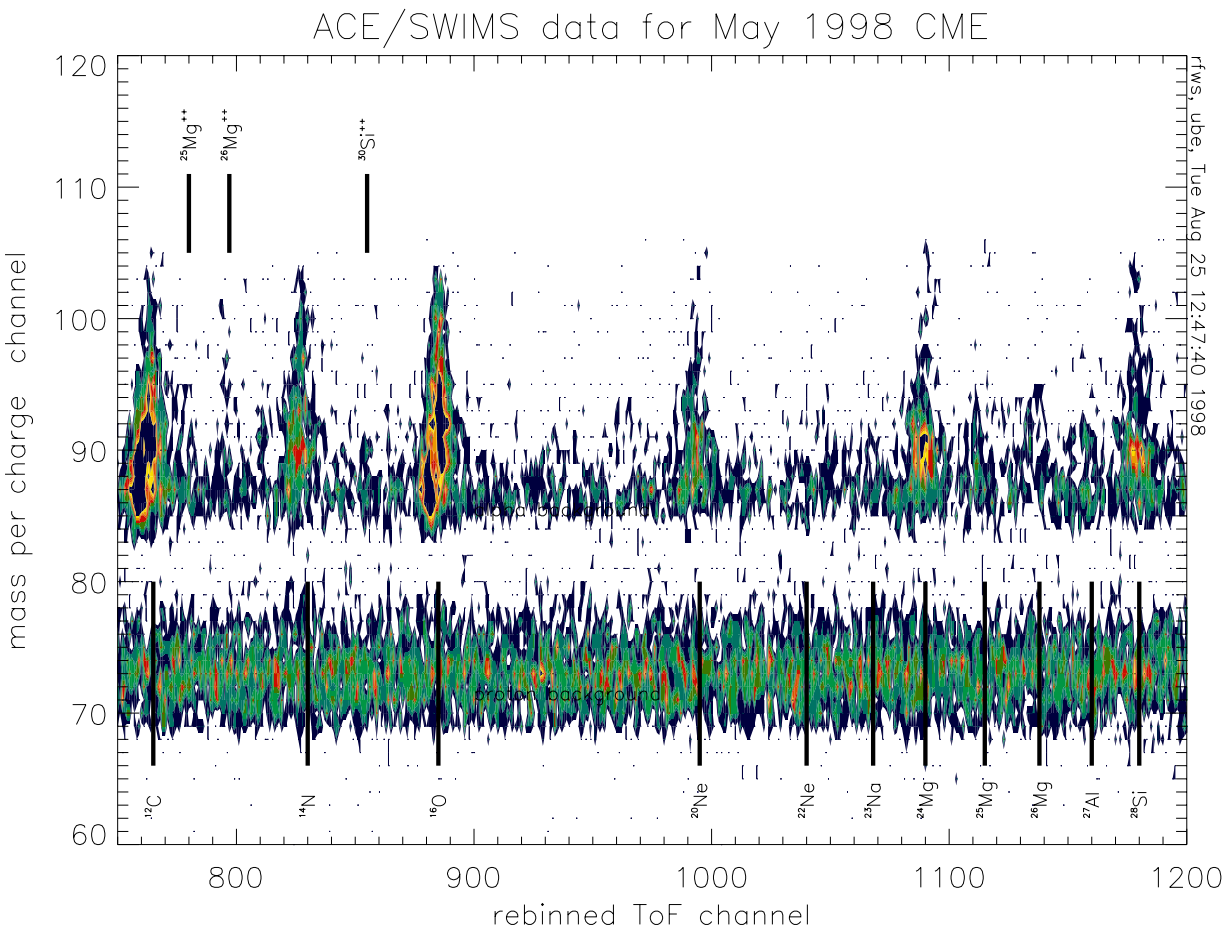

Figure 3: Solar wind data for the May 1998 CME period. The vertical axis is proportional to mass per charge, while mass is plotted along the horizontal axis. Different elements are clearly separated and some isotopes are visible.

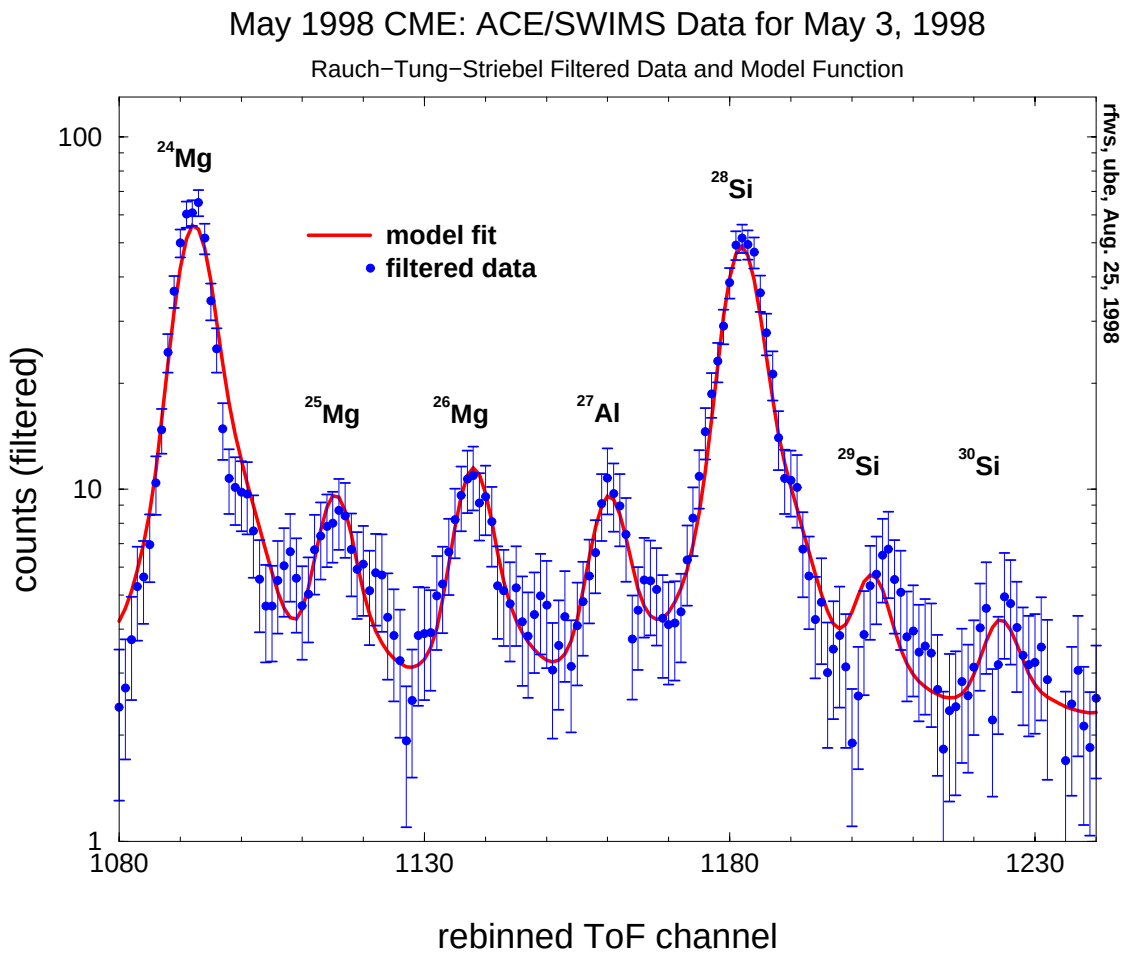

Figure 4: Mass spectrum of the May 1998 CME period. The isotopes of Mg and Si are clearly visible. The raw data were filtered using a standard signal-processing procedure, so-called Rauch-Tung-Striebel filtering. This is a variant of the better known Kalman filter. A model fit is also shown and has been fitted to the data with a maximum-likelyhood estimator.

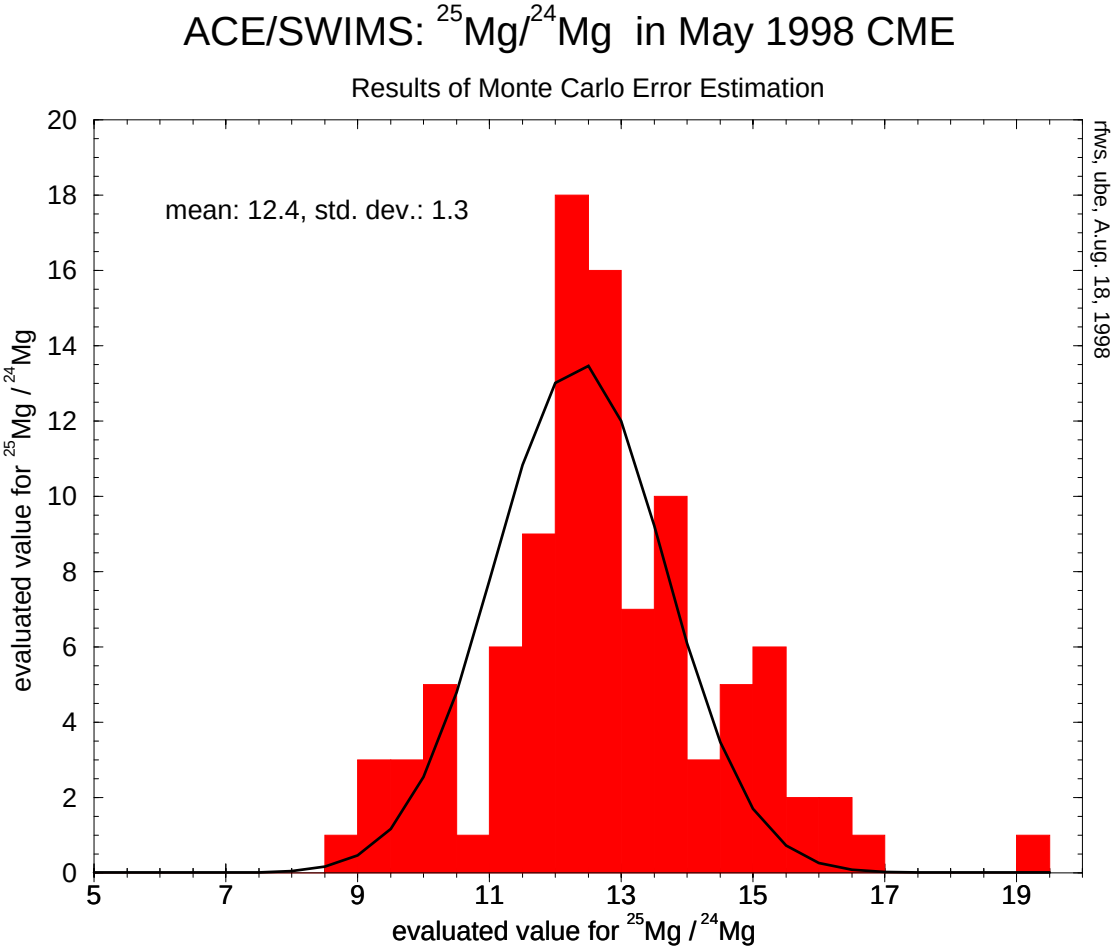

Figure 5: Error analysis for the values in table 1. Using the known instrument response and its uncertainties, a series of artificial spectra can be generated and then subjected to the same analysis as the real data. The variations in these model data are then a good measure for the uncertainties of the measured values.

Table 1. Values for the isotopic composition of Mg and Si and our results for the bulk plasma in the second half of the May 1998 CME. See text for discussion.

source	$^{25}Mg/^{24}Mg$	$^{26}Mg/^{24}Mg$	ref.	$^{29}Si/^{28}Si$	$^{30}Si/^{28}Si$	ref.
FSW	12.8 ± 1.1	13.8 ± 1.2	a	—	—	
SSW	13.2 ± 1.3	15.3 ± 1.3	a	—	—	
SSW	13.0 ± 0.7	13.7 ± 1.0	b	5.0 ± 0.2	3.39 ± 0.2	h
CME	11.7 ± 2.1	14.6 ± 2.4	c	5.6 ± 1.6	3.6 ± 1.5	c
SOL	12.66	13.94	d	5.06	3.36	d
SEPs	—	15.2 ± 1.2	e	16.8 ± 16.8	2.6 ± 4.6	i
SEPs	14.8 ± 3.6	14.8 ± 3.4	f	—	—	
SEPs*	25.0 ± 19.0	36.0 ± 21.0	g	—	—	

[a] *Bochsler et al.* [1997].
[b] *Kucharek et al.* [1998].
[c] This work.
[d] *Anders and Grevesse* [1989].
[e] *Selesnick et al.* [1993].
[f] *Mewaldt et al.* [1984].
[g] *Mason et al.* [1994].
[h] *Wimmer-Schweingruber et al.* [1998].
[i] *Simpson et al.* [1983].

SSW denotes slow solar wind, FSW fast solar wind, CME coronal mass ejection SOL solar system, and SEPs solar energetic particles. Mean of asymmetric uncertainties of *Mewaldt et al.* [1984] given. * ^{3}He rich event

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