

Posting type	Advisory
Subject	S interference in XRF determination of Si
Module/Species	A/ Si
Sites	entire network
Period	starting 12/1/01
Recommendation	Distrust reported Si concentrations when $[S] \gg [Si]$, and disregard reported uncertainties and MDLs
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Supporting information	

The primary XRF peak for sulfur has a shoulder that overlaps the primary XRF peak for silicon, as illustrated in Figure 1.

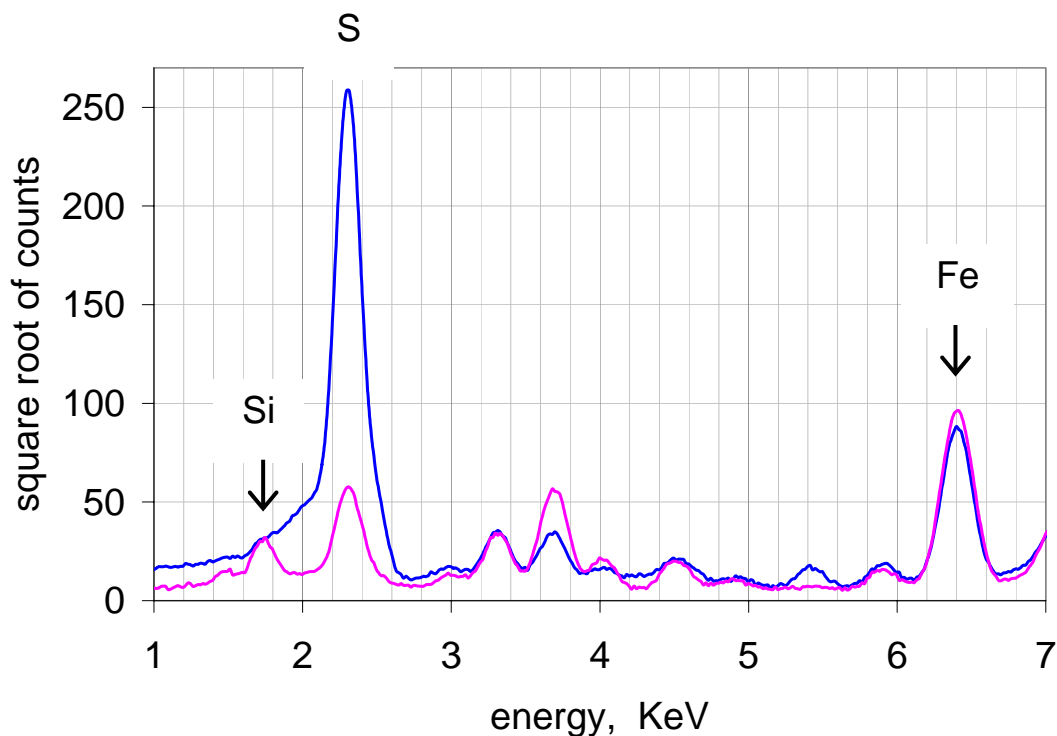


Figure 1. XRF spectra for two samples with differing S/Si ratios.

Accurate determination of Si is difficult when S concentrations greatly exceed Si concentrations. Reported concentrations then depart from expectations based on Fe and other crustal elements (Figure 2). Reported uncertainties and detection limits for Si do not adequately account for the interference by S (Figure 3).

The degree of interference by S is sensitive to details of system performance that can change from month to month, and the data user is encouraged to apply the screening approach illustrated in Figure 2 to the specific period of interest. Interference by S contributes also to the Al detection problem noted in a [previous advisory](#).

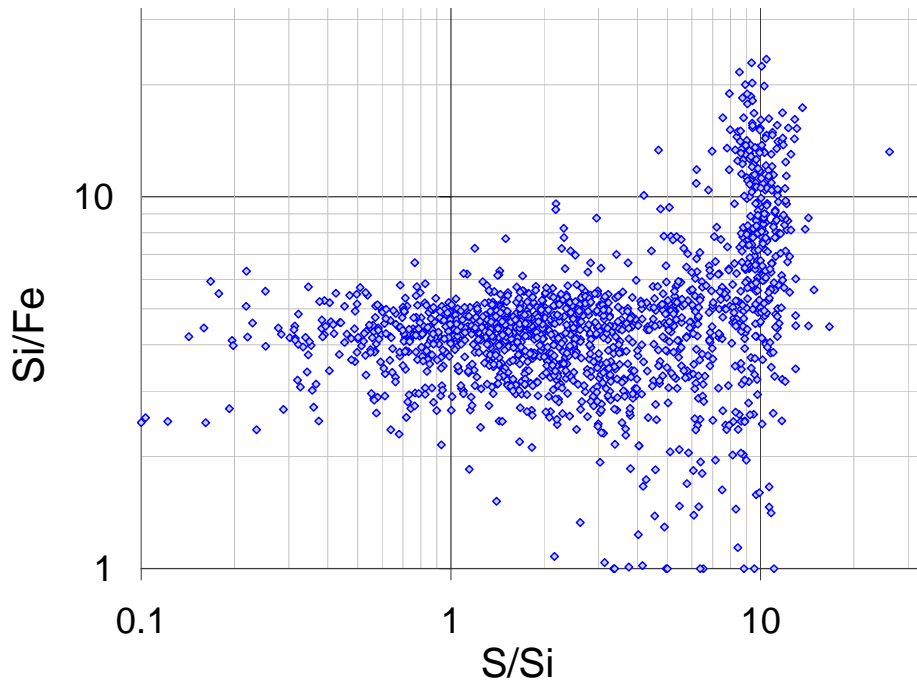


Figure 2. All July 2004 IMPROVE samples with Si at least 10 times the reported MDL. Values outside the plotting range are plotted at the appropriate boundary. Observed Si/Fe mass ratios in fine soil dusts are commonly 3 – 6.

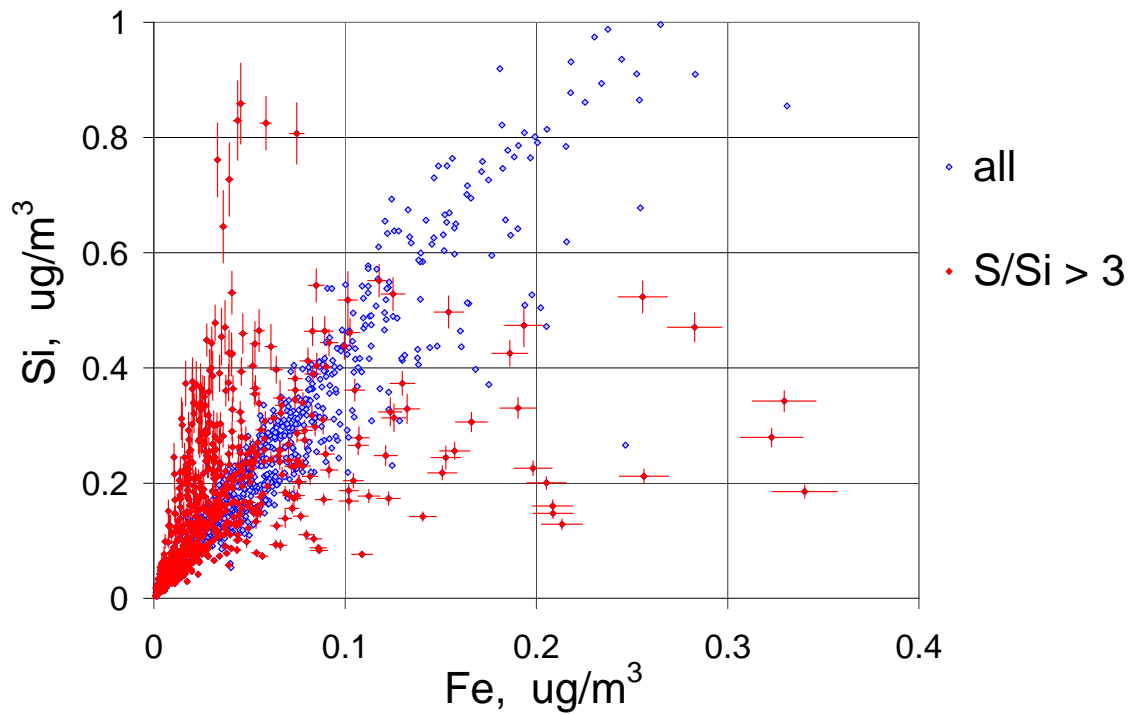


Figure 3. All July 2004 IMPROVE samples with Si less than 1 $\mu\text{g}/\text{m}^3$ and at least 10 times the reported MDL. Reported uncertainties are indicated for samples with $S/Si > 3$.