

**Posting type**            Advisory

**Subject**                 Marginal detection of heavy elements by PIXE analysis

**Module/Species**        A/ Pb, Sr, Se, Rb

**Sites**                    Entire network

**Period**                  Before 6/1/1992

**Recommendation**      Recognize trend artifacts introduced by the PIXE - XRF transition.

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**Supporting information**

The heavy elements in samples collected since 1 June 1992 have been determined by X-Ray Fluorescence (XRF). In earlier samples, those elements were determined by Proton-Induced X-ray Emission (PIXE). The PIXE analysis was considerably less sensitive for lead, strontium, selenium, and rubidium (Table). The concentration statistics of marginally detected elements are [known to be distorted](#) by the censoring of undetected amounts. The effects of such distortion are evident in the Figure.

**Figure (right).** Monthly median and interquartile range, with monthly mean reported detection limit, for selected elements in all network samples.

	1992 detects	
	Mar-May PIXE	Jun-Aug XRF
Br	100%	100%
Fe	100%	100%
Zn	99%	100%
Pb	88%	99%
Se	31%	92%
Sr	46%	88%
Cu	86%	86%
Rb	24%	82%
Zr	8%	35%
Ni	15%	32%
As	20%	26%

**Table (above).** Detection rates in Spring (PIXE) and Summer (XRF) 1992 analyses. Of the eight elements with high XRF detection rates (green), four had significantly lower PIXE detection rates (yellow).

