

Posting type	Advisory
Subject	Elemental concentrations above the MDL can go undetected
Module/Species	A/ Al
Sites	entire network
Period	entire record
Recommendation	Estimate undetected Al from Si (<i>e.g.</i> Eldred, 2003)
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Supporting information

Minimum detectable limits (MDLs) for XRF and PIXE analyses are based on the background spectrum at the location of an element's primary energy peak. Standard theory is used to estimate the contribution of this background to uncertainty in the measured peak. The MDL estimated in this manner serves as a conventional metric of analytical sensitivity. It is not an upper bound on undetectable concentrations, particularly in the presence of other elements whose peaks overlap the peak of interest. This caveat applies with particular force to aluminum, whose peak is on the shoulder of a larger peak for silicon. The figure below illustrates the behavior of the aluminum MDL. Alumino-silicate minerals are the main source of both aluminum and silicon in the air. Measured aluminum and silicon concentrations correlate strongly and approximate their ratio in earth's crust. Aluminum is undetected, however, in many samples for which measured silicon indicates aluminum concentrations well above the MDL.

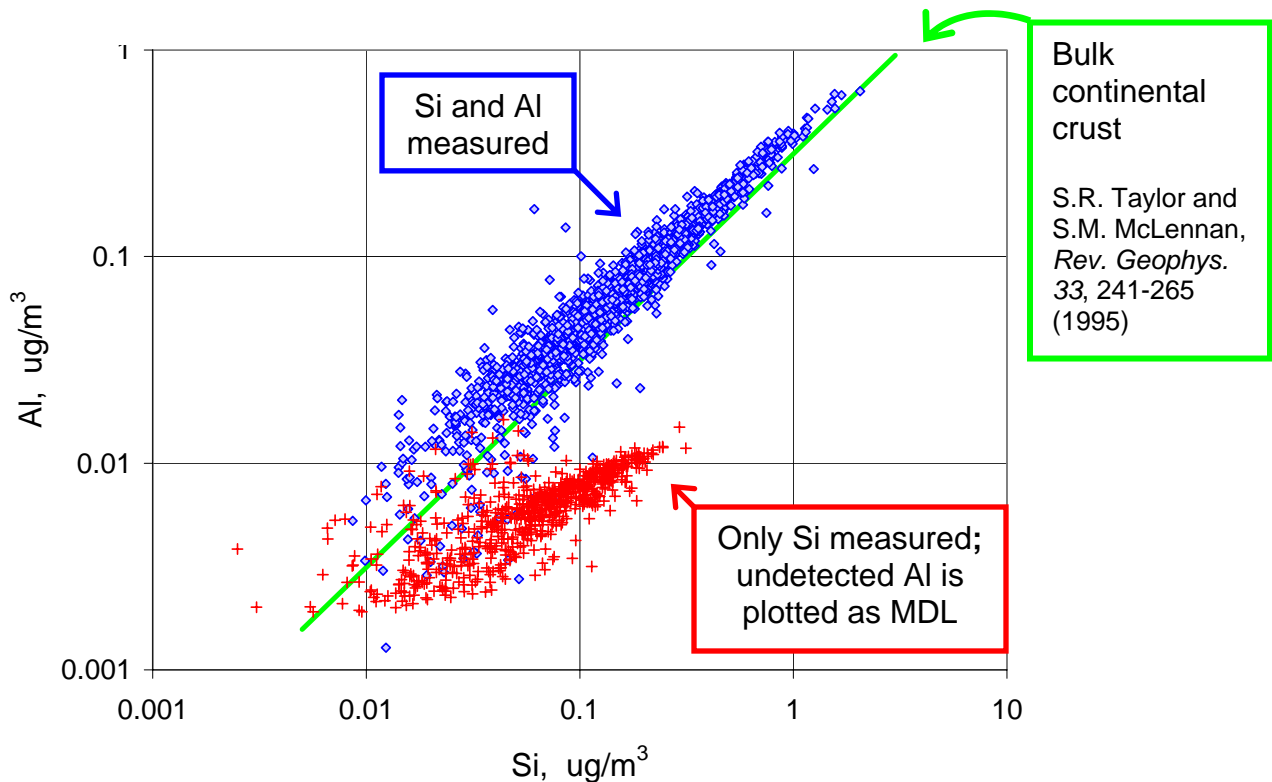


Figure 1. Aluminum and silicon concentrations from all non-urban sites in the network during March-April 2004.