Surficial arsenic concentrations in the northern Great Basin

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Nearly 10,200 new arsenic analyses of stream-sediment and soil samples, most collected during the National Uranium Resources Exploration (NURE) program, have been analyzed for arsenic using both ICP-40 and a partial solution method that uses concentrated hydrochloric acid and hydrogen peroxide, and is designed to measure the metals NOT bound in silicate minerals. The samples encompass all or parts of 17 contiguous 1 by 2-degree quadrangles in NV, CA, and OR.

This large dataset was gridded and processed by fourier-transform analysis of the apparent wavelength of anomalies, using software developed for processing geophysical data. The data signal was divided into four grids: 1) a gradient, homoclinal in form, that decreases from SE to NW; 2) a regional pattern, dominated by about 10 anomalies with wavelengths of tens of km; 3) a pattern of many tens of residual anomalies, with wavelengths of about 10 km or less; and 4) noise, a very short-wavelength pattern.

The residual anomalies are of greatest interest for mineral exploration, but only about half of them appear to be related to specific significant mineral deposits, districts, and belts. Many correspond to areas with no known mineral deposits. Alignment of these anomalies may define young crustal fractures, due to arsenic transport and redeposition by surface waters, and by groundwaters moving along regional structures

The arsenic distribution patterns can be used both as a guide to mineral exploration, and to point to regional sources for the high arsenic concentrations common in surface and ground waters in the region. Large areas of the map have average surface concentrations above 22 ppm, the proposed EPA remediation goal for residential soil.