

GEOCHEMICAL MAPS BASED ON ULTRA-LOW-DENSITY SAMPLING OF THE CONTERMINOUS UNITED STATES

1SMITH, D.B., 2GUSTAVSSON, N., 3BOLVIKEN, B. 1U.S. Geological Survey, Denver, CO USA; 2Geological Survey of Finland, Espoo, Finland; 3Geological Survey of Norway, Trondheim, Norway

The U.S. Geological Survey, under the leadership of H.T. Shacklette, collected soil and other regolith samples from 1,323 sites in the conterminous United States (7,840,000km²) from 1961 - 1975 and prepared single-element, point-symbol geochemical maps in black and white for 7 major and 39 trace elements. We have reprocessed these data, using weighted median and Bootstrap procedures for interpolation and smoothing, and produced full-color maps for 7 major elements (Al, Ca, Fe, K, Mg, Na, and Ti) and 15 trace elements (As, Ba, Cr, Cu, Hg, Li, Mn, Ni, Pb, Se, Sr, V, Y, Zn, and Zr). Comparison of the K map produced in this manner with a corresponding map produced from airborne radiometric measurement of K shows that the reliability of these maps is good even with the ultra-low sample density. The low-density maps successfully reveal broad geochemical dispersion patterns for both major and trace elements and should prove useful in demonstrating the natural variability of the geochemical landscape and for establishing baselines against which human-induced changes may be recognized and measured. These maps were produced from a sample density that is similar to that currently being obtained throughout many European countries participating in the Forum of European Geological Surveys' (FOREGS) Geochemical Baseline Program. The FOREGS Program is the first coordinated international effort to implement the recommendation for the establishment of a global geochemical reference network as articulated in the final report of IGCP Project 259 (International Geochemical Mapping).