United States Department of the Interior
Geological Survey

Helium Sniffer Field Test: Roosevelt Hot Springs, Utah, October 1975 and March 1976

By

Edward H. Denton

Open-File Report 77-606

1977

Helium Sniffer Field Test: Roosevelt Hot Springs, Utah, October 1975 and March 1976

By
Edward H. Denton

Examination of the data (fig. 3) obtained with the helium "sniffer" (Friedman and Denton, 1976), during two brief visits to Roosevelt Hot Springs, Utah (figs. 1 & 2), lead to the following observations:

1. A correlation appears to exist between the location of a subterranean fault, reported by the University of Utah (oral communication, 1975), and the pattern of helium signals obtained from subsurface air samples taken along one of the University's base lines crossing this fault. (See figs. 2 & 3.)

2. An increase of 8 millibars in atmospheric pressure between 23 and 24 October 1975 appears to have caused a decrease of nearly 50 parts per billion in the average abundance of helium in samples taken along the same line on both days. The absolute barometric pressure, however, was not measured during that trip. It was recorded on 24 March 1976 to be 829.8 millibars.

3. Additional data taken on 24 March at half-mile (o.8 km) intervals along the road to Negro Mag Wash (figs. 2 & 4) suggest the location of still another fault some two miles (3.2 km) east of the first one.

4. The atmospheric abundance of helium at Roosevelt Hot Springs on both trips was within one percent of 5,240 parts per billion.

The sensitivity of the helium "sniffer" during both trips

was 18 parts per billion helium in air (±10%) per scale unit output of the spectrometer. All subsurface air samples were taken two feet (o.6m) below the surface of the ground using $\frac{1}{4}$-inch (o.64 cm) diameter probes.

On both trips, the weather was relatively dry with occasional winds as high as 20 miles an hour (32 km/hr) from the southwest. The soil along the line "2200 North" was composed of moderately coarse sand. Along the eastern portion of the Negro Mag road, the subsurface soil frequently was damp and composed of fine clay, making sample retrieval somewhat more difficult.

We are indebted to Professor Stanley Ward, of the University of Utah's Department of Geology and Geophysics, for inviting us to collect our samples along one of the University's base lines, and for his interest in our helium detection system.

Alan Roberts of the U.S. Geological Survey and two of his associates, Mary Dalziel and John Lubeck, participated in the collection of samples during the October trip.

The mobile helium "sniffer" was originally developed by the Isotope Branch of the U.S. Geological Survey. However, the truck-mounted unit used on these trips was lent to us by Michael Reimer of the Uranium-Thorium Branch.

Reference Cited

Friedman, Irving, and Denton, E.H.(1976) A portable helium sniffer: U.S. Geol. Survey Jour. Research, v.4, no. 1, p. 35-6.

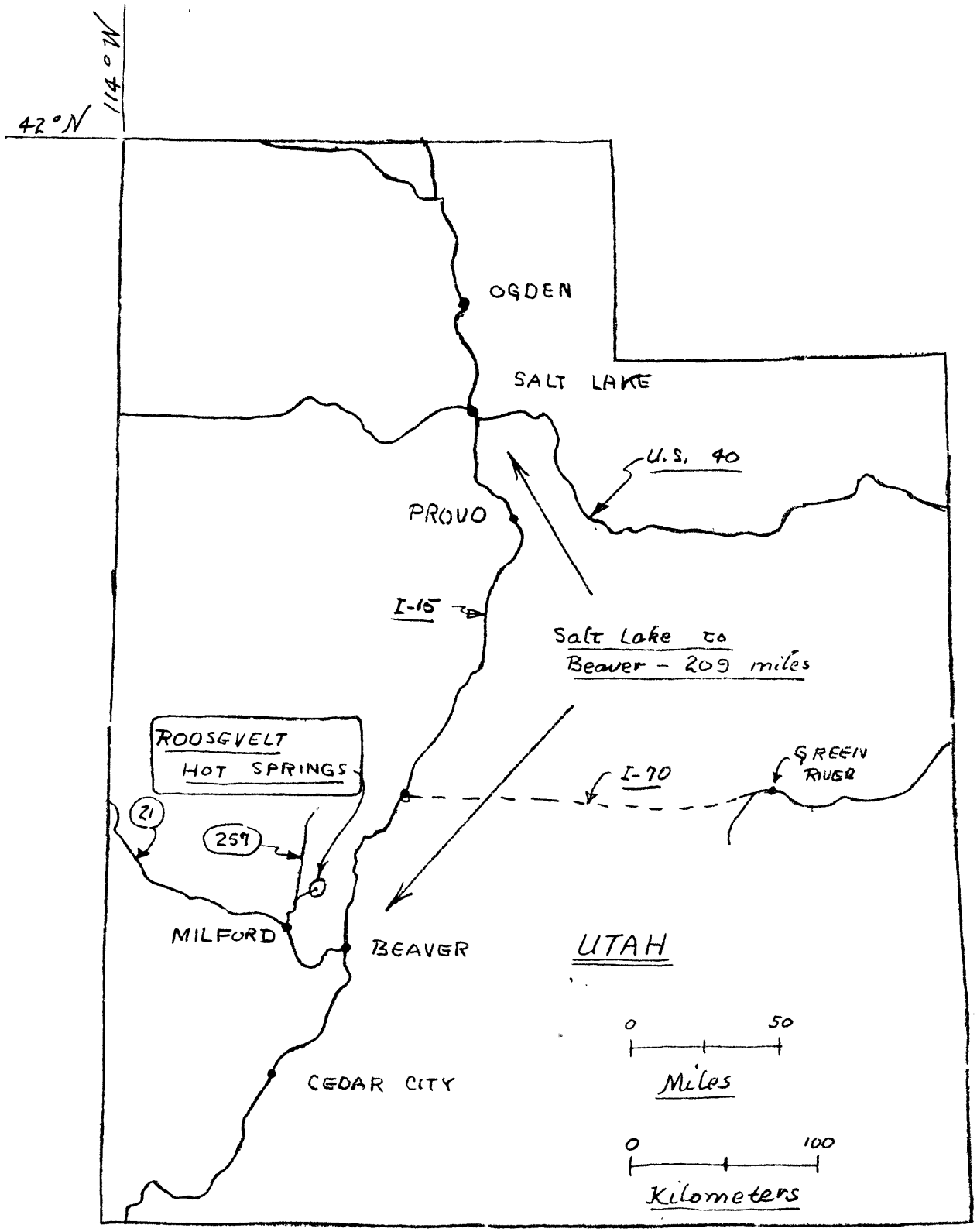


Figure 1. Location of Roosevelt Hot Springs, Utah

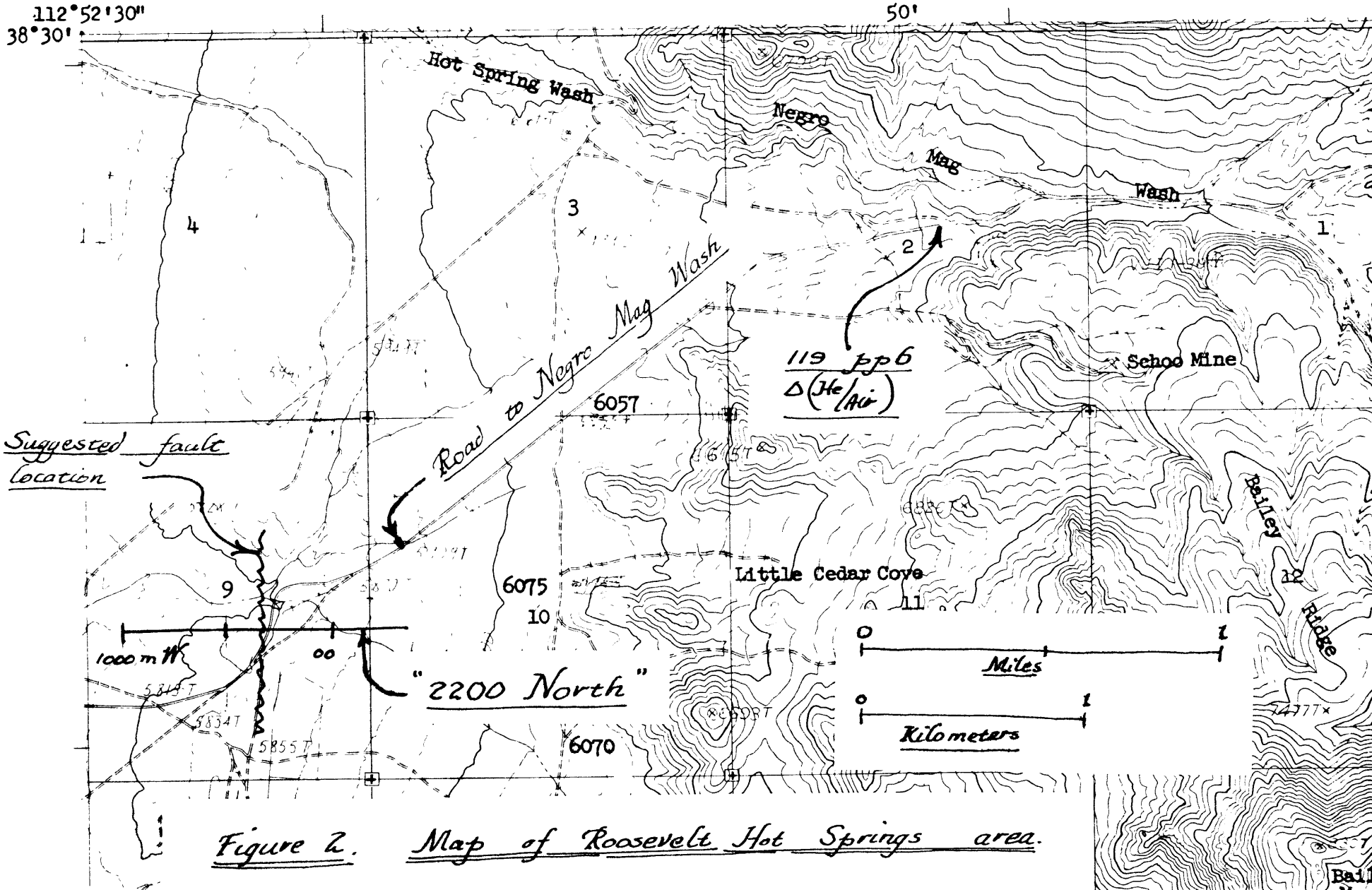


Figure 2. Map of Roosevelt Hot Springs area.

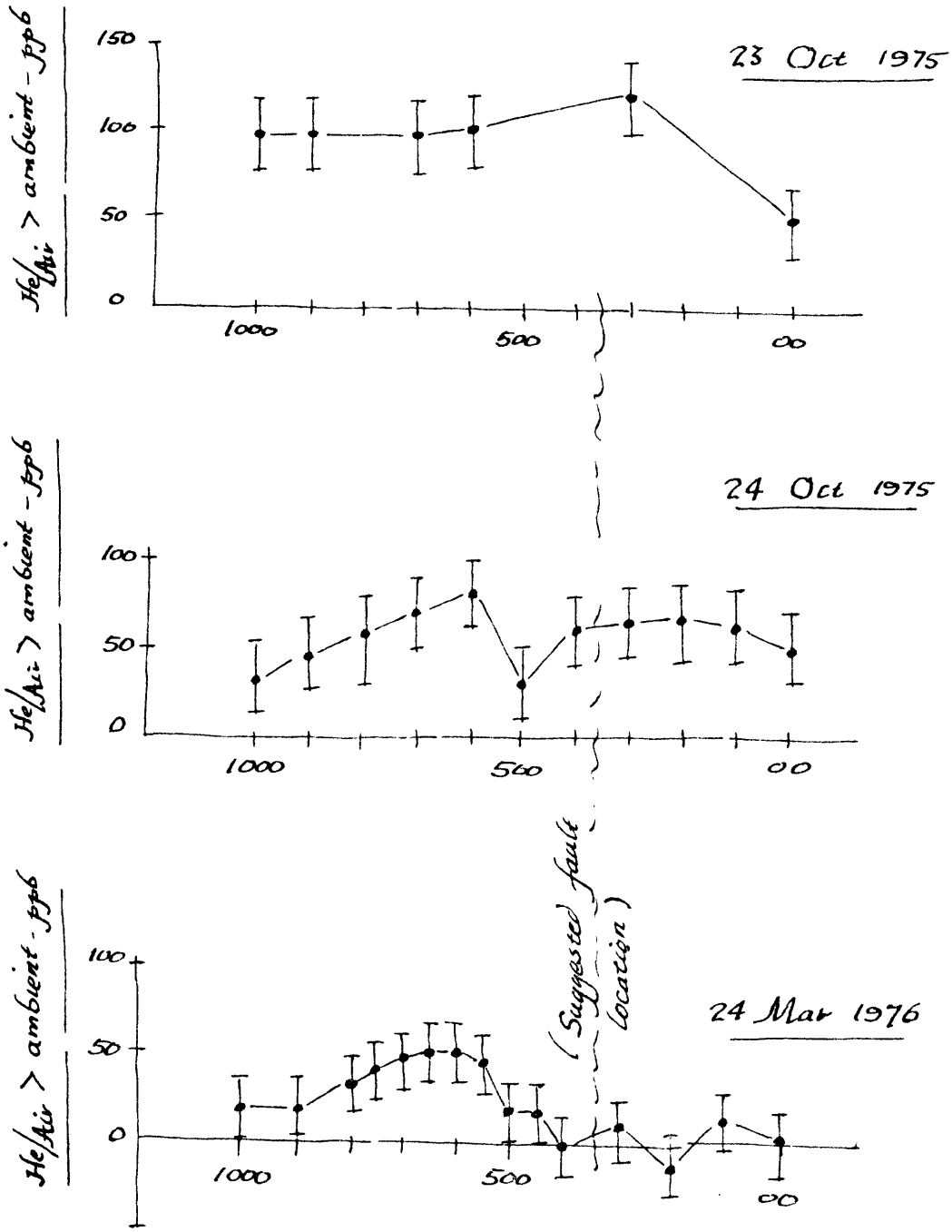
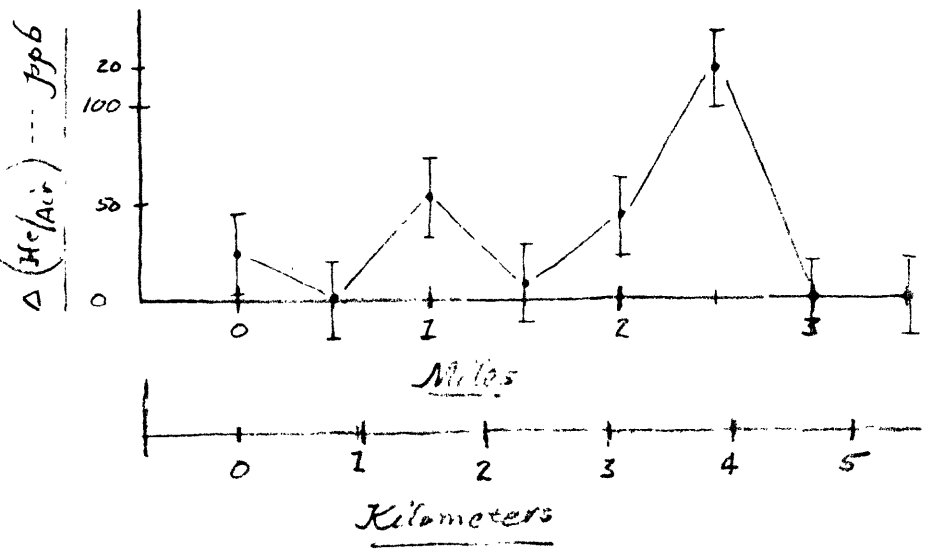


Figure 3. Helium concentrations above ambient in subsurface air along line "2200 North". Concentrations in parts per billion.

— E.H. Denton, 13 My 1976

24 Mar 1976



Location along road to Negro Mag Wash

Figure 4. Helium abundance in subsurface soil along road to Negro Mag Wash — starting south of "500 West" on line "2200 North" (See fig. 2)