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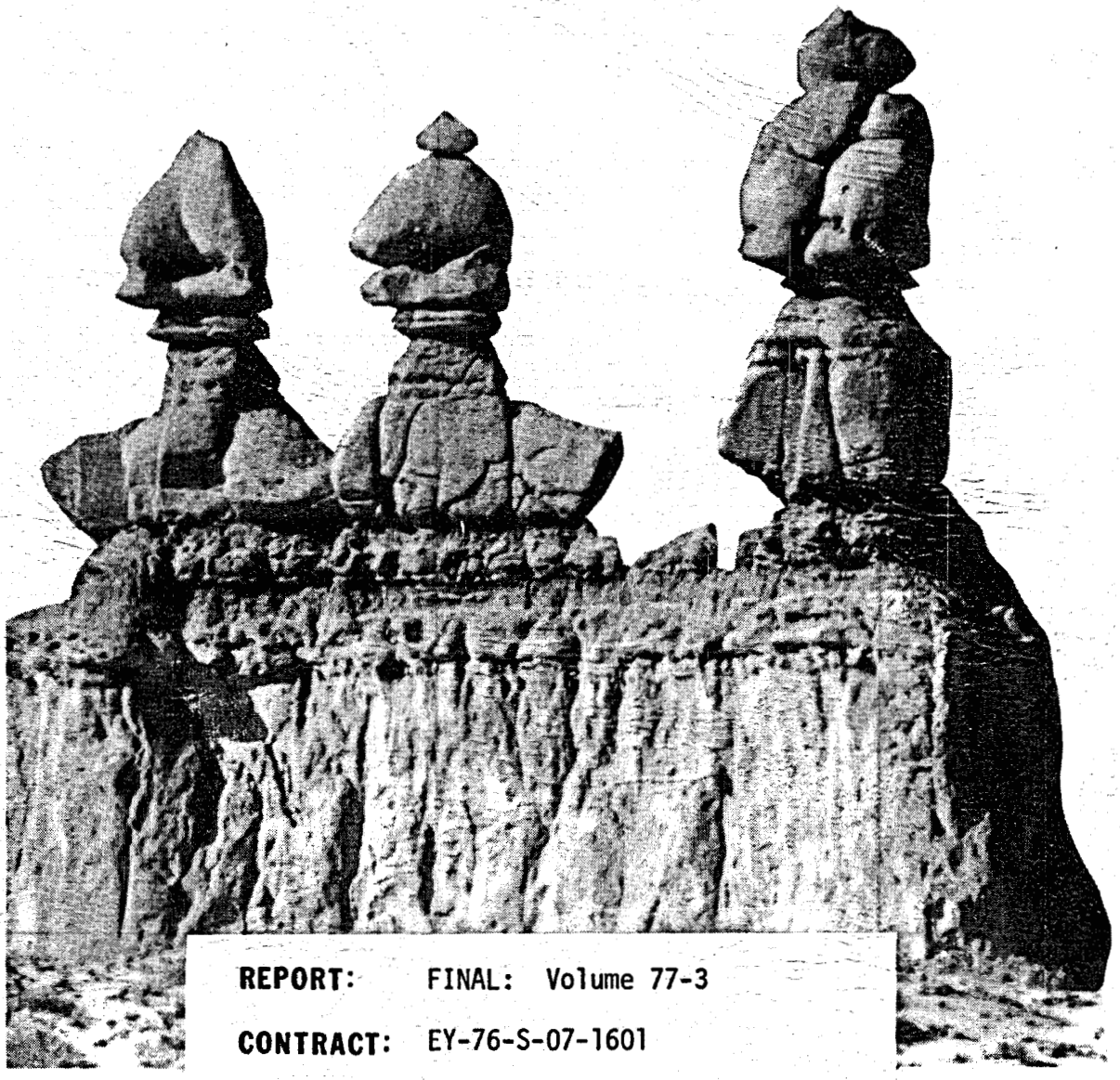
DEPARTMENT OF GEOLOGY AND GEOPHYSICS



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LONG-TERM SEISMIC MONITORING OF THE ROOSEVELT - COVE FORT KGRA'S

By

Robert B. Smith

Introduction

Earthquake monitoring of the Roosevelt - Cove Fort Hot Springs KGRA's was implemented by installation of three RF telemetered, vertical component, seismograph stations: CFU, MNU and RHU (Figure 1). These station sites were selected on the basis of proximity to the KGRA's, with respect to known earthquake activity determined in our microearthquake surveys (Olson and Smith, 1976).

The three permanent stations form the basic long-term monitoring capability of the Roosevelt-Cove Fort KGRA's. The signals are FM transmitted to a collecting site near Milford then they are telephone-transmitted to the University of Utah campus for recording. The limitations of only three-stations precludes accurate hypocenter determinations but allows detection to a minimum threshold of about M-0.5 for close-in events. Locations can be determined for earthquakes of about M0.7 or greater.

Regional coverage of the south-central Utah KGRA's is supplemented by the use of other existing University of Utah stations to the east: MSU, PUU, and RFU (Figure 1). Together the six stations allow long-term detection of this geothermally active region.

Results

During the period of 1 January 1977 to 30 June 1977 (Figs. 1 and 2) over 70 earthquakes were located in the south-central Utah area. Persistent activity continued throughout the Cove Fort area. This cluster

of relatively intense swarm type activity was first noted in our 1974 and 1975 surveys (Olson and Smith, 1976). During the period of this report the seismicity at Cove Fort continued at an equally high rate of activity. No distinct trends of activity were noted at Cove Fort and the seismicity seems to be scattered throughout a 20 km x 15 km zone.

Only two earthquakes were located near the Roosevelt Hot Springs in the period 1 January 1977 to 30 June 1977. These two events were located north of Roosevelt Hot Springs. The close proximity of one earthquake to the Roosevelt Hot Springs steam production area suggests that although the seismicity is low, there is sufficient brittle strain release to warrant consideration as a potential area of earthquake inducement.

A dispersed zone of earthquakes occurred in the Beaver Valley area during January - March 31, 1977, but there are no noteable correlations of this activity with young volcanism or hot springs.

An important observation from the Roosevelt Hot Springs station was the well developed seismic signals generated by steam withdrawal from a well about 1 mile from the RHU seismograph site. We have recorded seismically several of the steam tests in the Roosevelt Hot Springs area and we are watching for earthquakes that may be related to these tests.

In conclusion, this 6 month period of earthquake locations shows continuing swarm activity near Cove Fort with relatively little activity at the Roosevelt Hot Springs KGRA. Because of the sparseness and wide station spacings, no accurate focal depths or fault plane solutions could be calculated.

References

Olsen, T. L., and Smith, R. B., 1976, Earthquake Surveys of the Roosevelt Hot Springs and the Cove Fort Areas, Utah: Final Report, v. 4, submitted to RANN, National Science Foundation.

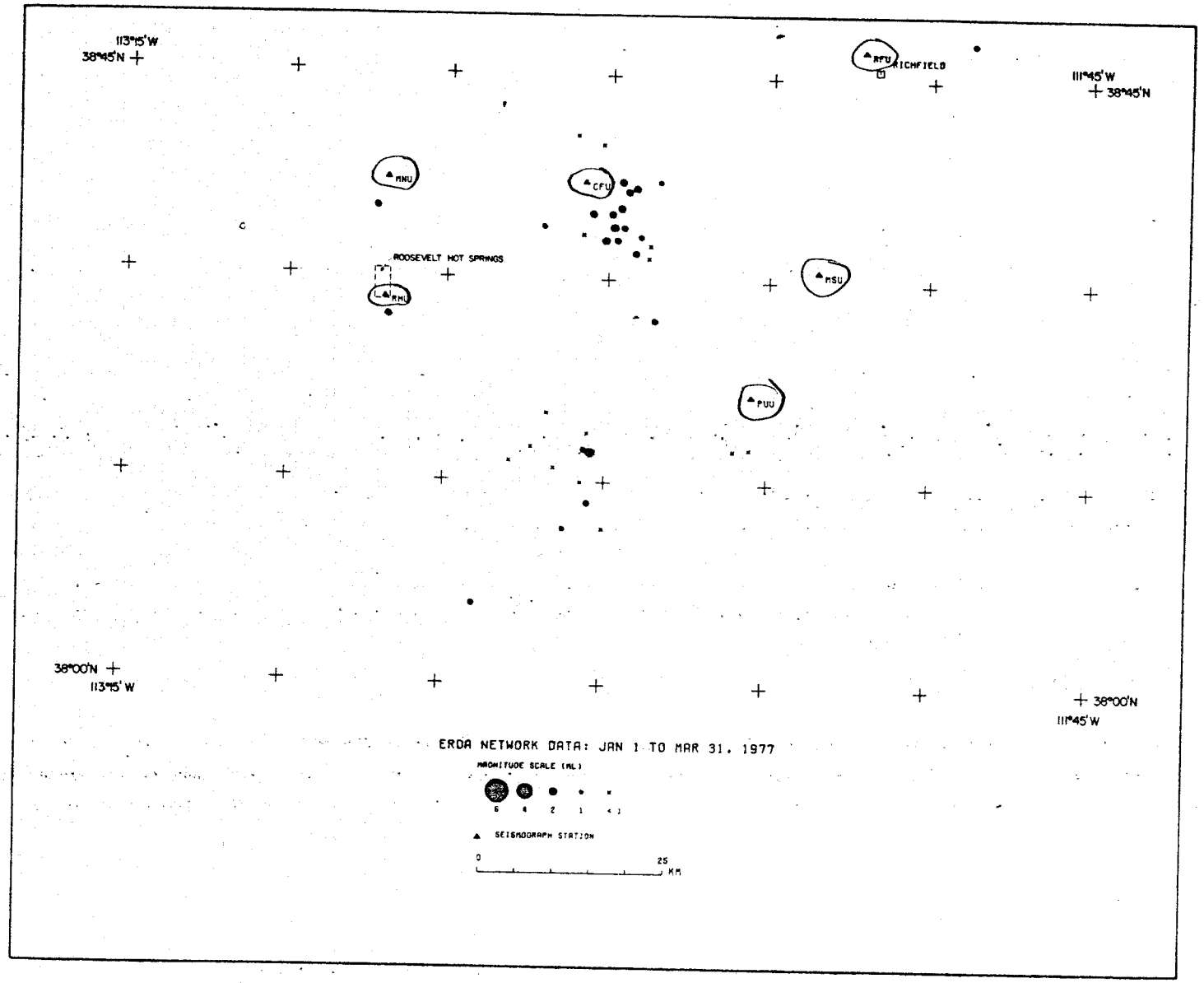
113°15'W
38°45'N
RFU
RICHFIELD
111°45'W
38°45'N
MNU
CFU
ROOSEVELT HOT SPRINGS
RMU
MSU
PUU
38°00'N
113°15'W
38°00'N
111°45'W
ERDA NETWORK DATA: JAN 1 TO MAR 31, 1977
MAGNITUDE SCALE (ML)
6
4
2
1
< 1
SEISMOGRAPH STATION
0
25
KM

Figure 1

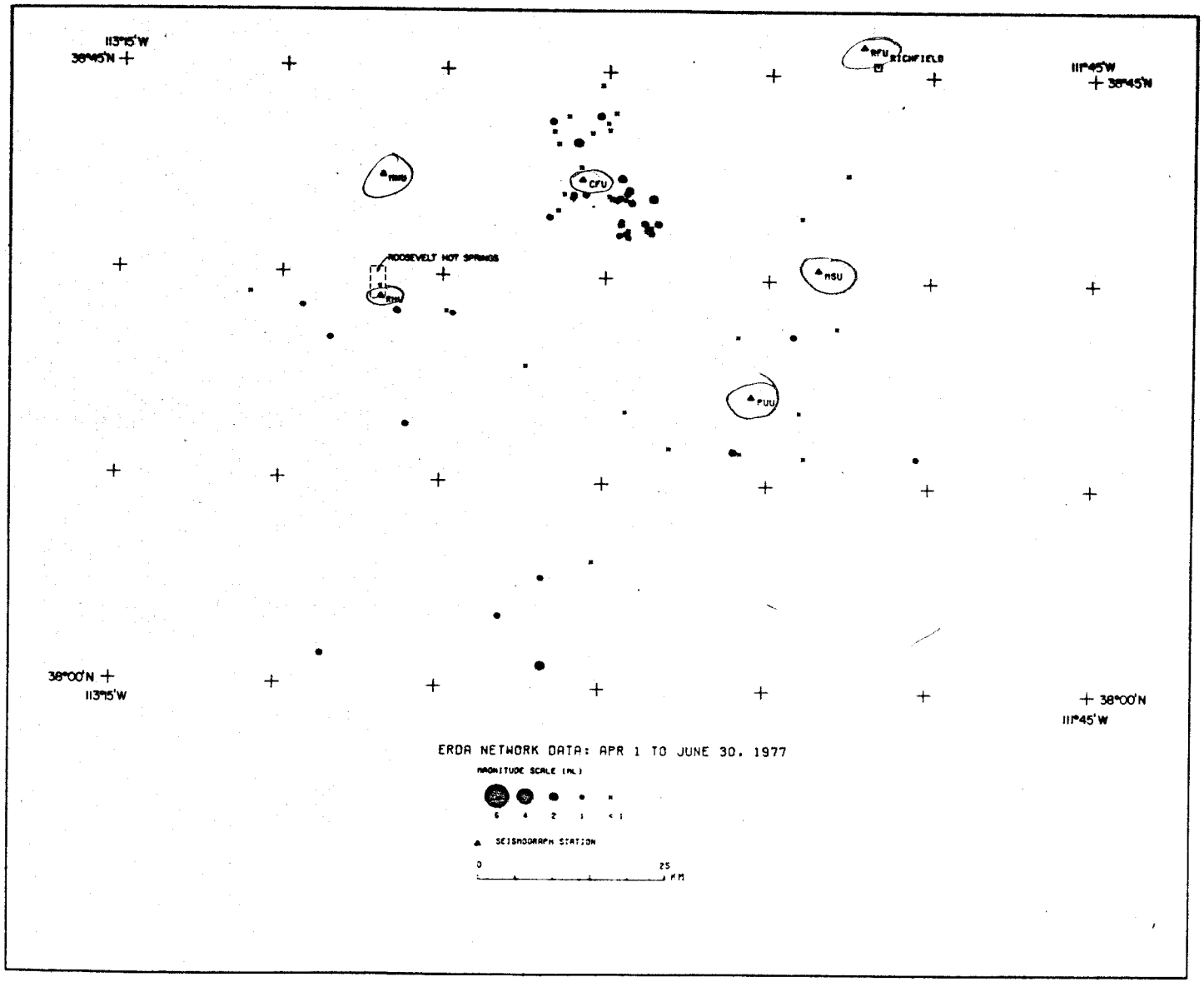
113°15'W
38°45'N
111°45'W
38°45'N
RICHFIELD
RFU
CFU
MSU
FUU
ROOSEVELT HOT SPRINGS
38°00'N
113°15'W
38°00'N
111°45'W
ERDA NETWORK DATA: APR 1 TO JUNE 30, 1977
MAGNITUDE SCALE (ML)
6
4
2
1
< 1
SEISMOGRAPH STATION
0
25
KM

Figure 2