Third Semi-Annual Report on NASA Research Grant

NGR-32-004-011

A COMPARATIVE STUDY OF LUNAR CRATERS AND TERRESTRIAL VOLCANO-TECTONIC DEPRESSIONS IN RHYOLITE ASH-FLOW PLATEAUS

Wolfgang E. Elston

Department of Geology

University of New Mexico

Albuquerque, New Mexico

March 1, 1966

N67-81165 (ACCESSION NUMBER)

9 (PAGES)

CR 71429 (NASA CR OR TMX OR AD NUMBER)

(THRU)

none (CODE)

(CATEGORY)

FACILITY FORM 602

A COMPARATIVE STUDY OF LUNAR CRATERS AND TERRESTRIAL VOLCANO-TECTONIC DEPRESSIONS IN RHYOLITE ASH-FLOW PLATEAUS

Introduction

The Mogollon Plateau is a polygonal volcanic area in southwestern New Mexico, roughly 75 miles in diameter. For reasons outlined in the original proposal for the NASA grant, in the first semi-annual report, and in the reprints submitted with the second and third semi-annual reports, the Mogollon Plateau may be a terrestrial analog of a large endogenous lunar crater.

Summary of Research

The first 1 1/2 months of the period covered by this report were part of the 1965 summer field season. The results were described in a publication submitted with the second semi-annual report.

Since the beginning of the 1965-66 academic year, work has concentrated on spectrographic analyses and petrographic studies of volcanic rocks collected in the previous year, compilation of field data, examinations of photographs of lunar and Martian features, a library survey of the geology of terrestrial ring-dike complexes, and field examination of "striated cones," features in volcanic rocks that resemble shatter cones. Laboratory work is still in the early data-gathering stage. Present indications are that "striated cones" are formed by wind abrasion under special conditions and are not shatter cones.

[redacted]

Activities of Research Personnel
August 1, 1965, to February 28, 1966

Dr. Wolfgang E. Elston, Principal Investigator

I returned to the campus of the University of New Mexico on August 10, 1965, after a year of sabbatical leave spent on full-time geologic field work in connection with the NASA-sponsored research project. Since the beginning of the academic year, I have been doing research on a one-quarter time basis. Work has consisted of supervision of student research; petrographic study of rocks; interpretation of lunar, Martian, and terrestrial photographs; and planning of future work.

I attended the following meetings in connection with space-related work:

Oregon-New York Academy of Sciences Lunar Geological Field Conference, Bend, Oregon, August 22 to August 28, 1965. Read a paper entitled: "Possible Connections between Rhyolite Ash-Flow Plateaus, Ring-Dike Complexes, and Lunar Craters: A Progress Report."

16th Field Conference, New Mexico Geological Society, October 15 to October 17, 1965. Led a trip across the Mogollon Plateau and nearby volcanic areas. The field conference was attended by 225 geologists. Contributions to the guidebook were submitted with the second semi-annual report.

Dedication of the U. S. Geological Survey Center of Astrogeology, Flagstaff, Arizona, October 18 to October 19, 1965.

Albuquerque Geological Society, January 18, 1966. Read a paper on "Craters on Earth, Moon, and Mars."

Dr. Edgar F. Cruft, Faculty Associate

Dr. Cruft began the program of spectrographic analyses outlined in the original proposal. The direct-reading emission spectrograph has been calibrated, and whole-rock trace-element analyses are being run on an initial batch of 50 samples. Reproducibility of results has been excellent.

Dr. Peter J. Coney, Research Assistant Geologist

Dr. Coney spent the 1965 summer field season mapping parts of the western rim of the Mogollon Plateau. He plans to continue this work during the 1966 season.

David L. Giles, NASA Fellow

Mr. Giles has been performing spectrographic trace-element analyses of biotites from rhyolite ash flows as part of his Ph.D. dissertation research.

Dwight E. Deal

Mr. Deal is continuing his study of the development of the topography of the Mogollon Plateau as part of his Ph.D. dissertation research.

Gerrit J. DeKoning, Research Assistant

Mr. DeKoning performed numerous routine laboratory jobs and is preparing to join the mapping program during the 1966 field season as part of his Master's thesis research.

Publications

The following articles were published during the period covered by this report:

*Elston, W. E., 1965, Volcanic rocks of the Mimbres and Upper Gila drainages, New Mexico: New Mexico Geol. Soc. Guidebook of Southwestern New Mexico, II, 16th Field Conf.: p. 167-179.

*_____, 1965, The Mogollon Plateau volcanic province: possible connection with ring-dike complexes and lunar craters (abs.): ibid., p. 239.

The two reprints that accompany this report were published during the previous six-month period, but reprints were not received in time for the previous report. They are:

Elston, W. E., 1965, Rhyolite ash-flow plateaus, ring-dike complexes, calderas, lopoliths, and Moon craters: New York Acad. Sci. Annals, v. 123, art. 2, p. 817-842.

Elston, W. E., and Lambert, P. W., 1965, Possible shatter cones in a volcanic vent near Albuquerque, New Mexico: ibid., p. 1003-1016.

*Copies submitted with second semi-annual report.

Future Plans

Laboratory work will continue for the remainder of the academic year. Plans are also being made to continue field work during the summer of 1966.