Title of Investigation: Wind Erosion of Soils

E73-10719
CR-133219

GSFC ID: AG 337

Objectives of the Contract:

To locate wind erosion sites in West Texas and to develop the technology necessary to inventory the extent and spread of wind erosion.

Chronology of Important Events Associated With the Contract:

The study area is large, but the major portion is covered by two orbit passes of the satellite. The data received are summarized in Table 1.

Statement of Problems in the Report Period:

The satellite data are received 4 to 6 weeks after the overpass (Table 1). Since wind erosion is a very dynamic process, the erodible conditions can change between orbit date and the date the data are received. If the action agencies are to make maximum use of the data, they would need to receive the information within 2 to 3 weeks after the flight. If we are to process and interpret the imagery before sending it to the action agencies, the turn-around-time must be as short as possible.

Summary of Work Performed this Reporting Period:

The extent of wind erosion on the test site has not been great. Isolated areas along the Texas-New Mexico border have been eroding, but soil moisture conditions have been good and erosion was controlled using conventional tillage practices.

The transparencies have been catalogued and studied. From the September 22 imagery we were able to locate extensive sand dune areas in the Kermit area of West Texas. On the basis of the ERTS data we scheduled an aircraft flight for mid March 1973 to include the sand dune areas. The NASA RB-57 developed structural problems so the U-2 was scheduled, but was unable to fly the target area in this report period.

The resolution of the ERTS-1 data is good, but it is doubtful that we can measure small increases in the size of eroded areas. CCT were requested for the October 9 orbit but the precision tapes received were not compatible with the program for bulk tapes at Weslaco, Texas. Bulk tapes were requested by phone on February 15, 1973.

The MSS channel 5 gives the best visual response to the changes in soil reflectance associated with wind eroded areas.

Table 1. ERTS 1 orbit date, date data were received, cloud cover, and image quality over the Big Spring test site.

Date	Orbit Number	Data Received	Cloud Cover	Sun Elevation	MSS 4567
July 29	83	-	20	59.5	GGG
July 30	97	-	0	59.4	GGGG
August 16	334	-	30	57.2	GGGG
August 17	348	-	20	56.9	GGGG
September 3	585	-	100	53.4	GGGG
September 4	599	October 30	30	53.1	GGGG
September 21	836	October 27	90	48.9	GGGG
September 22	850	October 27	0	48.7	GGGG
October 9	1087	November 10	10	43.7	GGGG*
October 10	1101	November 13	10	43.5	GGGG
October 27	1338	-	50	38.5	GGGG
October 28	1352	-	30	38.2	GGGG
November 14	1589	December 2	10	33.5	GGGG
November 15	1603	December 18	60	33.3	GGGG
December 2	1840	January 11	0	29.7	GGGG
December 3	1854	January 8	0	29.5	GGGG
December 20	2090	February 2	50	27.6	PPGG
December 21	2104	January 22	0	27.5	GGGP
January 7	2342	-	100	27.7	GGGG
January 8	2356	-	100	27.8	GGGG
January 25	2593	-	100	29.9	GGGG
January 26	2607	March 2	20	30.2	GGGG
February 12	2844	April 18	0	34.3	GGGG
February 13	2856	April 18	20	34.6	GGGG
March 2	3095	April 23	10	40.9	GGGG
March 3	3109	April 18	0	41.2	GGGG

*Ordered CCT on November 27, 1972; Received precision tapes in December 1972.

Work Plan of Period March 17 to May 17:

We plan to use image enhancement techniques to delineate and determine the extent of wind erosion from the 9-inch transparencies. The image enhanced results will be checked by extracting the digital data from the MSS channels.