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CR-131849

STUDY OF THE MARINE ENVIRONMENT OF THE NORTHERN  
GULF OF CALIFORNIA

University of Arizona  
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Tucson, Arizona 85721

Principal Investigator: Dr. J. R. Hendrickson

NASA Contract Number: NAS5-21777

GSFC ID Number: UN-603

ERTS-A Proposal Number: SR-102

Type I Progress Report for period ending April 30, 1973

The primary objective of this investigation is to develop baseline information for use in interpretation of orbital remote imagery to determine the feasibility of monitoring the northern Gulf of California environment. In order to achieve this objective, major emphasis is placed on documentation of quantitative seasonal variation within the study area in such physical oceanographic parameters as salinity, temperature, water clarity, bottom configuration, current patterns, and possibly, primary productivity. Thus, a significant proportion of the effort relates to the establishment and coordination of extensive ground observation in the form of monthly oceanographic sampling throughout the study area. In support of the primary objective, and of the ERTS program, technology will be developed to utilize the Data Collection System (DCS) supplied by NASA, for in situ measurement of oceanographic parameters on a continuous basis.

(E73-10550) STUDY OF THE MARINE ENVIRONMENT OF THE NORTHERN GULF OF CALIFORNIA Progress Report, period ending 30 Apr. 1973 (Arizona Univ., Tucson.) 7 p HC \$3.00 N73-23423  
CSCL 08J G3/13 00550  
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Bi-Monthly Progress Report for Period March 1 - April 30, 1973

Project UN 603, Study of the Marine Environment of the  
Northern Gulf of California

1. Work performed during this reporting period.

Regular oceanographic ground observation cruises were maintained during the reporting period, coincidentally with the satellite passes. Good radiometer data was obtained during the morning period of two sets of passes for a variety of stations. Replacement of the submarine photometer with a newly reconditioned instrument appears to have significantly improved turbidity measurements.

Personnel problems mentioned in the previous Type I report have been resolved and we do not expect them to recur. Planning and execution of remaining ground observation cruises present no problems and no delays in the cruise schedule for this reason are foreseen.

The data storage and processing facility continues to function as planned. During this reporting period, debugging of the vertical turbidity profile was completed and plots have been generated for all stations in all cruises to date. These plots have resulted in an idea for a further reduction of the turbidity data and that program, designed to calculate and plot the change in extinction coefficient with depth, is in the final processes of debugging. Another program, designed to derive statistical parameters of the data collected within each month on meteorological and oceanographic phenomena, is near implementation. This program will be used as the first stage in the comparative analysis of monthly data. The algorithm for processing buoy data has been written and is in the preliminary stages of debugging. It is expected that this program will be ready for implementation by the time that the remote instruments are installed for the second time.

Preliminary agreements have been reached with the Universidad Nacional Autonoma de Mexico (UNAM) for a cooperative analysis of phytoplankton samples collected during the contract period. The principal Mexican scientist on this project is Maestro Virgilio Arenas. Plans are being finalized concerning the exchange of data, etc.

Much activity occurred during this reporting period with the remote oceanographic data collection system. The first buoy platform, deployed and waiting to receive the instruments, was subjected to a very severe storm. The iron loops by which the buoy was attached to the anchor lines were broken or torn from the concrete. The buoy rode the waves into shore and was totally destroyed in its passage over the shoreline reef. The design engineer attributed the failure of the anchoring loops to structural weaknesses incurred during the first beaching of the buoy, in early November (see Type II report of Jan. 20) and not to the basic design. However, when the second buoy was constructed in early April, the iron was increased by 100%

throughout and the thickness of the concrete imbedding the loops was also increased.

On April 13th, 14th and 15th the instruments and power supplies were installed into the newly constructed buoy. The buoy operated as expected for two days and then all measurement activity ceased. The instruments were removed on April 28th, brought back to the laboratory where preliminary inspection revealed that a shorted battery had drained the power reserve. The two days of successful data collection did confirm the engineering success of the complex timing system that coordinated measurements with both morning and evening satellite passes. Also, a check through the data confirmed that the sensors, with the exception of the current sensor, functioned well. Further plans for the buoy are discussed below.

## 2. Current problems.

The re-activation of the oceanographic instrumentation buoy is our major area of concern at present. In the Tucson laboratories, all the electronic components must be inspected and repaired as necessary, all connectors must be cleaned and repaired or replaced, the systems must be reconnected and recalibrated. The waterproof boxes must be resealed after equipment is replaced, repressurized and pressure-tested, then transported back to Puerto Penasco for re-installation. Several new brackets of improved design must be installed on the buoy, then the equipment must be re-installed and given a few days operational testing on-site. All the above must take place in time to allow one month's operational data collection before July 15th (modified goal adjusted to circumstance of non-renewal of the contract after July 19th).

A second area of concern which must receive continuing attention during the remaining period of the contract is preparation for termination of activities in mid-July when the contract ends. This will include giving appropriate notice to the Universidad de Sonora from whom the research vessel "ADVENTYR" is chartered, and to the vessel's employed crew. It will also involve coordination with cooperating scientists from the Universidad Autonoma de Mexico for cessation of cruise activities and continued exchange of data as analyses in progress warrant this. Planning for efficient evacuation of the vessel will be required, and a special work period must be organized for removal of equipment from the oceanographic instrumentation buoy at the latest possible date, followed by destruction of the concrete buoy chassis in accordance with requirements of the local Mexican port authority.

## 3. Work schedule during the next reporting period.

The final two oceanographic cruises will be undertaken during the months of May and June and will close the ground data collection phase of the project. No changes in procedure or instruments are planned.

A realistic appraisal will be taken of the remaining time for design and implementation of data analysis programs and effort will then be allocated to the most important programming problems. The basic set of analysis programs will be completed, in addition to the algorithm for processing

remote data from the oceanographic buoy (DCS). Following the June cruise, the June data will be run through the standard set of analysis programs and then all data will be analysed for seasonal trends.

Analysis of the multispectral scanner imagery from ERTS-1 will continue as described in earlier reports.

The remote oceanographic data collection system will be re-installed after conditioning as described above. The prospective dates for the second deployment are May 26, 27 and 28, notwithstanding the occurrence of storms or other "Acts of God" which have hampered this phase of our project.

In late June all data collection aspects of the project will be over and recovery, mothballing, and return of instruments will proceed. Evacuation of the boat is tentatively planned for the week of July 9.

Final data analysis, which will require close coordination among the image analysts and ground data analysts will begin after processing of the final cruise data in mid-June. This must necessarily precede the preparation of the final contractual report. This report is slated as our last official activity under this contract.

4. Publications, etc.

Nothing was published.

5. Recommendations.

We recommend and request that the due date of the draft copy of our Final Report be postponed until September 29, although Phase III activity shall end on July 19, 1973 as per the May 11 letter from the Contracting Officer. Some reasons for this recommendation and request are: 1. Principal Investigator has recently been notified that he will be placed on academic salary as of June 30th, with no University income until the beginning of our fall semester. His time on the contract from July 1 through July 19 will therefore be unpaid, and it would be a severe hardship to continue without pay through the remainder of the summer while preparing the final report, etc. 2. The nature of much of the collected data requires considerable time for receipt, collation and analysis, making it impracticable to prepare the draft final report without a waiting period for processing. 3. Appropriate communication with our cooperating colleagues in Mexico regarding discussion of analyses and formulation of conclusions requires more time than would be allowed by the August 19th deadline for the draft Final Report.

6. Standing order.

No changes are presently contemplated or requested in our standing order for ERTS-1 imagery.

7. ERTS Image Descriptor Form.

ERTS Image Descriptor Forms are not applicable to this contract.

8. Retrospective data requests.

Data Request Forms were submitted on 10 April 1973. Copies of these forms are attached.

ERTS DATA REQUEST FORM  
560-213 (7/72)

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N \_\_\_\_\_  
ID \_\_\_\_\_  
DTM \_\_\_\_\_  
TM \_\_\_\_\_  
TM APP: \_\_\_\_\_

1. DATE 10 APRIL 73

5. TELEPHONE NO. 602-884-1889  NEW

2. USER ID U603

6. CATALOGUES DESIRED

4. SHIP TO:

STANDARD  U.S.  NON-U.S.

ADDRESS DR J R HENDRICKSON  NEW

DCS

THE UNIVERSITY OF ARIZONA

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BIOLOGICAL SCIENCES DEPT

TUCSON, ARIZONA 85721

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