APPLICATION OF SPACE IMAGERY TO MAPPING ROMAN FLOODWATER FARMING SYSTEMS IN LIBYA

by

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ABSTRACT

The UNESCO Libyan Valleys Survey is concerned with the mapping and subsequent analysis of Roman period remains of extensive floodwater farming systems in the Libyan pre-desert. It is hoped that the information derived from this project might contribute to the re-establishment of agriculture in this semi-arid region.

Four seasons of fieldwork have permitted 15,000 km2 to be surveyed, using a wide range of analytical procedures to record ancient sites and local environmental data. For in situ navigation, terrain assessment, site distribution mapping and line mapping, false colour prints from Landsat-MSS were employed both a priori and a posteriori.

On the basis of the fieldwork analysed to date, a range of models was developed to help isolate the main factors responsible for the emergence and subsequent rapid decline of the Romano-Libyan agricultural system. The recent addition of stereo Spacelab Metric Camera (SMC) imagery has opened up new possibilities of providing both validating and supplementary data to these models. These data include:

- a Digital Elevation Model (DEM) for catchment area and run off analysis
- a SMC ortho-image for base mapping of all field survey data
- the use of a DEM for shading correction as an aid to the classification of Landsat-MSS images of rocks, soils and vegetative cover
- the detection and isolation of modern irrigated vegetation, including the re-use of ancient wadi wall systems
- the mapping of marginal vegetation, water control systems and local hydrological systems not obvious from the ground
- the mapping of sand dunes and ancient and modern roads

Preliminary results will be presented of these data, emphasising both their unique contribution and the difficulties of automating the extraction of these image features and their subsequent correlative interpretation.