The figure indicates that waterlogged areas can be picked up by LANDSAT and TM data if the capillary rise in the soils is high and topsoil zone is near saturation. Similar observations have been made by Mendel and Schultz. Depth of groundwater in such cases is less than 2 m and the area is waterlogged.

Figure 1b shows different results. In this case, the area is water-logged and has depth to groundwater less than 2 m, but due to low capillary rise, the topsoil zone is not saturated adequately to have a sufficiently different reflectance from unsaturated topsoils. Hence it cannot be distinguished on LANDSAT and TM data products.

Thus it is obvious that the appearance of waterlogged areas on LANDSAT and TM data products is controlled by the capillary rise, which is influenced by the nature of soils. Field visits in such cases have also proved that although the area is water-logged, it has not appeared on LANDSAT and TM data products. Any investigation which does not incorporate enough field data but is based solely upon interpretation done through the use of remotely sensed data will yield incorrect results despite the usefulness of remotely sensed data in monitoring water-logging and salinity patterns. Even areas where water-logging is acute may not be identified. Recommended measures include construction of new surface, link and sub-surface drains; lining of canals and distributaries; introduction of vertical drainage, afforestation measures, etc. and aim to decrease the inflow components and increase the outflow components in the groundwater system. However, these remedies may not be taken up in priority areas if they are based only on LANDSAT and TM data. Thus, without the support of field data, faulty planning and execution of schemes in the field may result. The reclamation of truly water-logged areas may thus not be pursued. Remote-sensing technology is an additional tool for solving certain problems but should not be regarded as a substitute for field work.

7. Singh, K. P. and Singh, B. D., Publication of the Centre for Advanced Study in Geology, Punjab University, Chandigarh, 1988, 3, 77.

29 April 1990
An entirely different mode of quartz characterized by well-rounded grains in contrast to the texture of other minerals, which however is numerically very rare, was also observed. Shells and shell fragments were completely absent in this zone.

Gypsum crystals are distributed in fine sediments of >1 φ size, the largest grain observed being 1.7 × 0.45 mm in size. Two types of crystals are present. One is euhedral and transparent with excellent clinodome (011), prism (110) and cleavage (010) faces. The other one is a tabular, platy transparent to milky white crystal, generally anhedral. Both types have impurities on the surface and enclose fine detrital grains of opaque minerals and quartz.

The euhedral shape, association with carbonate and absence of typical diagenetic features like displacive nature, overgrowth on grain margins, solution and erosion features and deformation structures suggest that these gypsum crystals are of evaporitic origin formed possibly in isolated ponds of seawater disconnected from the open sea as evidenced from the total absence of shells in this zone. And such isolated pools of seawater can occur in bay areas when the sea level is lowered both locally and eustatically. Geophysical evidence from the bay indicates a basement ridge at the mouth of the bay (A. Bagchi, 1989, personal communication). During times of lowered sea level (in the Holocene) the bay could have formed almost a closed basin of saline water turned ultralimnic for gypsum to precipitate under conditions of arid to semi-arid climate. The semidesert-like conditions in the hinterland are also indicated by well-rounded quartz grains which could represent aeolian influx. The conclusions of Hashmi and Nair (1982) that India experienced climatic aridity during the late Pleistocene–early Holocene are also supported by the occurrence of possible evaporitic gypsum in the sub-bottom nearshore sediments of the western continental shelf of India. Its restriction to littoral sediments is a point to be reckoned with the fact that it is the nearshore areas where seawater gets isolated during sea level fluctuations. Further, there is no evidence of rounding or dissolution on the gypsum crystals indicative of transportation.


ACKNOWLEDGEMENT. I thank Shri B. R. J. Rao, Director, for encouragement.

31 January 1990

Pollen tube growth and site of incompatibility reaction in niger (Guizotia abyssinica Cass.)

Vandana Prasad
National Botanical Research Institute, Lucknow 226 001, India

Self-incompatibility studies have been made out on Guizotia abyssinica. No seed set was found to occur in a plant grown in isolation. In such cases germination of pollen grains on the stigma surface is very poor and pollen tubes show twisting and coiling over the stigmatic papillae.

Guizotia abyssinica of the tribe Heliantheae, family Compositae, is a short day plant. A single plant when put in isolation does not set seeds. The present communication deals with scanning electron microscopic (SEM) studies on stigma structure, pollen tube growth and site of incompatibility reaction.

Upper surface of stigma shows numerous papillae (Figure 1a, b) covered with uniformly thickened cu-