FORMS OF AEOLIAN SANDY DEPOSITS IN PARTS OF RAJASTHAN
BASED ON AERIAL PHOTO-INTERPRETATION

M.V. KAYERRER & R.A. CHANSARKAR
Terrain Evaluation Cell, R & D Organization, Ministry of Defence,
New Delhi.

ABSTRACT

Aerial photographs are invaluable for study of terrain characteristics
which are reflected in the morphology—form and association of different
physiographic units in any area. Based on environmental controls of geology,
relief, dominant geomorphic process and climate, a system of landscape classi-
fication has been evolved. Characteristic physiographic units in any area are
identified and defined based on their form, slope variations, orientation,
spacing, surficial deposits and water regime. Only two units i.e. landscape
pattern and facet are adopted in the classification system.

The dominant aeolian process evolves a variety of forms and associations.
The most important forms evolved are long sandy ridges with variation in
spacing and directions, shifting sand dunes—both scattered and in clusters and
various combinations of short sandy ridges.

The paper describes the form, association and characteristics of one of
the landscape patterns classified in the desert area. The norms established on
the basis of aerial photo-interpretation thus help to infer terrain characteristics
at different places where the pattern occurs.

INTRODUCTION

Most of the desertic portion in Rajasthan has been classified for Terrain
Evaluation purpose. The system of classification is based on environmental
controls like geology, relief, dominant geomorphic process and climate. Aerial
photographs are invaluable for the recognition and the classification of units
and in the study of their characteristics, which are reflected in the morphology-
form and association. This paper deals with one of the landscapes in the desert
classification i.e. parallel sandy ridges which occupy extensive areas south and
west of Jaisalmer. Aerial photo characteristics are tabulated.

LANDSCAPE CLASSIFICATION

The scheme of landscape classification and recording of data on each basic unit
of classification is based on the ‘Geomorphic concept’. The geologic structure
and type of climate through which the geomorphic processes act are the
dominant factors in the evolution and subsequent transformation of any lands-
cape. Each geomorphic process leaves its distinct mark on the landscape and
each process develops its own characteristic assemblage of landforms. Terrain
Evaluation—A New Technique (1969) has given in detail the aim, development and basis of classification adopted. The units of classification are *Pattern* and *Facet*. *Facet* is the basic unit of classification. It is a piece of ground or part of landscape exhibiting uniform physical properties for all practical purposes. It is classified and defined on the basis of morphology, configuration, nature of surficial deposit, surface and subsurface drainage conditions. *Pattern* is a higher order in classification. This is a regularly occurring grouping of related facets as an area or group of areas displaying recurring pattern of topography and soils. It is defined on the basis of geology, climate, morphology, soils and drainage.

**METHOD OF STUDY**

For any area of interest, the published literature on various aspects of terrain is compiled, toposheets are studied and the available photo cover scanned. Based on this, a tentative classification of the area into landscape *Patterns* and *Facets* is done. Initial field reconnaissance is carried out with simultaneous photo reading. During detailed work in the field, photo interpretation characteristics for each facet or group of facets are tabulated and terrain data recorded. Treating that small area of field work as ‘type area’, further facet mapping is done with the help of aerial photos and transferred to toposheets. The validity of this is tested in other areas and photo interpretation characteristics modified or supplemented. Method of this study is given in Table 1.

In the photo indexing, annotated mosaic of the type area, and stereopairs of groups of facets are prepared. These show principal point, transferred principal point, approx. scale, and facet boundaries with numbers. The stereopairs can be viewed both under pocket and mirror stereoscopes.

**PARALLEL SANDY RIDGES**

Desertic region is characterised by intense aridity and aeolian activity causing a constant shifting of fine particles of sand, silt and clay. This shifting takes place in the form of suspended particles as dust in the air and surface flow. The heavier particles are moved from place to place through ‘saltation’. Due to the varying intensity of winds, topographic undulations and vegetation, the aeolian deposit tends to accumulate a gainst obstruction and rising surface forming ‘bar chan’ like formations, in which each barchan dune leap frogs and thus shifts the mass. In most of the cases these coalesce together giving rise to ridges with a gentler windward slope and steeper leeward slope. The shift in a ridge takes place in the form of creep of the leeward slope. Among the various assemblage of forms that are identified and classified, only one named Parallel Sandy Ridges is described here.

The study of one inch maps and available airphoto cover in different parts of Rajasthan (photo scale aprox. 1:35,000 to 1:60,000) have revealed the following landscape types. Each type is based mainly on geometry of landform association, orientation, spacing, height variations, generalised slopes, surficial deposit and seasonal variation in surface water regime.