THE GEOMORPHIC ASSESSMENT AND IMAGE APPRAISAL OF LATERITES AND THEIR EFFECT ON LANDFORM AND LAND USE OF KOLAMBE-GOLAP PLATEAU, MAHARASHTRA

ABSTRACT

Laterite is an important lithological formation in the Konkan area of Maharashtra. Various aspects of these laterites have been studied by many scholars. It has been noticed that coastal laterites of Ratnagiri and Sindhudurg districts pose many problems as regards their origin and lithostratigraphy. In some part of the district the laterites rest over 3 to 4 m. thick lignite beds. Although the occurrence of lignite below laterites has been reported by many researchers and institutes, especially G.S.I., it has never been used to reconstruct the paleo-landscape in the area.

The attempt of this kind necessarily requires thorough geomorphic assessment of the area. This can be done using conventional methods of field mapping as well as modern technique of image analysis. The work presented here gives main emphasis on such applications and tries to use the results and observations in the reconstruction of the lateritic and pre-lateritic paleo-environment in the study area.

The study area comprises mainly of lateritic plateau along the coastline, bordered in north and south by the estuaries of Kajvi and Muchkundi respectively. The plateau is spread between 16° 48': 16° 59'
N. and 73° 17': 73° 21' E. 66 percent of the study area is covered by laterites. Hardpan laterite caps the surface at 80 m above sea level.

The area is a classic example of landforms and landuse being dictated by a thick lateritic cover. The geomorphic assessment of this lateritic area was done using traditional methods of field mapping, surveying as well as by using modern image analysis technique. The vertical sections of the wells dug on plateaus were studied to understand the weathering sequence down to the occurrence of the marine sediments. The samples of the lignite deposits collected from the lignite section were analyzed chemically and for their age determination using Carbon-14 technique. The technique of image analysis was used specifically for the identification and delineation of surface features along the coast and on the plateau. IRS-1 D Pan Point Geo coded scene acquired in December 1996 was used for the appraisal and analysis. The assessment and analysis lead to following observations and conclusions.

The recent changes in the aspect, shape, and their location with respect to sea, however, are probably due to shifts in wave attack induced by changes in sea level in later part of Holocene. The shoreline terraces and the shore platforms above the present water level testify the existence of relative sea level up to 3 m above present level.
From the study of shore marks, beach rocks and terraces, it can be concluded that there are the evidences on the coast that are indicative of relative sea level.

It could be ascertained that the wave action is presently modifying ancient coastal landforms inherited from the period of higher sea level. The present rate of erosion seems far too low to produce 49 m wide shore platforms in the area, since last fall of sea level. It is also likely that there is a partial inheritance of the platform, a part belonging to earlier Holocene and a part to Pleistocene.

The study of the shore platforms in the area shows that there is a very weak relationship between platform morphology and today’s wave and tide conditions. This observation also supports the idea of inheritance.

The coastal terrain and the hinterland in the study area is a unique product of combination of different processes such as formation of trap rocks, rifting of landmass or faulting, formation of coastal plains in Miocene, Valley incision, secondary laterisation causing burial of earlier land facets and sea level fluctuations in Holocene.

The ancient geological history of the area could be built by carefully studying the stratigraphy of sedimentary deposits and their position with respect to parent rock. Age of low-level secondary laterites
covering the earlier landscape is a key factor in reconstruction of paleo
environment

The C14 and pollen analysis dating of the lignite deposits from the
study area suggest an age of around 30,000 to 10,000 yrs BP. It can be
therefore said that the process of laterisation and burial of earlier
landscape continued till early part of Holocene.

The thesis presented here also tries to assess the impact of lateritic
lithology and its inertness to the landform landscape and drainage
development as well as the land use and landcover. To achieve this the
traditional methods of field work and modern techniques of remote
sensing and image analysis and interpretation were used.

The lithology exposed in the lateritic column in the study area are
discussed by many especially with reference to the location of lignite
beds at the end of leaching column roughly at a depth of 17 m. The fact
however has never been used in the reconstruction of the paleo-
environment on the basis of different chemical, sedimentary and biotic
properties of the lignite beds. Thesis gives a major thrust on the
interpretation of such properties in the reconstruction of the ancient
environments and the identification of tentative geochronology of the
tectonic events in the area. The narrow shore platforms along the coast of
the study area are in all probability inherited from the earlier sea level
scenario.
LITHOSECTION EXPOSED IN A ROAD CUTTING NEAR PAWAS SHOWING LATERITIC CAP AND LITHOMARGE