

Chapter 5

Identification of Tectonic Activity and Fault Mechanism From Morphological Signatures

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ABSTRACT

Agartala, the capital of Tripura, is one of the most important and populated cities of North-East India. From the aspect of geomorphology, the whole area is characterized by highlands (tilla) and lowlands (lunga). Tectonically, Tripura falls under very active zone (Zone V). Assessment of tectonic activities of this region is very significant. For identification of tectonic activity, morphological or geomorphic signatures play very important role. The chapter identifies the presence of tectonic activity from morphological signatures in and around Agartala city. Landsat 8 OLI, maps from Geological Survey of India, Google Earth imageries have been used in this study. The presence of some lineaments and sag ponds has been identified on the basis of which fault mechanism of Agartala and Baramura hills has been delineated. This study contains a brief note on the conceptual demonstration of application of GIS and RS technologies and how morphological signatures and satellite images can help us to recognize tectonic activities over a region.

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INTRODUCTION

Geomorphology: Definition and Scope

The word 'Geomorphology' derives from three Greek words: 'Ge' means *earth*, 'morphe' means *form* and 'logos' meaning *discourse* (Huggett, 2007). Geomorphology is the branch of science, that deals with study of landforms and the processes that form those landforms (Addy, 2013). It investigates the development of landforms and the processes which are acting on them at present. Geological structures and processes control the evolution of landform on a large scale as well as on a small scale basis (Hugget, 2007). According to Thornbury, 1969, there are ten important fundamental concepts of Geomorphology, which are elementary pillar for interpretation of landscapes which are as follows:

Concept 1: "The same physical processes and laws that operate today operated throughout geologic time, although not necessarily always with the same intensity as now"

Concept 2: "Geologic structure is a dominant control factor in the evolution of land forms and is reflected in them".

Concept 3: "To a large degree the earth's surface processes relief because the geomorphic processes operate at different rates".

Concept 4: "Geomorphic processes leave their distinctive imprint upon land forms, and each geomorphic process develops its own characteristic assemblage of land forms".

Concept 5: "As the different erosional agents act upon the earth's surface there is produced an orderly sequence of land forms".

Concept 6: "Complexity of geomorphic evolution is more common than simplicity".

Concept 7: "Little of the earth's topography is older than Tertiary and most of it no older than Pleistocene".

Concept 8: "Proper interpretation of present day landscapes is impossible without a full appreciation of the manifold influences of the geologic and climatic changes during the Pleistocene".

Concept 9: "An appreciation of world climates is necessary to a proper understanding of the varying importance of the different geomorphic processes".

Concept 10: "Geomorphology, although concerned primarily with present day landscapes, attains its maximum usefulness by historical extension".

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