Evolution of the Lower Gangetic Plain landforms and soils in West Bengal, India

Lalan P. Singh a, *, 1, B. Parkash a, A.K. Singhvi b

a Department of Earth Sciences, University of Roorkee, Roorkee, (U.P.)-247 667, India
b Physical Research Laboratory, Navrangpura, Ahmedabad, 380 009, India

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Abstract

Three major landforms, Uplands, Old Fluvial/Deltaic Plains and Young Fluvial Plains are identified from the Lower Gangetic Plains of West Bengal, India, on the basis of remote sensing and field studies. Morphologic, quantitative and thermoluminescence studies of soils of the study area have been conducted. Two types of Uplands are recognised: Upland in the west overlain by red soils (autochthonous and allochthonous types) and upland in the north (Barind Tract), characterised by three topographic levels. Aspects of the autochthonous Upland Red Soils (Lower to Middle Pleistocene age) show the ferrugination (ferrisol) phase of development. Soils of the Old Fluvial/Deltaic Plains (6–3 ka) and Lower Level of the Barind Tract have argillic horizons and exhibit the fersiallitisation phase of development. Development of ferrugination and fersiallitisation phases was favored due to the pre-weathered nature of the parent material. Soils of the Old Fluvial/Deltaic Plains, Barind Tract (Lower Level) and Young Fluvial Plains show effects of hydromorphism due to waterlogging in the form of segregations of Fe–Mn oxides/gleying and chloritisation, probably due to ferrolysis in the upper horizons of some of these soils. Neotectonics seems to have affected development of landforms and soils significantly. Due to reactivation of some basement faults in the western region, some tectonic blocks subsided, causing transgression during the Early Pleistocene and at ca. 7 ka. Subsequent uplift of these blocks caused regressions and development of soils on the exposed landscapes. Episodic uplift of the Barind Tract in the northern region may have given rise to three topographic levels. Some faults confine the courses of the Damodar, Ganga and Bhagirathi rivers. © 1998 Elsevier Science B.V. All rights reserved.

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* Corresponding author. Fax: 0091-1332-73-560; E-mail: bpes@rukiu.ernet.in
1 Present address—Engineering Geology Division, Geological Survey of India, Western Region, Jaipur-302004, India.

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