

“Presentation during the XXII convention of Indian Association of Sedimentologists with a focal theme of ‘Sedimentary Basins of the Himalaya: Challenges for the future’ at Wadia Institute of Himalayan Geology, Dehradun from 21 to 23<sup>rd</sup> December 2005”

## **Terrace stratigraphy and sedimentary facies of a part of the Teesta river near Kalijhora, Darjeeling Himalaya, West Bengal**

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### **Abstract**

In the Darjeeling Himalaya, terraces, tributary stream related fans, flood plains and channel bars are present near Kalijorha village along the western bank of the southward flowing Teesta river. This area is tectonically active and is traversed by three major E-W trending thrusts named North Kalijhora Thrust (NKT), Main Boundary Thrust (MBT) and South Kalijhora Thrust (SKT).

The oldest terrace T<sub>3</sub> is present at an elevation of 215m a.s.l. and occurs on the Gondwanas and Lower Siwalik rocks between the NKT and MBT. It has an aerial extent of 1.8 km<sup>2</sup> and it is pinching out at both the upstream and downstream ends on the western bank of the Teesta river. It consists of two lithofacies units. The stratified poorly to moderately sorted cobble to pebble sand unit occurs at the bottom and is overlain by a multi-storied sand to granule unit.

The Terrace T<sub>2</sub> is about 8-10 m thick and its top surface lies at 175 m a.s.l.. Three lithofacies units occur in this terrace. The lower unit is composed of very angular poorly sorted stratified to disorganised poorly imbricated clast supported boulder cobble gravel; the middle unit is characterised by clast supported stratified sub-angular to sub-rounded pebble gravel with isolated cobbles; the upper unit consists of inversely graded well imbricated pebble-cobble-boulder gravel.

The Terrace T<sub>1</sub> is 1.5-2.5m thick and is spread over a small area of 0.33 sq. km. This terrace is composed of two lithofacies units separated by an erosional contact. The lower unit consists of clast supported angular pebble-granule gravels which are poorly imbricated. The upper facies consists of clast supported inversely graded, stratified, angular pebble-cobble gravels.

The Kalijorha flood plain extends over 0.7 sq. km and is built up of 1-1.3m thick deposits. Two major facies units characterize this unit. The lower unit is composed of clast supported well imbricated, sub-angular to subrounded, fining upward boulder, cobble, pebble gravels with medium to fine sand matrix. The upper unit consists of planar stratified, fining upward, light brown, fine to coarse sand. A gravel layer of well imbricated, sub-rounded cobbles is present between the upper and the lower unit.

The lithofacies analysis of these deposits of the Teesta river system indicates that i) the oldest terrace T<sub>3</sub> consists dominantly of channel flow deposits with a 4-5m thick hyperconcentrated flood flow deposit at the middle part, ii) T<sub>2</sub> consists of hyperconcentrated flood flow deposits at the bottom capped by thick channel bedload deposits, iii) T<sub>1</sub> terrace contains the hyperconcentrated flood flow deposits and iv) the present flood plain consists of channel flow deposits with bed load sediments at the bottom covered with overbank sediments.

**Key words:** Darjeeling Himalaya, Hyperconcentrated flow deposits, Channel Flow deposits.