Paper ID	194
Author(s)	Sayako Kanda
Title	Rivers, Hills, and Wetlands: The Trans-Boundary Production of Slaked Lime in North Sylhet during the Late 18th and Early 19th Centuries

Abstract

This paper examines how the production of slaked lime, or chunam, in North Sylhet expanded its production capacity during the late 18th and early 19th centuries. This period saw a growing demand for chunam, which was used in lime mortar and as an ingredient in betel quid (paan) in South Asia, coinciding with the British East India Company's increasing political control over the region. The production of chunam, which is calcium hydroxide, followed two main steps: first, making quicklime (calcium oxide) by burning limestone; and second, slaking the quicklime by mixing it with water. To support this industry, it was essential to secure ample supplies of limestone and fuel materials for burning. Chunam factories were situated in lowland areas along both sides of the Surma River, stretching from Chhatak to Sunamganj, from where chunam was exported to cities like Calcutta and Dhaka by river. Limestone was extracted from the Khasi Hills and transported through fast-flowing streams to the lowlands during the rainy season. Factories in Chhatak primarily used wood for producing quicklime, which was sourced from Banskandi, Dudpatil, and other locations in Cachar along the Barak River. In contrast, the factories in Sunamganj predominantly utilized reeds, known as nal, which were harvested from wetlands extending from Sunamganj to South Sylhet. Thus, chunam production in this region relied heavily on trans-boundary exchanges of materials. Additionally, various ethnic groups were involved in this industry amid rapidly changing political circumstances.

Keywords	Water, Plants, Air

Paper ID	259
Author(s)	Abhijit Das, Sudipta Kumar Hore and Md. Munsur Rahman
Title	Applicability of Erosion Prediction Model Developed for Meandering River in a Multi-channel Braided River

Abstract

Riverbank erosion is a silent natural disaster. While erosion process in the braided rivers is different as compared with the meandering river as a braided river consists of multiple channels. Analytical assessment of erosion in such rivers is highly challenging. Some analytical formulae have been suggested by many researchers which are mainly based on near-bank flow depth and excess velocity for a particular location. All the formulae are derived for meandering bends, and hence, these formulas are applicable in single-channel rivers. On contrary, developed tools for predicting riverbank erosion for braided rivers still need further improvement. Under the circumstances, the application of the formula for the meandering river in the case of a near bank channel of a braided river demands some modification as the braided channel often experiences submerged sandbars.

This study aims to modify the formula of universal bank erosion prediction method by Hasegawa with the question whether it could be applied in a sand bed braided river. An empirical factor has been proposed to reflect the impact of submerged sandbars. The value of this reduction factor was estimated for a reach of the Jamuna River in Bangladesh which ranges between 2 and 4. This value has been verified in another reach of the same river by hindcasting. The study concludes that the modified formula would be applicable in braided rivers by determining the empirical constant which is useful for predicting riverbank erosion in the free-flowing bend of

a braided river reach.	
Keywords	River Morphology, Erosion, Braided River, Water Resource, Prediction Model

Paper ID	257
Author(s)	MUNSUR RAHMAN and Anisul Haque
Title	Updating the Sediment Budget in the Ganges-Brahmaputra-Meghna System in Bangladesh using Bangladesh Delta Model

Abstract

The volume of incoming sediment and its dispersion processes are the vital ingredients for maintaining the sustainable landscapes in the deltaic environment managing the river systems. But both the sediment load and its dispersions are dynamic entities because of anthropogenic climate change at the basin level as well as at the regional and local level. Again, the large-scale measurement of sediment load at several points, its dispersion and deposition are very expensive and time consuming. Under the above drawbacks, modelling the dynamic features of the incoming sediment load is very essential.

To address the above issue, we developed Bangladesh Delta Model (BDM) using the Deflt3D modelling platform capturing the entire river systems within Bangladesh. Several hydrological conditions including climate change scenarios and anthropogenic interventions are considered to estimate the sediment load at some strategic key points, its dispersions and sedimentation have been estimated. It is found that the sedimentation on the deltaic landscapes is very much essential for ensuring the sustainable delta system. Moreover, maintaining certain flow-sediment regime within the river systems are also important for the managing the rivers systems, while BDM is capable to calculate these dynamically in terms of space and time.

Keywords	GBM delta, sediment budget, BDM

Paper ID	217
Author(s)	Azusa Fukushima, Taiichi Hayashi, Toru Terao, Fumie Murata, Masashi Kiguchi, Yusuke Yamane, Masahiro Tanoue and Hideyuki Kamimera
Title	Data rescue project of meteorological data observed in private tea gardens in Assam, India

Abstract

In Assam, India, many tea gardens are located in the Brahmaputra-Barak basin. These tea gardens(estates) that were established during the era of British India are doing own meteorological observations of the temperature and rainfall in each tea garden. The observation has been introduced by British people who were established or managed the tea gardens as a pioneer, and it has continued by Indian managers or owners still now. Our group is planning to digitize these observational data and aim to use it to analyze the long-term trends, extremes, and inter-annual or inter-seasonal variations of precipitation in the detailed regions. To clarify the current situations of the private tea gardens in Assam, we visited 11 tea gardens. The air temperature and rainfall were observed in all gardens. Some tea gardens have Stevenson (Instrument) shelter for the thermometer. The thermometer is the maximum-minimum thermometer (Six's thermometer). Type of the rain gauge is the 5-inch manual (water storage type) rain gauge. In spite of the available data period is different on each garden, almost garden has more than 15 years. We'd like to discuss with an academic value of this new dataset through the case study of extreme heavy rainfall events occurred in Assam.

Keywords	Air, Land, Water, Data rescue, meteorological observation, Tea gardens

Paper ID	223
Author(s)	FUMIE MURATA, Toru Terao, Hiambok Jones Syiemlieh, Laitpharlang Cajee and Taiichi Hayashi
Title	Rainfall variability in the northeast Indian subcontinent

Abstract

The northeastern part of the Indian subcontinent is an interesting region with various interactions between its topography and weather. This area belongs to the Indian monsoon region, and is characterized by distinct summer monsoon rains and a dry winter season. Northeast India has a unique topography, surrounded by high mountains to the east and north. In this region, the inflow of warm and moist southwest winds brings significant rainfall. On the other hand, when low-pressure systems make landfall from the Bay of Bengal and move northeastward across the Indian subcontinent, the southeast winds dominate in northeast India, leading to dry spells. The alternation between southeast and southwest winds occurs on timescales of one week to a month, known as intraseasonal oscillation. In the literature of the Bengal Plain, the relationship between the alternating east and west winds experienced on the ground and precipitation or flooding is well-known. Additionally, it is characteristics that precipitation tends to occur during specific hours of the day, reflecting the diurnal variation in wind structures. In the Brahmaputra River basin and the southern slope of the Himalayas and Meghalaya plateau, which are adjacent to the Bengal Plain, rain is more likely at night. During the daytime, rainfall is more common in the mountainous regions around the Brahmaputra Valley and the Bengal Plain.

Keywords	water, disasters