

List of publications:

- **Borah, S.B.**, Das, A.K., Hazarika, N., Basumatary, H. (2022). Monitoring and assessment of glaciers and glacial lakes: climate change impact on the Mago Chu Basin, Eastern Himalayas, *Regional Environmental Change* 22:124, DOI: 10.1007/s10113-022-01984-2.
- Basumatary, H., Devi., H.S., **Borah, S.B.**, Das, A.K. (2021). Land cover dynamics and their driving factors in a protected floodplain ecosystem, *River Research and Applications* 37(1), DOI: 10.1002/rra.3775.
- Hazarika, N., Barman, D., Das, A.K, Sarma, A.K. and **Borah, S.B.** (2016). Mapping flood hazard and vulnerability in Upper Brahmaputra Valley using Participatory GIS and Multi-Criteria Evaluation (MCE), *Journal of flood risk management*, DOI: 10.1111/jfr3.12237.
- Hazarika, N., Das, A.K., **Borah, S.B.** (2015) Assessing land-use changes driven by river dynamics in chronically flood affected Upper Brahmaputra plains, India, using RS-GIS techniques, *Egyptian Journal of Remote Sensing and Space Science* 39(18):107-118. DOI: 10.1016/j.ejrs.2015.02.001.

List of conference papers:

Borah, S.B., Das, A.K. & Sah, R.K. (2017). Assessment of changing land use patterns in the floodplains of Manas-Aie-Beki catchment of lower Brahmaputra valley using hybrid classification technique. National Seminar on Climate Change and Society, January 2017, Tezpur, India.

Borah, S.B., Hazarika, N., Mahanta, M. & Das, A.K. (2015). Understanding the fluvial dynamics of Manas-Beki River system. 36th Indian Geographers' Meet & International Seminar, 25-28th February, Gauhati University, Guwahati.

Hazarika, N., **Borah, S.B.**, Barman, S. & Das, A.K. (2015). Monitoring aquatic macrophytes in Kaziranga National Park using Remote Sensing Indices. 36th Indian Geographers' Meet & International Seminar, 25-28th February, Gauhati University, Guwahati.



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Chapter 1: Introduction

1.1 Introduction and literature review

Hydrogeomorphic characterization, monitoring and assessment of changes in channel planform, land use/land cover, glaciers and high-altitude lakes at the basin-site scale of the Manas-Beki river basin - a large Eastern Himalayan basin forms the core of this research work.

Rivers are highly dynamic surface features and the primary factors affecting change can vary from climatic, anthropogenic to tectonic causes [1]. Hydrogeomorphology of a river is the understanding of its dynamics through careful observation of the forms, processes and feedback that contribute to change [2]. The dynamic nature of rivers and their associated landscapes are manifested through hydrological, geomorphic and ecological processes [3]. Changes in the river's streamflow or runoff is the major contributor towards hydrogeomorphic changes [4, 5]. Streamflow is in turn dependent primarily on precipitation followed by land cover change, glaciers and snowmelt [6]. Changes in any of these factors can have manifold repercussions in the river's hydrogeomorphology.

Climate change is one of the prime issues threatening the sustainability of world's environment today [7, 8, 9]. Climate change is a long-term shift in the statistics of weather, driven primarily by increase in concentrations of greenhouse gases since pre-industrial era [10]. There are clear evidences that the earth's climate has changed due to increased greenhouse gases in the atmosphere over the past century leading to varying impacts on land and sea [11-16]. The major climatic indications are rising temperatures and changing precipitation patterns observed all over the world [17]. These climatic variations have significant effects on hydrology and hydrologic cycle thus effecting global water availability which is so crucial for the sustenance of mankind [18]. Climate change could affect the hydrological regime by changes in seasonal extremes, increased evapotranspiration and changes in snow and glacial extents, volume and melt [19, 20, 21].

Drainage basins are highly sensitive to changes in climate and the nature and timescale of basin responses like weathering, transport, erosion and deposition depends on increase or decrease of runoff intensity [22]. Climate effect is dominant in annual streamflow as precipitation is the major contributor in stream runoff and changes in it can modify the hydrological regime of the drainage basin which was studied through the years by many researchers in different parts of the world [23

Hydrogeomorphic and land cover dynamics of Manas-Beki river basin with special emphasis on the glacial regime

by Suranjana Bhaswati Borah

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