

National Mission on Himalayan Studies

PERFORMA FOR THE HALF YEARLY PROGRESS REPORT

(Period from .01.04.2016 to 30.11.2016)

Project Title -: Geomorphic characterization of flash floods and mass wasting in upper Ganga terrain of Garhwal Himalaya: role of climate - tectonic interaction in gradation processes

Sanction No. and date -: NMHS/SG-2016/002/373 & 31.03.2016

Institution Name -: CSIR- National Geophysical Research Institute Uppal Road, Hyderabad

Personal Details -:

Name and Address of the PI:- Dr. Anand K Pandey, CSIR- National Geophysical Research Institute Uppal Road, Hyderabad
Name and Address of the Co PI:- Dr. Prabha Pandey, CSIR- National Geophysical Research Institute Uppal Road, Hyderabad

Partner Details:- None

SI No	Name/ Address	Work assigned to partners	Fund allocated to partners during the period

Project Objectives:-

- Geomorphic characterization and correlation of pilot catchments affected by flash floods and debris flow during last century in Garhwal Himalaya
- To differentiate the geomorphic factors responsible for GLOF and LLOF type gradation process.
- Integrate the numerical simulation with the field observation and dating of landforms to generate recurrence interval, understand paleoclimate interventions and generate model scenario.
- The analysis of spatial relation of vulnerable zones with the habitation and major infrastructural growth to understand risk association.

Completion in the last six months in % (According to each Deliverables):-

SI No	Quantifiable Deliverables (as per sanction letter)	Output/ achievements	Performance in terms of Monitoring indicators	Remarks
	Geo-referenced maps on different themes that include litho-tectonics / geology, landforms, digital elevation model, slope, relief, drainage pattern, basin/catchment asymmetry and various morphometric parameters computed from	40%	Monitoring in comparison to the baseline information to be provided by the proponent.	

	above thematic spatial and vector dataset generated by extensive field mapping and numerical simulations.			
	Data base on various factors affecting localization in varying case scenario like GLOF and LLOF type gradation process.	10%	Geo-referenced Maps and Geomorphic Factors on the selected themes viz., geology, landforms, digital elevation model, slope, drainage patterns, etc. (Nos.).	
	Dating of at least 2 old landforms to build geological history and recurrence, where possible.	0%	Status and assessment reports for varying case scenarios (Nos.).	
	Recommendations for disaster risk deduction for important human settlements through analysis of habitation with the landform.	0%	Long-term Thematic datasets and cross-correlation patterns of GLOF, LLOF, etc. (Nos)	
			Dating of old landforms to form geological history of the selected sites along with communities engaged in monitoring programmes (Nos.).	
			Vulnerability maps created through overlay and habitation analyses of Landforms and Geomorphic Factors (Nos).	

Summary of progress -: (with in 200 words)

- Thematic base maps regional geology (after GSI and Valdiya, 1980) are digitized.
- The SRTM Digital Elevation Model for the Ganga catchment is generated for drainage classification and further morphometric analysis.
- The critical catchments affected by GLOF and LLOF in past/present century are identified and detailed morphometric analysis is in progress.
- Field mapping and characterization of ephemeral landform developed during 2013 Uttarakhand disaster have been mapped in some catchments (Fig. 1).
- Effort is in progress to understand the role of extreme events on landscape growth in non-steady state drainage catchment, which are affected by frequent erosion and landscape modification in form of large landslides.
- Some small catchments affected by cloudburst are analysed with the aim to scale up for larger catchment analysis (Fig. 2). The same mapped for
- The terrain analysis and erosion potential proxies are generated using spatial and along the drainage profiles in upper catchment (Fig. 3).



Fig. 1: (a) Pre- & post- June, 2013 event Google images showing debris flow along 5th order Khirao Ganga affecting Vishnuprayag project affected stretch of road and helipad (*inset*), (b) The debris fan and (c) the debris flow during flash floods overtopped dam and chocked the reservoir.

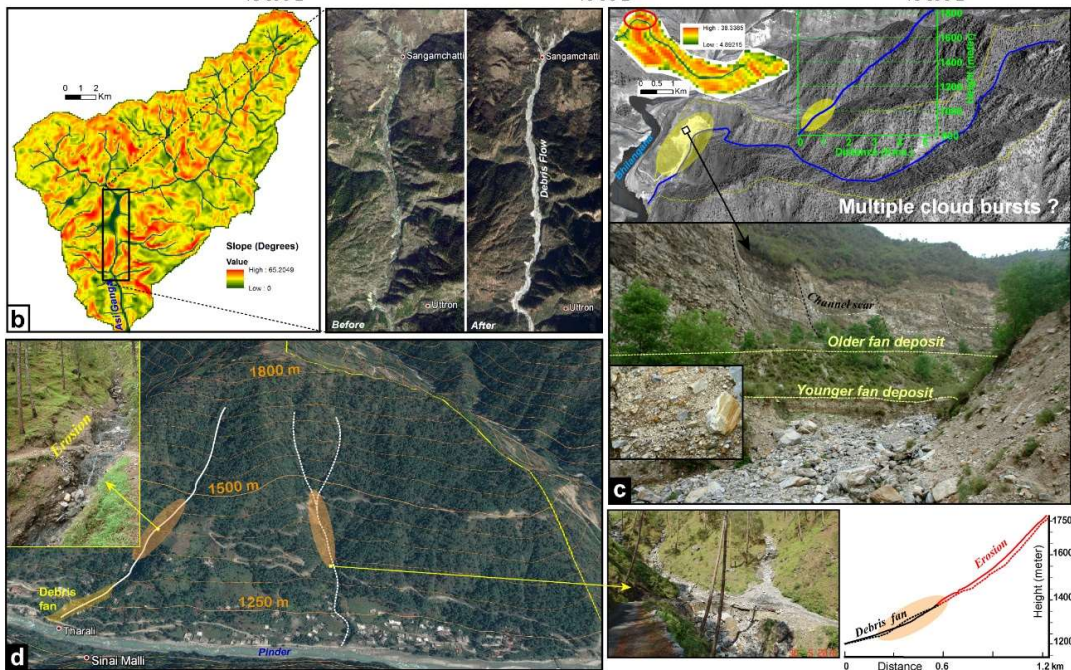


Fig. 2:(b) Slope pattern and Google images of pre- and post- 2 August, 2012 cloudburst Asi Ganga river catchment affected. (c) PAN image, slope pattern, profile section and field photograph of the repeated cloud burst affected valley along the Bhilangana river. (d) Slope affected by erosion during extreme precipitation on 8th May, 2016 along the Pinder river.

Name of the PI:- Dr. Anand K Pandey

Signature :-

Date:- 20.2.2017