

**GEOLOGICAL INVESTIGATION OF  
RIVER TERRACES AND  
ASSESSMENT OF SINKHOLE  
HAZARD IN THE ARMALA AREA,  
POKHARA, NEPAL**

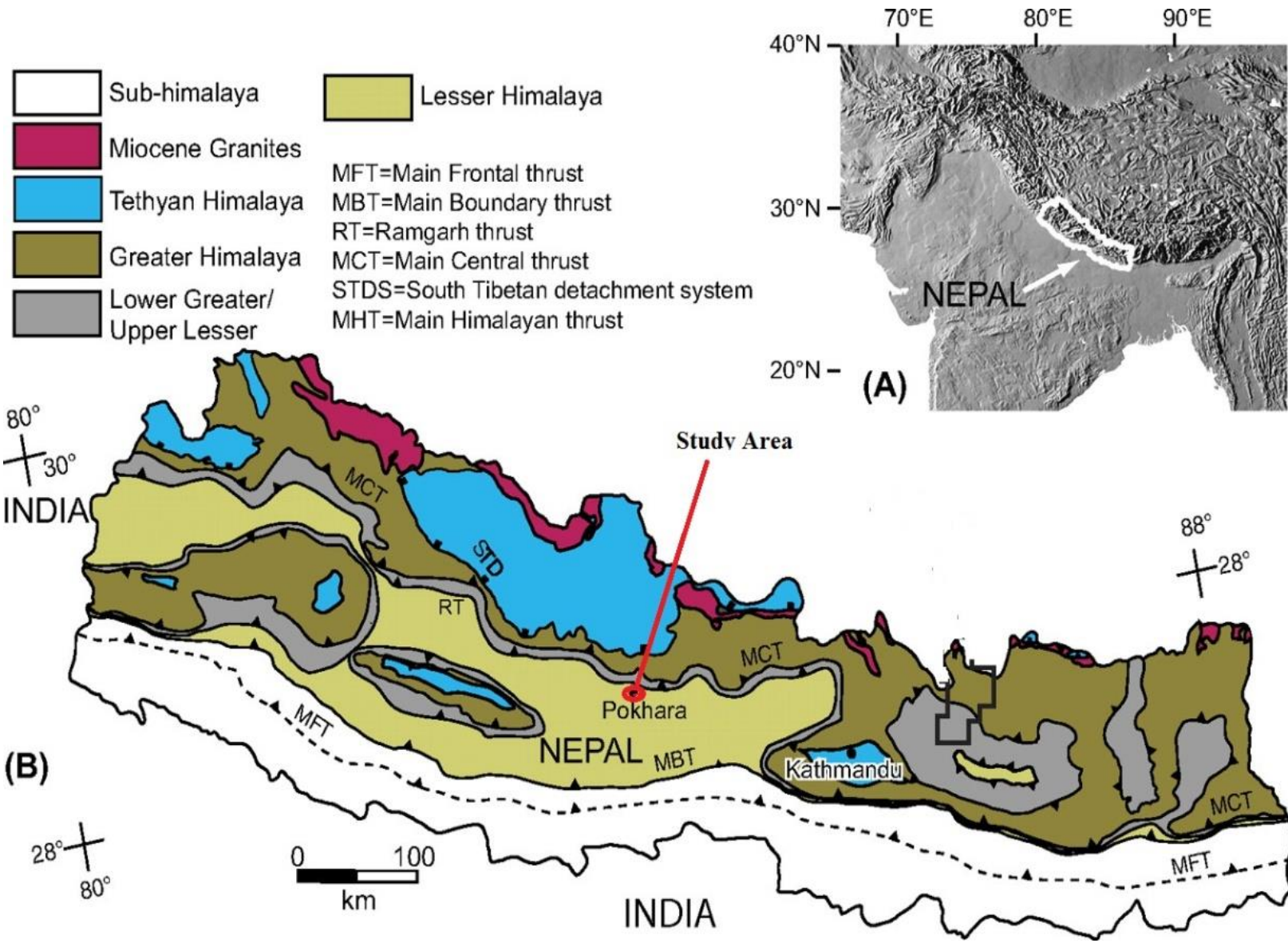
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# INTRODUCTION

- ❖ **Pokhara Valley** is a beautiful and unique valley in the western part of Nepal.
- ❖ It lies in the Quaternary deposit where different levels of terraces are developed in the Seti River and other small tributaries river section.
- ❖ Sinkhole formation is rapid and severe in Armala area which lies in Pokhara Valley.
- ❖ The study is focused on depositional environment, mechanism and assessment of **sinkhole** in the area.

# LOCATION AND ACCESSIBILITY



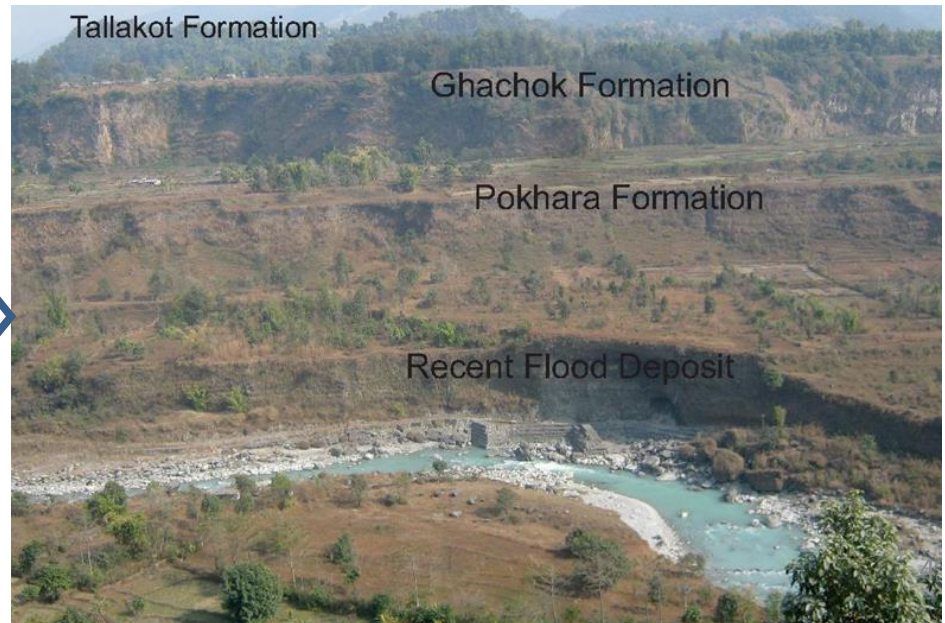
Location Map of the Study Area (Martin et al. 2005)



Sinkhole hazard area:  
**Phewa Formation**

**Lithology:** fluvio-lacustrine deposit of gray color calcareous clayey silt and gravel deposit

**Other formations observed in the study area.**  
Image shows different formations seen in the Seti river terraces



# SINKHOLE HAZARD ASSESSMENT

## Preparation of Sinkhole inventory map:

1. Image of sinkhole area obtained by drone camera.
2. Google Earth Satellite images taken in different years were observed to know the history of sinkhole and its changing pattern in the Armala area.



Drone image of the study area. Photo courtesy: Satoru Hagino

No any sinkhole

2004

Image © 2016 DigitalGlobe

Few indication of sinkholes

2012

Image © 2016 DigitalGlobe

106 m

Imagery Date: 11/8/2012 28°16'55.17" N 83°59'

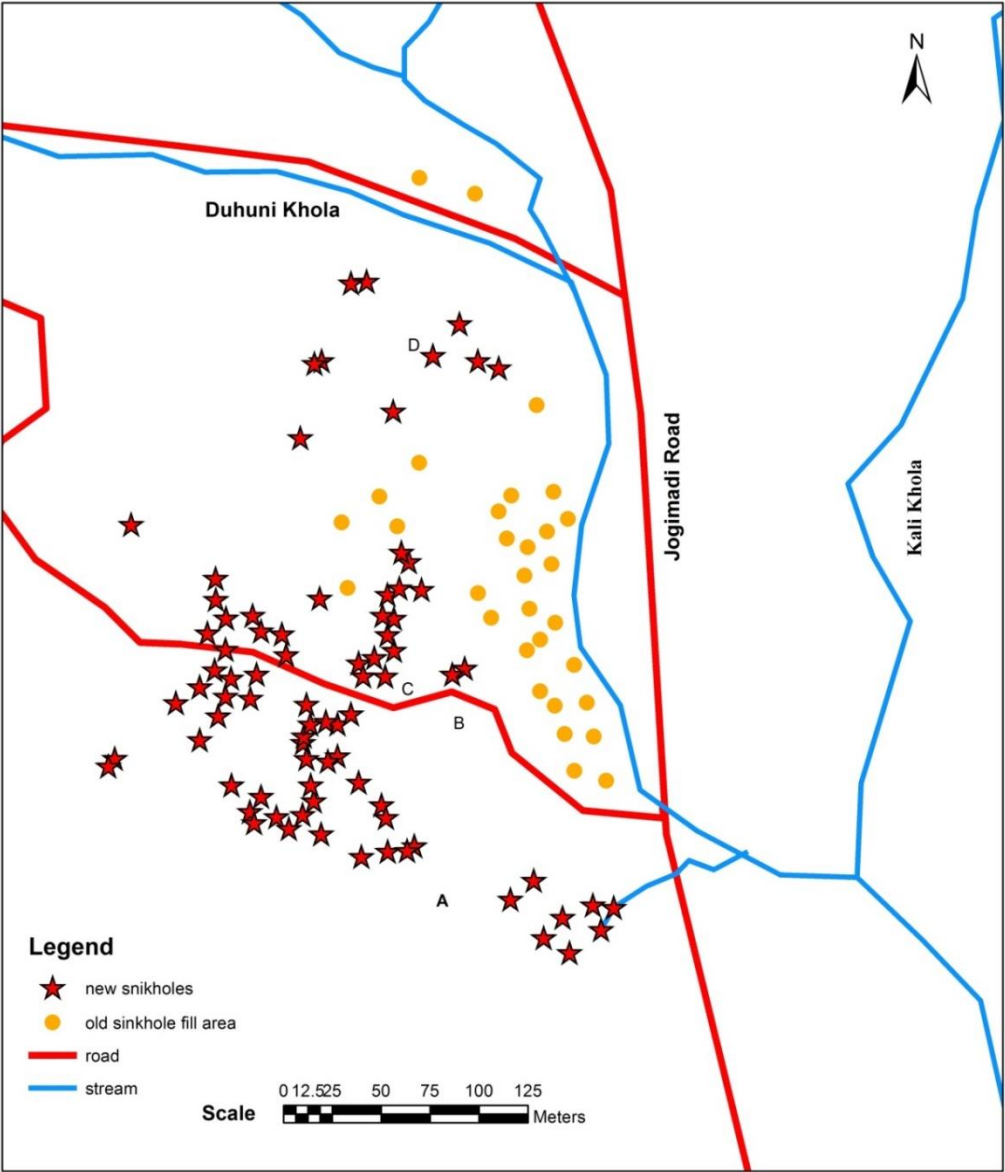
sinkholes is only in right side of road

2014

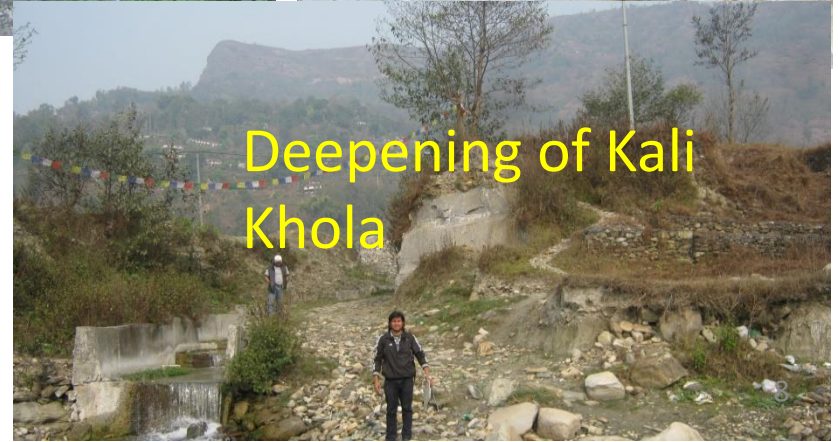
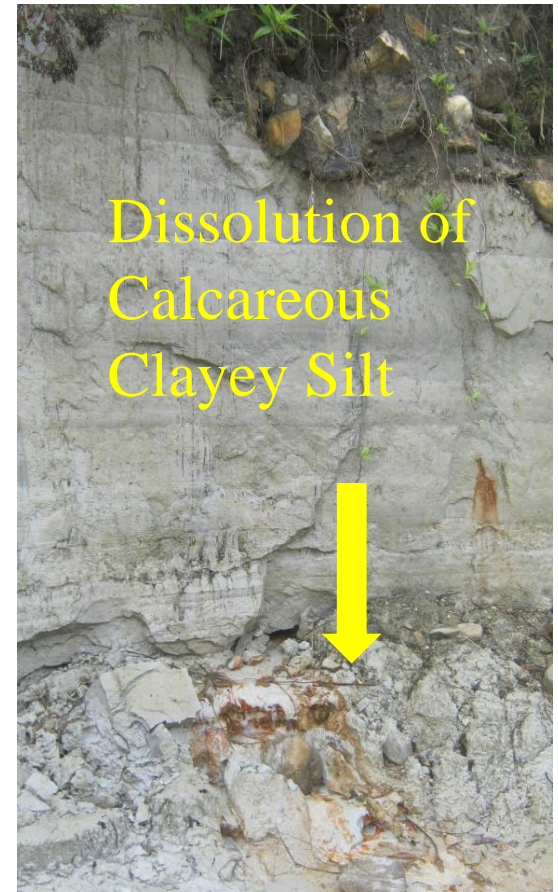
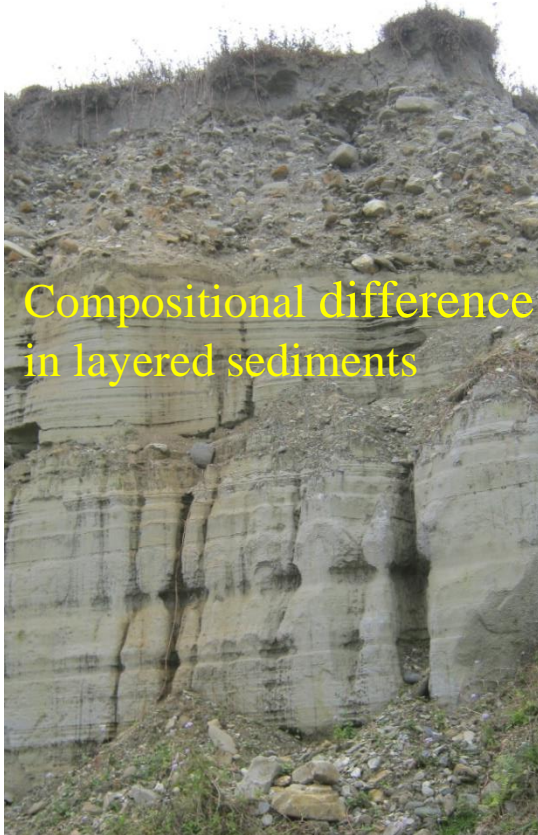
sinkholes occurrence is shifted toward left side of road

2015

# Sinkhole inventory map of Armala area



# Possible Causes of Sinkhole Formation





# Conclusion

- The present study area can be divided into five formations.
- The study shows that the sinkhole prone Armala area lies in the quaternary deposit of **Phewa Formation** covered by loose gravel of recent river bed.
- The possible causes of sinkhole formations were identified.
- Additional research is recommended to identify and control sinkhole hazards.

**THANK YOU**

