

GFZ GEOPHYSICAL FISCALIZATION

DETECTING GLACIAL LAKE FROM LANDSAT TIME SERIES OUTBURST FLOODS

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1. WHY SO FEW?

The increasing number of glacial lakes along the Himalaya Hindu Kush (HKH) range is at odds with the frequency of GLOFs recorded over the past decades.

Glacial lakes VS Reported GLOFs

2. OUR IDEA

Develop, validate and apply a technique to automatically detect GLOFs using 30 years of Landsat satellite imagery

3. OUR WORKFLOW

- Why is GLOF detection so tricky? «
- Stack of fuzzy land cover maps
- Extracting pixel time series
- Detecting change points
- What is the optimal number of time slices?»

Data input: Collect samples, Train fuzzy Random Forests classifier, 2-500 Landsat images, DEMs, Spatial cross-validation.

Classify land cover: Calculate likelihood of change, Visual check for sediment tails.

Change point detection: Maps of change.

4. THE HIMALAYAS

Filling the big picture towards a more complete GLOF inventory for the HKH

Including Hindu Kush, Karakoram & Nyaninga-tangula mts.
• 11 GLOFs reported from 1988 to 2006
• 4 test sites for our workflow

Legend:
Reference GLOFs
Heavily Melted GLOFs
Test Sites
Propagated area along the lake

5. ROBUST DETECTION OF...

9 new GLOFs

We nearly doubled the GLOF record for the Indian arc valley analyzing only 1% of its size!

10 reference GLOFs
Tara Co (TARA) China: 28 April 2006
Kamru Co (KAMU) China: 05 July 2013

6. CHALLENGES REMAIN

How many GLOFs between 1988 and 2006 along the HKH?

Lake Chabokan (China): 27 June 2013

Also to merge flood propagation modelling with fieldwork techniques

7. THE ROAD AHEAD

Multiscale Time Series (TSR) TS

Future work:

• Improved time resolution - daily data

• Improved spatial resolution - 1 km

• Improved accuracy - better classification

• Improved validation - better ground truth

• Improved integration - better interdisciplinary collaboration

A photograph of a poster session at a conference. Several people are standing around a large display board, looking at a poster titled "susceptibility assessment in Romania: current states and perspectives". The poster is divided into sections: INTRODUCTION, STUDY AREA, METHODOLOGY, and CONCLUSIONS. A black backpack is on the floor in the foreground.

A group of people, including men and women, are gathered in a modern building with large glass windows. They are holding white coffee cups and talking. The view outside the windows shows a green lawn and trees with yellow autumn foliage. A man in the foreground is wearing a bright yellow bag.

The formation of diamonds and their journey to the surface



Dan Frost- Bayerisches Geoinstitut



perception and political geography of volcanic hazards in Goma, Democratic Republic of Congo

in Doeverspeck, Political Geography, University of Bayreuth

Central European Geomorphology Conference, Bayreuth 10.10.2017





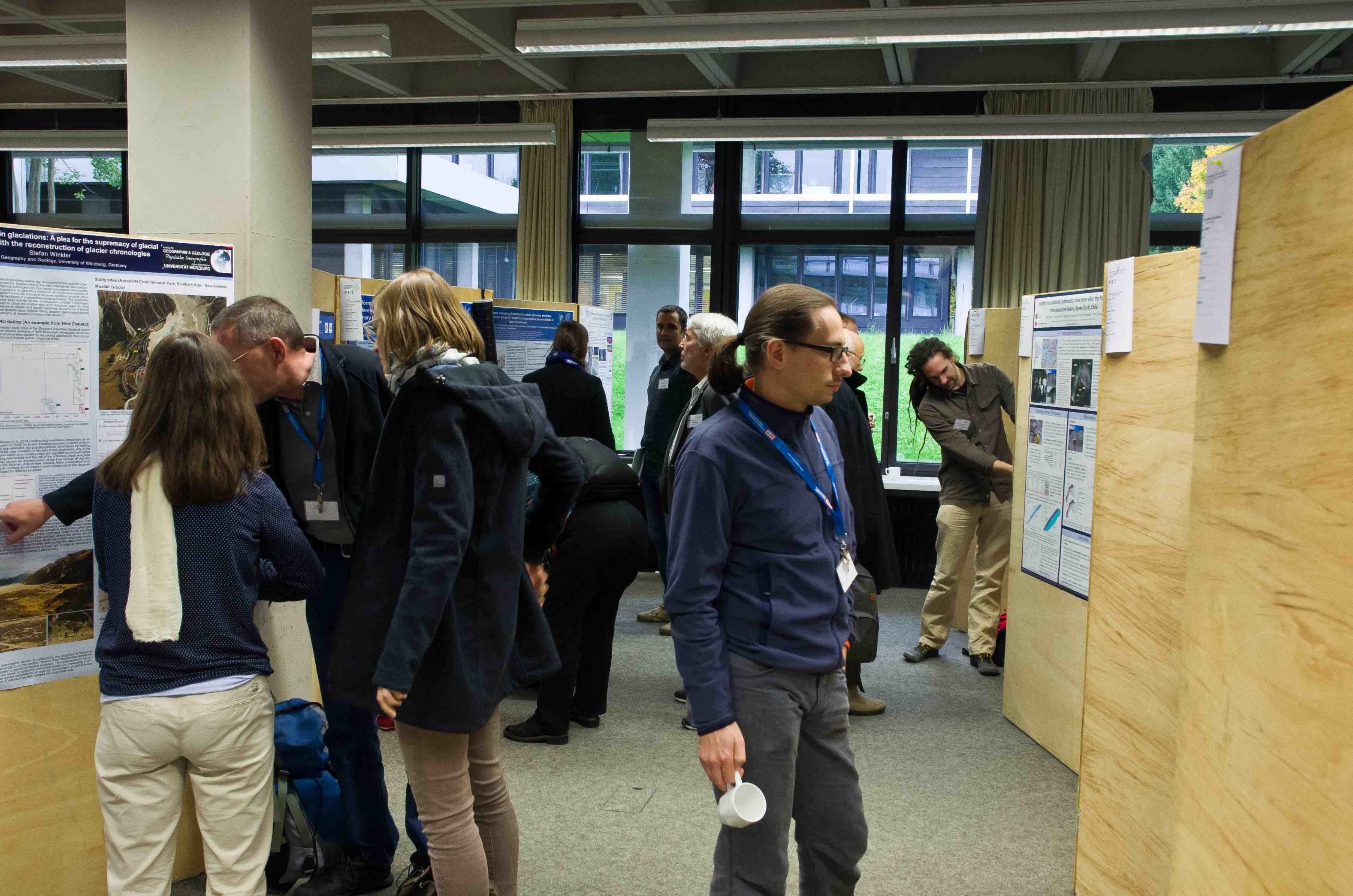
Risk perception and political geography of volcanic hazards in Goma, Democratic Republic of Congo

Martin Doevenspeck, Political Geography, University of Bayreuth

4th Central European Geomorphology Conference, Bayreuth 10.10.2017







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Westnorwegen: Hangin fiordalen,
sich verändernden Land Sturzströme in einem
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