Assessing the value of information in climber's guidebooks to derive spatio-temporal rockfall patterns

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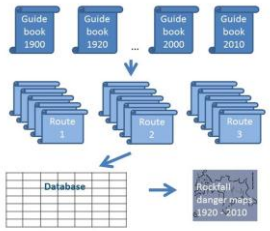
● 1229 **Abstiegsmöglichkeiten**
Der Abstieg von der Aig. Verte ist in jedem Fall ein schwieriges Unternehmen.
Der sicherste Abstieg ist normalerweise der *Moinegrat* (R 1182), sofern er nicht zu stark verschneit ist. Bei guten Verhältnissen ist ein schwieriger, aber vielfach schnellerer Abstieg durch das *Whympercouloir* (R 1181) möglich. Ein Absteigen sollte hier aber nur bis zum frühen Vormittag oder am Abend unternommen werden, da tagsüber mit Steinschlag zu rechnen ist. Insbesondere das Einstiegscouloir ist sehr gefährlich. Nach stärkeren Schneefällen und bei Wärmeeinbrüchen ist mit z.T. erheblicher Lawinengefahr zu rechnen. Der untere Teil des Whympercouloirs, insbesondere das Einstiegscouloir und der Bergschrund können abseilend überwunden werden. Normalerweise weisen hier alte Abseilschlingen den Weg. Der Abstieg über den Felssporn der Grande Rocheuse ist ziemlich langwierig und bei viel Schnee nicht dem Moinegrat vorzuziehen. Im unteren Teil muß man zudem das Einstiegscouloir des Whympercouloirs benutzen.

1. Introduction

Rockfall rates in mountain ranges are expensive to measure over large spatial scales, mainly due to the inaccessibility of mountainous terrain. Existing methods to measure rockfall include acoustic, spectral and volumetric methods. These methods, especially in combination, have allowed researchers to quantitatively derive rates (and changes of rates over time) of rockfall for several well studied locations.

However, the small spatial support and extent of these methods is a problem when baseline information on rockfall rates over entire mountain chains and ranges is required. This contribution explores the potential of **information contained in climber's guidebooks to derive qualitative rockfall rates with large spatial and temporal coverage**.

Climber's guidebooks have been published since the early 1900's, giving prospective mountaineers strongly standardized information about routes and conditions expected along the way.



The information provided about the looseness of rocks, which is clearly important for climbers from a safety perspective, may also be useful to link to rockfall rates. Here I explore the difficulties associated with this method and present a timeplan for a first test.

2. Major questions

A. Are climber's guidebooks explicit enough about rockfall danger?
The spatial support of rockfall danger information is sections of climbing routes (up to hundreds or metres along the routes). The thematical information is qualitative and will be categorized into three classes (no danger – little danger – considerable danger). Route descriptions that were discontinued because of extreme danger will form a fourth class.

B. Are route descriptions in climber's guidebooks biased towards reasonably safe and climbable routes?
Climbing routes are not spatially random samples – they follow logical, attractive and perhaps uncommonly safe routes. The magnitude of this problem must be assessed with existing rockfall datasets and may differ per climbing region.

C. Is reported rockfall danger related to volumetric rockfall frequency or rockfall rates?
Rockfall danger as experienced or perceived by the writers of guidebooks is likely biased towards high-frequency low-magnitude events. Large magnitude events, such as the recent set of failures destroying entire climbing routes on the Aiguille du Dru near Chamonix in France (pictured) is therefore not incorporated in rockfall maps based on climber's guidebooks.
The relation between danger on routes and rates from slopes can be elucidated using 3D-models of mountains and the position of routes on them.

D. Are temporal and spatial resolution and extent of guidebook-based rockfall data valuable next to available rockfall datasets?
Existing data may be very detailed and quantitative, but they lack the spatial coverage that is needed for societally required conclusions. Data from guidebooks may provide this coverage at the expense of some detail.

3. Prospects

1) **Verification**. Explore the value of the information contained in guidebooks for the Bernese Oberland, focusing on the very detailed descriptions of some of the most famous routes on mountains in the Eiger - Jungfrau area. This should answer the first and last major question.
2) **Calibration / validation**. Creation of a spatial and temporal rockfall danger map of the Bernese Oberland and compare with the sparse existing quantitative rockfall data. This should focus on major questions 2 and 3.
3) **Extrapolation**. Derivation of climate-rockfall relations helped by other research to extrapolate rockfall (danger) rates in space and time

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