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# Simen Mountains Ethiopia

1:100 000

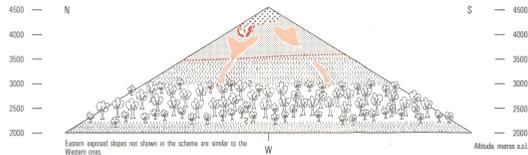


**Altitudinal Belts of the  
Last Cold Period (Late Wurm)**

# Simen Mountains – Ethiopia: Altitudinal Belts of the Last Cold Period (Late Wurm)

Hans Hurni · Institute of Geography · University of Berne · Switzerland

Scheme of the Last Cold Period Altitudinal Belts Dependent on Slope Aspect



## Key for Map and Scheme

Topographic contours of the last cold period maximum (reconstructed)

Moraines (with reconstructed direction of ice flow)

Periglacial siltification deposits on trough-shaped slopes, with depths greater than 2 m

Lower limit of dominant siltification processes with deposits thicker than 0.1 m. If the symbol is discontinuous, the limit is interrupted (not investigated in the field, based upon the topographical analysis (see text))

Fluvio-siltified deposits on valley floors (with lower altitudinal limits unknown)

## Additional Key for Scheme

Climate belt (Climate: snowline of coldest phase: 4250 m ± 150 m, dependent on slope aspect)

Periglacial belt (Climate limit: 3500 m ± 100 m, dependent on slope aspect, slope length, and gradient)

Mountain slopes (I) (No field evidence)

Forms (I) (No field evidence)



## Topographic Source Materials

The map is compiled from the maps NO 3110 (1:250,000) of the Ministry of Land Reform and Administration, Addis Ababa, "Tosch-Simien" (1:50,000) by J. Winkler (1956), "Simien" and "Simien Mountains National Park" (1:25,000) by Pro Simien Foundation, Zürich, Institute of Geography, Berne, W. Müller, F. W. Müller, M. Müller, and E. Müller (1970), and the Institute of Geography, Addis Ababa (1971).

Project: H. Hurni and S. Messerli, Institute of Geography, University of Berne, and M. Zurbuchen, Institute of Photogrammetry and Engineering Survey, Berne, Switzerland.

Field completion: 1977 (1980)

Design and Field Survey: H. Hurni (1975/1977/1980)  
Cartography: A. Brodbeck, R. Singer, S. Wulschläger  
Additional based on an orthophoto 1:50,000 of the  
Mapping and Geography Institute, Addis Ababa

Printed by Karmel & Frey, Berne, Switzerland  
Photoreproduction by E. Colucci & Co., Berne, Switzerland

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Hochgebirge von Semien – Äthiopien Vol. II

**Hans Hurni**

**Klima und Dynamik der Höhenstufung  
von der letzten Kaltzeit bis zur Gegenwart**

(Teil II gemeinsam mit Peter Stähli)  
Mit 3 Kartenbeilagen, 55 Figuren und 23 Bildern

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**Umschlag für Kartenbeilagen  
*Wrapper for Supplementary Maps***

Karten / Maps

- *Simen Mountains – Ethiopia 1:100'000: Altitudinal Belts of the Last Cold Period (Late Würm)*
- *Simen Mountains – Ethiopia 1:100'000: Present Day Altitudinal Belts*
- *Harvesting Areas and Cultivation Belts in and around the Simen Mountains National Park – Ethiopia 1:50'000*

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*Simen Mountains – Ethiopia Vol. II*

**Hans Hurni**

***Climate and the Dynamics  
of Altitudinal Belts from the Last Cold Period  
to the Present Day***

(Part II in Co-authorship with Peter Stähli)  
*Extended Summaries, Maps, and Figures in English*



Contribution of the Commission on Mountain  
Geoecology (International Geographical Union)  
Institute of Geography, University of Bern 1982  
Eds Bruno Messerli and Klaus Aerni

# Harvesting Areas and Cultivation Belts in and around the Simen Mountains National Park – Ethiopia

## 1:50000

Hans Hurni · Institute of Geography · University of Berne · Switzerland

### Source Materials

The topographic situation is a reduction of part of the map "Simen Mountains National Park 1:25000" by P. STÄHLI AND M. ZÜRBUCHEN (1978), field verification by P. Stähli and H. Hurni (1975).

Harvesting areas and cultivation belts have been mapped in the field 1975 – 1977.

Cartography by A. Brodbeck

Printed by Fa. E. Colloud & Co (Berne)

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### Key for Topographic Situation

- |       |                                 |  |                                     |
|-------|---------------------------------|--|-------------------------------------|
| ••••• | Spot height (metres)            |  | Forest                              |
| ••••• | Settlement consisting of tukuls |  | Bush                                |
| ⊕     | Church (Ethiopian-orthodox)     |  | Grass-steppe                        |
| ⊖     | Mosque                          |  | Exposed rocks                       |
| —     | Major trail                     |  | Rock-band                           |
| - - - | Local trail                     |  | National Park boundaries (proposed) |

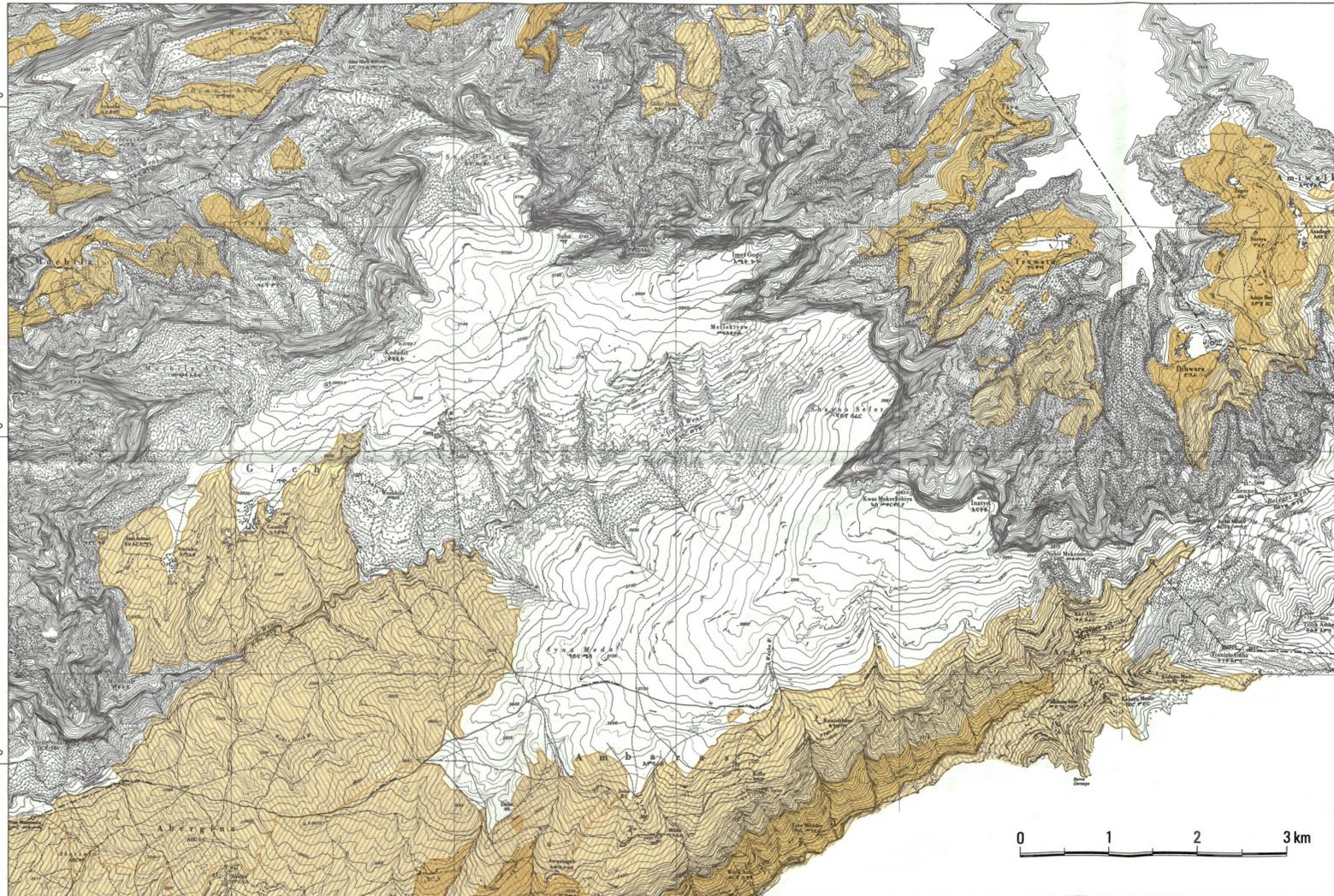
### Key for Cultivation Belts

Lower belt with one harvest every year. Cultivation of grains and pulses: Barley, wheat, lentiles, peas, beans, linseed, and below 2200 m, tef and maize. Upper limit of this belt at 2700 – 3400 m, depending on slope aspect. Sometimes in this belt, there are selected areas with several years of fallow.

Upper belt with one harvest every second year, with an intermediate fallow year. Barley cultivation only. Lower limit at 2700 – 3400 m, upper limit at 3500 – 3900 m (maximum 4000 m), mainly depending on slope gradient.

### Key for Subdivision of Each Belt into Harvesting Areas 1975 to 1977

- |  |   |
|--|---|
|  | 1975 cultivation and harvest in winter 1975/76, then fallow in 1976       |
|  | 1975 fallow, then cultivation in 1976 and harvest in winter 1976/77       |
|  | 1975 and 1976 cultivation and harvest in both winters 1975/76 and 1976/77 |
|  | Fallow in 1975 and 1976 and no harvest                                    |



# Simen Mountains Ethiopia

1:100000

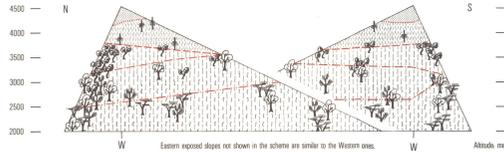


## Present Day Altitudinal Belts

# Simen Mountains – Ethiopia: Present Day Altitudinal Belts

Hans Hurni - Institute of Geography - University of Berne - Switzerland

## Scheme of the Actual Vegetation Limits and Belts in Simen Dependent on Slope Gradient and Aspect

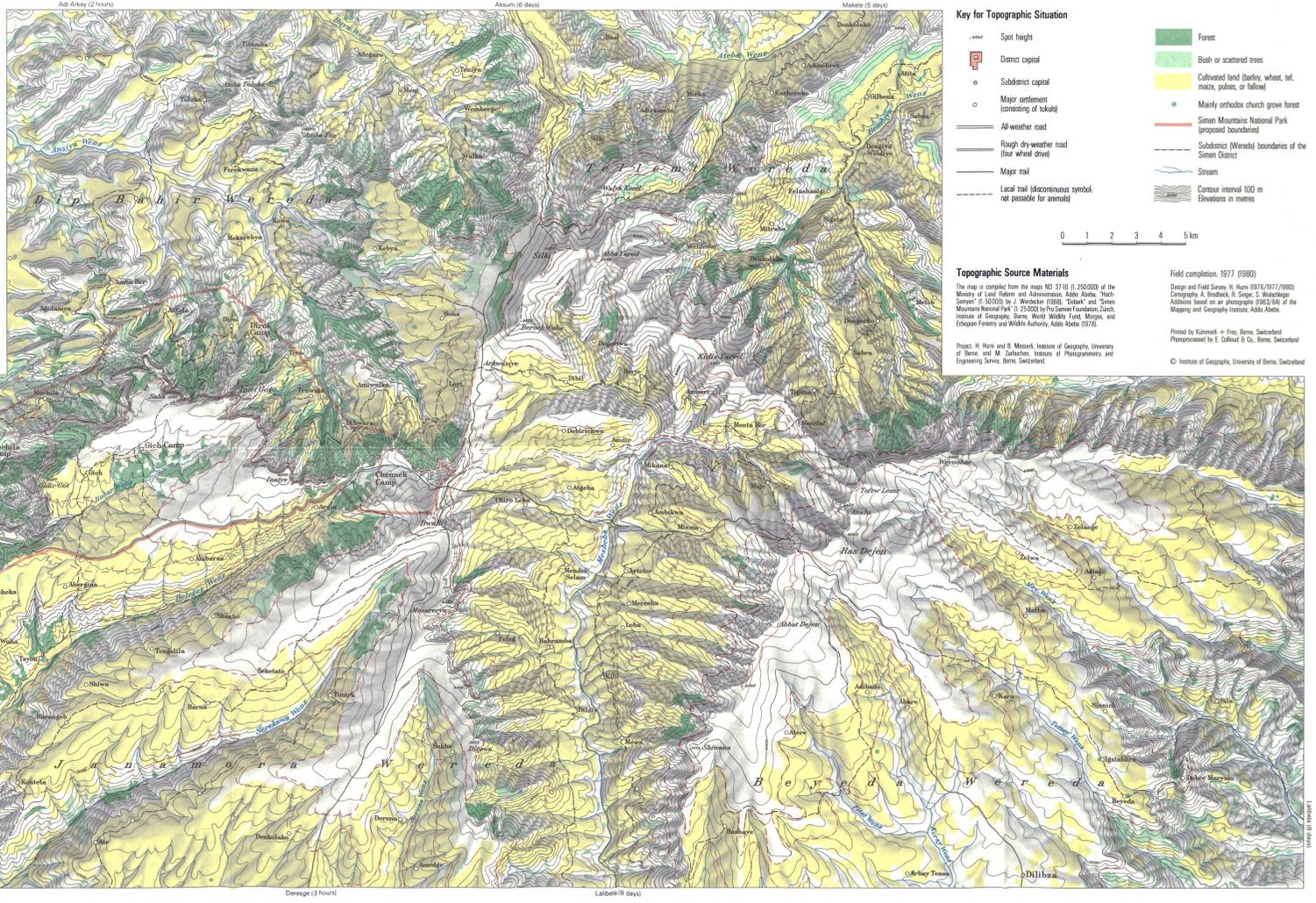


### Key for Map and Scheme

- Lower limit of geographical belt, and upper limit of vegetation with over 50% ground cover (altitudinal variations mainly according to slope aspect; see text)
  - Upper timber line of Ericaceous forests, and climatic limitation of productive barley cultivation (altitudinal variations mainly dependent on slope gradient)
  - Upper limit of eastern Juniperus-Juniperus Olea trees (altitudinal variations mainly dependent on slope gradient)
  - Upper limit of eastern Acacia trees. The upper limit of the agricultural belt of grains and pulses with one harvest per year extends 200 to 400 m higher than the Acacia line (altitudinal variations mainly dependent on slope aspect)
- Discontinuous signs on the map are interpolated (missing evidence, or not visited), based upon the topographical analysis of the field observations.

### Additional Key for Scheme

- Frost dental belt with tree suffocation forms
- Overgrown alpine Fescua-Danthonia grassland
- Giant Lobelia (Aethiopic Chibara)
- Retic Erica (Wachera) and Hypericum (Wenche) forams
- Barley fields (Gidat) with one harvest every second year per field
- Juniperus trees (Kicot)
- Grains and pulses with one harvest per year and field
- Retic Acacia trees and forests (Gret)



### Key for Topographic Situation

- Spot height
- District capital
- Subdistrict capital
- Major settlement (consisting of tukula)
- All-weather road
- Rough dry-weather road (four wheel drive)
- Major trail
- Local trail (discontinuous symbol not possible for animals)
- Forest
- Bush or scattered trees
- Cultivated land (barley, wheat, tef, maize, pulses, or fallow)
- Mainly orthodox church grove forest
- Simen Mountains National Park (proposed boundaries)
- Subdistrict (Wenche) boundaries of the Simen District
- Stream
- Contour interval 100 m
- Elevations in metres



### Topographic Source Materials

The map is compiled from the maps NO 3710 (1:250,000) of the Ministry of Land Reform and Administration, Addis Ababa (Tisch-Sarawat 1950/03) by J. Wankner (1980), 'Debarq' and Simen Mountains National Park (1:25,000) by Pro-Sarawat Foundation, Zurich, Institute of Geography, Bern, World Wildlife Fund, Munich, and Ethiopian Forestry and Wildlife Authority, Addis Ababa (1978).

Field completion: 1977 (1980)  
 Design and Field Survey: H. Hurni (1974/1977/1980)  
 Cartography: A. Probst, R. Singer, S. Wundtshaller  
 Additional based on an orthographic 1:80,000 of the Mapping and Geography Institute, Addis Ababa

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 Photographed by E. Gubler & Co., Berne, Switzerland

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13° 00'

13° 10'

13° 00'

13° 10'

13° 00'

13° 10'

13° 00'

13° 10'

IMAGE BY HURNI