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Organization of Field Guides

Field Guides organized in Slide Series

000a,b Organization / Preparation	2a Plate tectonics and Tethys
001a,b Overview of field sites	2b Gonzen, former iron mine
002 Mesozoic habitat-biogeology	2c Bündner shale
003 Subsurface geochemistry	2d Dolomites and gypsum
004a,b Iron cycling	2e Lower Engadin Window
005 Sulfur springs	2f S-char, former silver mine
006 Carbonate springs	2g Totalp, Serpentine
007a,b Geochemistry at surfaces	3a Iron cycling
008 Nutrients in atmospheric dust	3b Iron springs
009 Mineral waters for wellness	7a Geochemistry at Surfaces
010a-k Jöri lakes	7b Geochemistry at Surfaces
011 Snow and ice habitats	10a Motivation for visiting Jöri
012 Implications for Earth history	10b Overview for Jöri excursion
	10c Retreat of the Jöri Glacier
	10d Geology and tectonics
	10e Erosion and weathering
	10f Iron and phosphorus cycling
	10g Nutrient scavenging
	10h Evolution of lake habitats
	10i Microbial diversity
	10j Microbial blooms
	10k Community modeling

Topics: Three Geo-Biological Conditions for Habitability and Life

1<sup>st</sup> Minerals in rocks

2. a-g, Mesozoic habitat-biogeology in the Eastern Swiss Alps

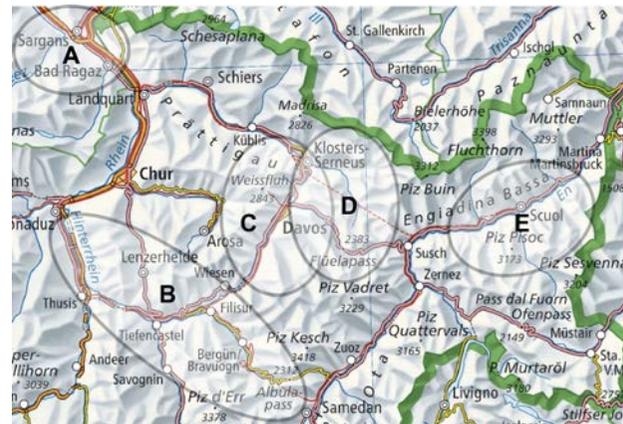
2<sup>nd</sup> Water and water-rock interaction

3. Subsurface geochemistry: How mineral waters are formed

3<sup>rd</sup> Organisms that can interact with rocks and use dissolved minerals

4. a-b, Geochemistry and geomicrobiology of iron cycling
5. Geomicrobiology: "Sulfur springs" as habitats
6. Geomicrobiology: "Carbonate springs" as habitats
7. a-b, Geochemistry at mineral surfaces: clays, silicates and carbonates
8. The role of atmospheric dust in nutrient transport
9. Economics: Mineral waters for health and wellness; engineering problems
10. Jöri lakes: Integrated geobiochemical case studies
11. Snow and ice as habitats
12. Implications for Earth history
13. Aspects of alpine Vegetation Ecology

Field Site Regions



Guides for Field Site Regions

Site	Location / Description	Information slides, field guides
A1	Sargans, Gonzen, former iron mine; Hematite, Ferrihydrite, Magnetite, Leptothrix	2a, 2b, 4a, 4b
A2	Old Bath Pfäfers: Tamina gorge, thermal spring, cyanobacteria	3, 9,
B3	Rhazüns, mineral water (bottling company); iron and manganese removal	9,
B4	Rothenbrunnen, iron spring, Gallionella	4a, 4b, 9,
B5	Tiefencastel, Bündner shale, sedimentation history & Ahaschein, gypsum mine, evaporites	2c, 2d, 3
B6	Alvanu-Bad, Fe- and S-springs, Thiothrix; iron ind sulfidic water, wellness business sulfur	5, 3, 9,
B7	Weissenstein – Albula: rauwacke and gypsum outcrops	2d, 3
C8	Davos, Totalp (Serpentinization, Magnetite), Schiahorn (Dolomite), erosion; vegetation cover	2g, 7, 12,
D9	Jöri, Silvretta nappe (Gneiss), glacial retreat, lakes, nutrient scavenging, blooms, soil organics	10a-k, 8, 11, 12,
E10a	Lower Engadin Window, Bonifacius bicarbonate mineral spring from Bündner shale	2e, 6,
E10b	Fuschna: carbonate ice, cyanobacterial mats; mass developments, nutrients in spring water	6, 4a, 4b, 7,
E10c	Emerita, Luzius, Carola springs: high mineral contents; past mineral water wellness	3, 6, 9,
E10d	Lischana: high Mg-spring; ion exchange, Inn in Ophiolite bed	3, 6,
E10e	Ciozza / Cius: CO2 outgassing, travertine, terracette formation	6, 3,
E10f	Rablönch: cyanobacterial mats, calcified gas bubbles, travertine precipitation	4a, 4b,
E11	Val Sinestra: Iron-Arsenate spring from Bündner shale, past medicinal uses	4a, 4b, 7, 9,
E12	Alp Champatsch: Peridotite intrusion, Serpentine (serpentinization), Pillow Basalt,	2g, 7, 12,
E13	S-char: former Pb and Ag mine, leachates in river sediments	2f,
E14	Lais da Rims: Carbonate Lakes, Dolines, weathering,	6, 2d, 7,

001  
Overview of Field Sites

Field Course  
Geomicrobiology and Subsurface Geochemistry  
in High Mountain Habitats and in cold Water Mineral Springs

Field trip to geomicrobiologically and geochemically interesting  
Ecosystems in the Eastern Swiss Alps  
Site Overviews in 12 Parts

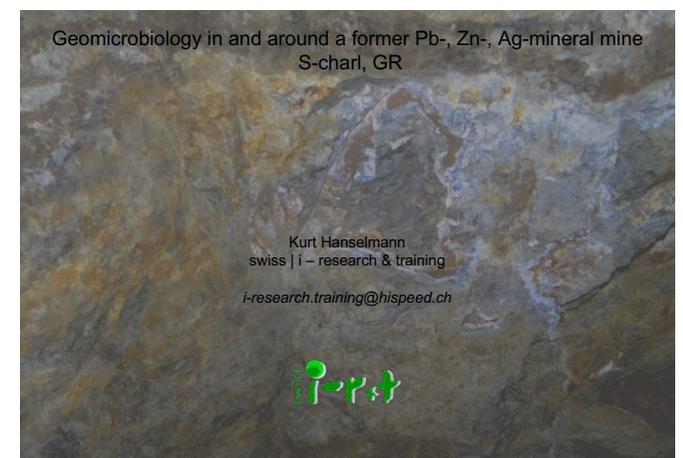
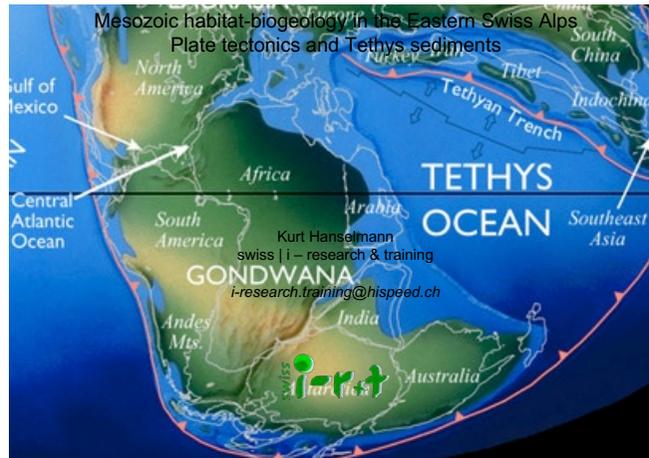
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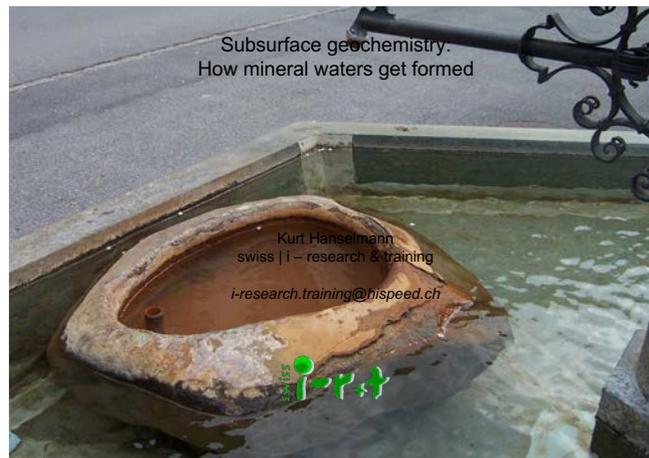
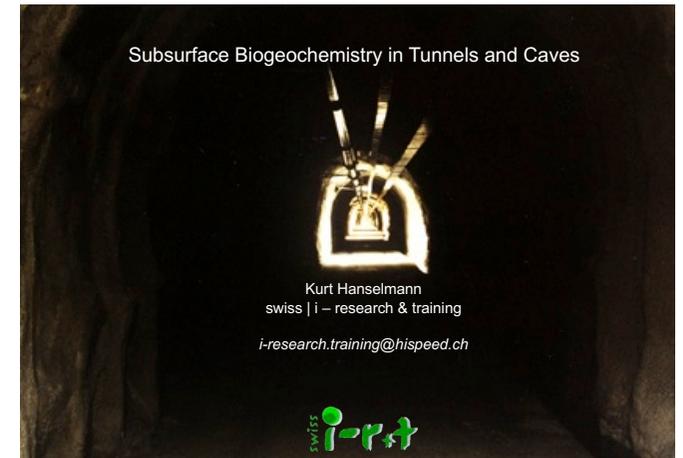
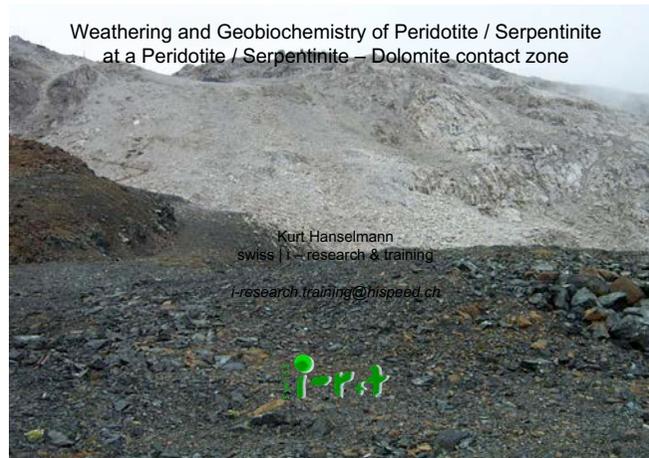


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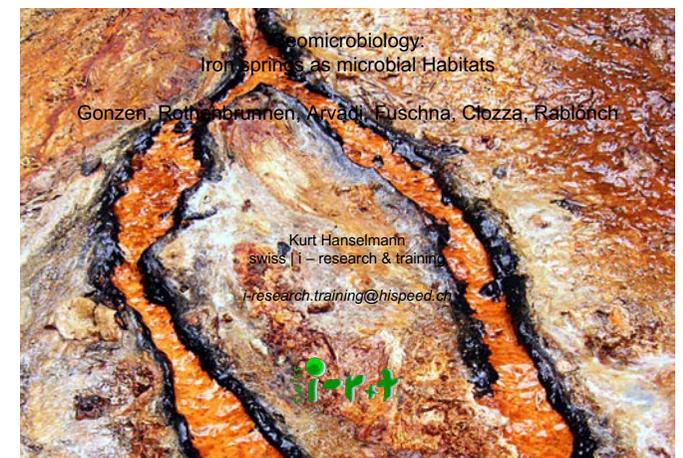
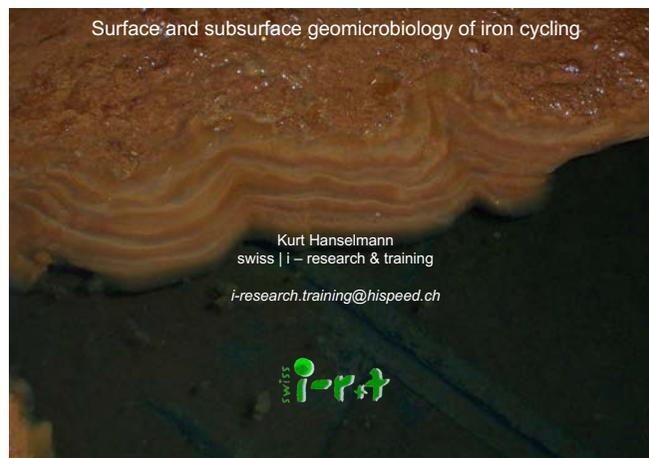
Mesozoic Habitat-Biogeology in the Eastern Swiss Alps



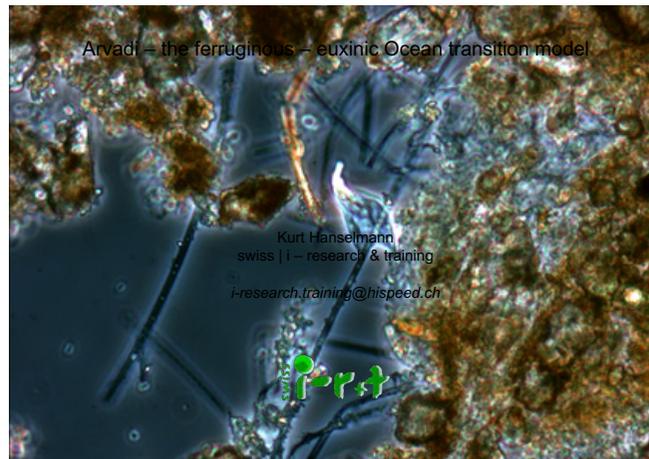
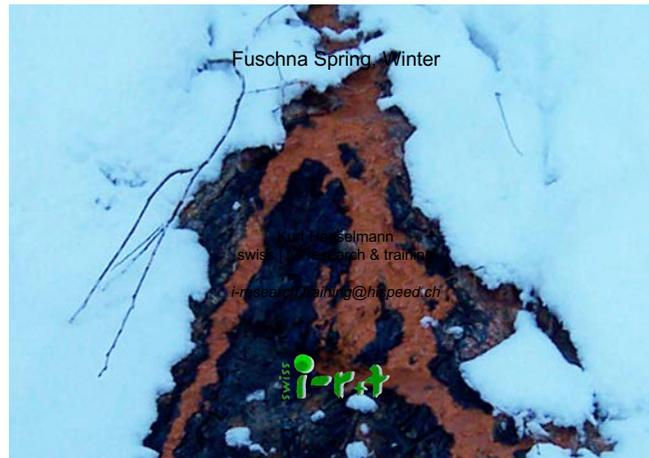
003  
Subsurface Geochemistry



004  
Iron Cycling



005  
Sulfur Springs



006  
Carbonate Springs



007  
Geochemistry at Surfaces

Geochemistry at mineral surfaces- Part 1  
Clays, silicates, carbonates

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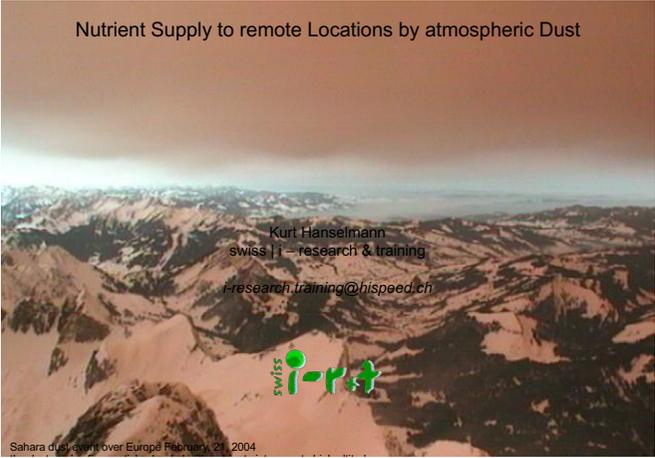
Geochemistry at mineral surfaces- Part 2  
Clays, silicates, carbonates

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008  
Nutrients in Atmospheric Dust

Nutrient Supply to remote Locations by atmospheric Dust



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Sahara dust storm over Europe February, 21, 2004

009  
Economic Aspects

Economic Aspects of Geohydrochemistry:  
Mineral Waters for Health and Wellness



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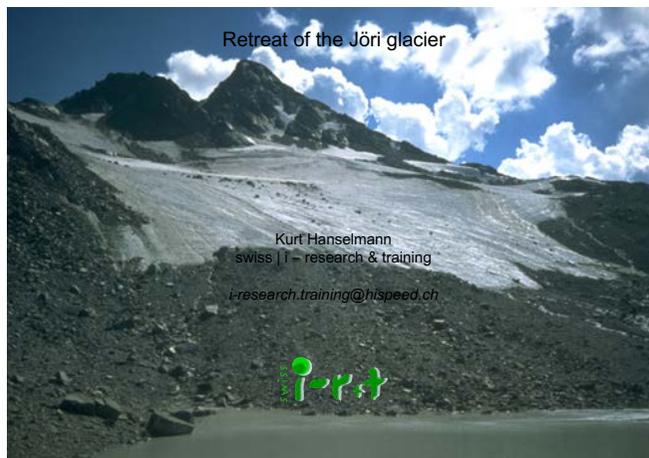
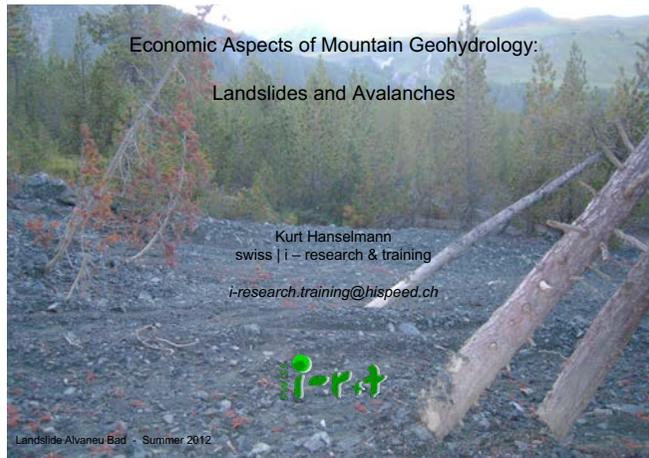
Health Aspects of Geohydrochemistry:  
Mineral Waters for Health and Wellness  
Historical Aspects



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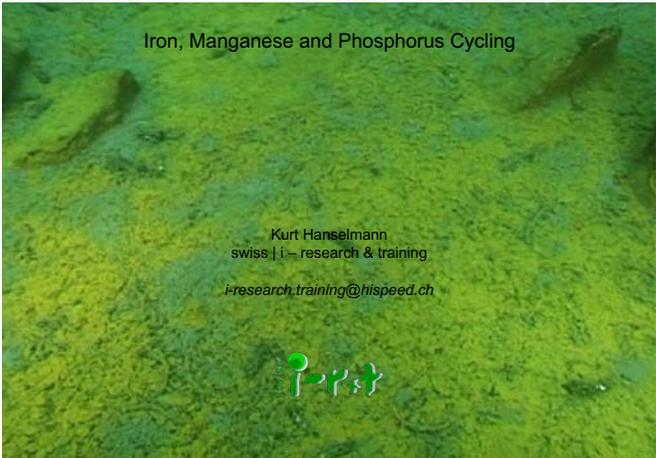
010  
Jöri Lakes:  
Integrated geobiochemical Case Studies in a glacial Retreat Area





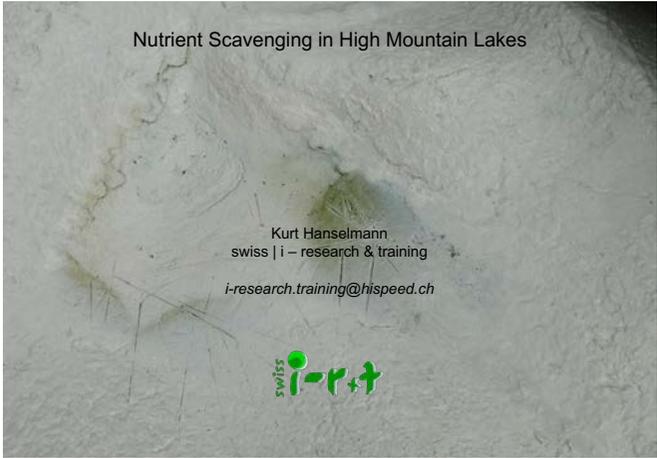
Erosion and weathering of Silvretta gneiss

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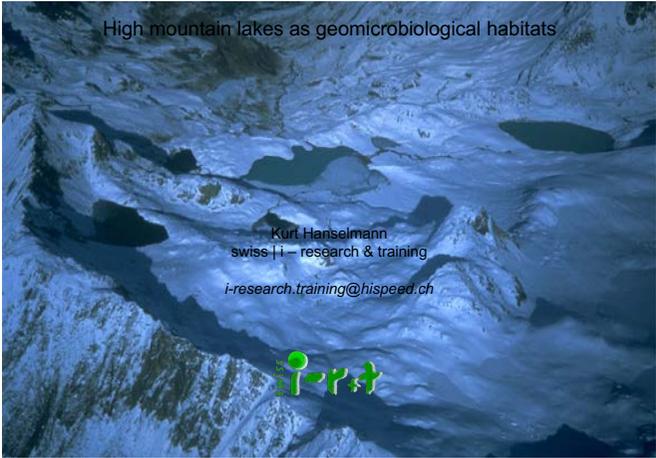
Iron, Manganese and Phosphorus Cycling

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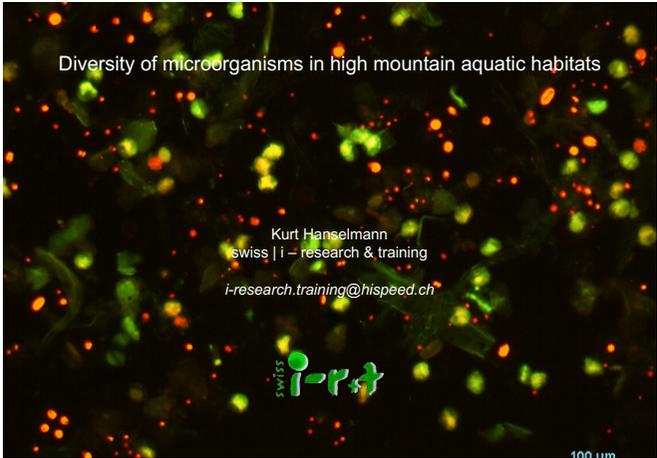
Nutrient Scavenging in High Mountain Lakes

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High mountain lakes as geomicrobiological habitats

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Diversity of microorganisms in high mountain aquatic habitats

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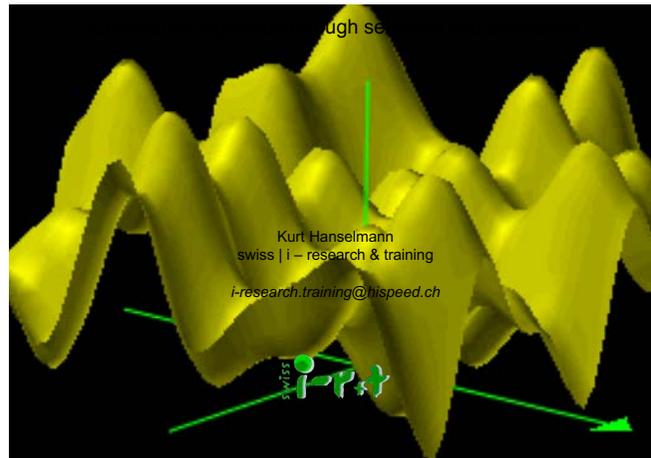


Dinoflagellate blooms in high mountain lakes

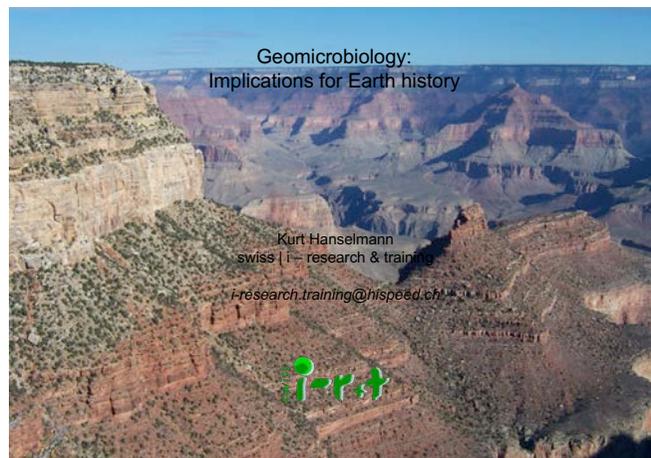
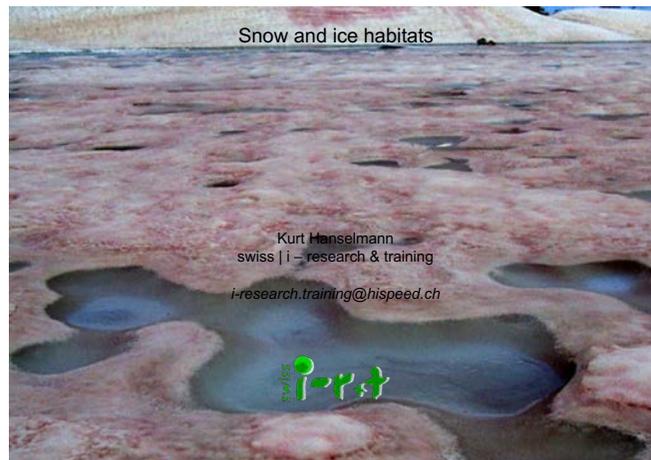
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011  
Snow and Ice Habitats



012  
Implications for Earth History



**013**  
Alpine Vegetation Ecology

