Preface

Amplified climate change and ecological sensitivity of polar and cold regions has been highlighted as a key global environmental issue. Projected climate change in cold regions is expected to alter melt season duration and intensity, along with total precipitation and the balance between snowfall and rainfall. Similarly, changes to the reduced extent of permafrost and increase active layer depth are also expected. These effects will undoubtedly change surface water environments in cold regions and alter the flux of sediment, nutrients and solutes, but the absence of data and analysis to understand the sensitivity of the surface water environment are acute in cold environments.

A working group of the International Association of Geomorphologists (I.A.G / A.I.G.) has been formed to address this key knowledge gap through the SEDIBUD (Sediment Budgets in Cold Regions) program. The central research question of the working group is to assess the contemporary particulate and dissolved fluxes in cold climates. SEDIBUD, building on the SEDIFLUX project, has developed into a global group of researchers with field research sites located in polar and alpine regions in the northern and southern hemispheres. Research carried out at each site varies by program, logistics and available resources, but typically represent interdisciplinary collaborations of geomorphologists, hydrologists, ecologists, and permafrost scientists and glaciologists with different levels of detail. SEDIBUD has developed a key set of primary research data requirements intended incorporate results from these varied projects and allow analysis across the network. Sites will report annual climate conditions as well as total discharge and particulate and dissolved fluxes.

This volume is meant to consolidate and communicate key information about selected SEDIBUD key test sites in an accessible and visible manner. SEDIBUD currently has identified 38 Sites with a goal to extend the network to at least 40 – 45 sites that cover the widest range of cold environments possible. Additionally, it is expected that collaboration within the group will act to develop new sites in underrepresented regions. Collaboration with a number of International Polar Year (IPY) research programs including: International Tundra Experiment (ITEX), Circumpolar Active Layer Monitoring (CALM) and Arctic Coastal Dynamics (ACD/ACCO Net) will provide further opportunities for collaborative research to address broader polar research issues. We anticipate that as SEDIBUD evolves, this volume of fact sheets will expand to reflect an increased range of cold regions.

We would like to acknowledge the contributions of all of the SEDIBUD researchers and the editorial assistance of Anna Donevan, Queen’s University.

June 25, 2008

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# Table of Contents

<table>
<thead>
<tr>
<th>Test Site</th>
<th>Principal Investigator</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austdalur, Iceland</td>
<td>Achim A. Beylich</td>
<td>2</td>
</tr>
<tr>
<td>Bodalen, Norway</td>
<td>Achim A. Beylich</td>
<td>4</td>
</tr>
<tr>
<td>Botn I Dyrafjordur, Iceland</td>
<td>Armelle Decaulne</td>
<td>6</td>
</tr>
<tr>
<td>Cape Bounty, Canada</td>
<td>Scott Lamoueux</td>
<td>8</td>
</tr>
<tr>
<td>East Dabka, India</td>
<td>Prakash Tiwari</td>
<td>10</td>
</tr>
<tr>
<td>Erdalen, Norway</td>
<td>Achim A. Beylich</td>
<td>12</td>
</tr>
<tr>
<td>Fnjoskadalur-Bleiksmyrardalur, Iceland</td>
<td>Armelle Decaulne</td>
<td>14</td>
</tr>
<tr>
<td>Godley Valley, New Zealand</td>
<td>John F. Orwin</td>
<td>16</td>
</tr>
<tr>
<td>Hofsjokull Foreland, Iceland</td>
<td>Þorsteinn Sæmundsson</td>
<td>18</td>
</tr>
<tr>
<td>Hrafndalur, Iceland</td>
<td>Achim A. Beylich</td>
<td>20</td>
</tr>
<tr>
<td>Kangerlussuaq, West Greenland</td>
<td>Bent Hasholt</td>
<td>22</td>
</tr>
<tr>
<td>Kidisjoki, Finland</td>
<td>Achim A. Beylich</td>
<td>24</td>
</tr>
<tr>
<td>Latnjavigge, Sweden</td>
<td>Achim A. Beylich</td>
<td>26</td>
</tr>
<tr>
<td>Musala Area, Bulgaria</td>
<td>Emil Gachev</td>
<td>28</td>
</tr>
<tr>
<td>Orravatnsrustir, Iceland</td>
<td>Þorsteinn Sæmundsson</td>
<td>30</td>
</tr>
<tr>
<td>Potrok Aike, Argentina</td>
<td>Bernd Zolitschka</td>
<td>32</td>
</tr>
<tr>
<td>Pasterze, Austria</td>
<td>Andreas Kellerer-Pirklbauer</td>
<td>34</td>
</tr>
<tr>
<td>Petuniabukta, Spitsbergen</td>
<td>Dr. Grzegorz Rachlewicz</td>
<td>36</td>
</tr>
<tr>
<td>Moor House, North Pennines, UK</td>
<td>Jeff Warburton</td>
<td>38</td>
</tr>
<tr>
<td>Mittivakkat, Sermilik, Greenland</td>
<td>Bent Hasholt</td>
<td>40</td>
</tr>
<tr>
<td>Location</td>
<td>Name</td>
<td>Age</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>-------------------</td>
<td>-----</td>
</tr>
<tr>
<td>Scottelva, Svalbard, Norway</td>
<td>Piotr Zagórski</td>
<td>42</td>
</tr>
<tr>
<td>Tindastoll-Reykarstrond, Iceland</td>
<td>Armelle Decaulne</td>
<td>44</td>
</tr>
<tr>
<td>Zackenburg, NE Greenland</td>
<td>Charlotte Sigsgaard</td>
<td>46</td>
</tr>
</tbody>
</table>
1. Cape Bounty, Canada
2. Botn í Dýrafirði, Iceland
3. Tindastöll, Iceland
4. Hrafnadalur, Iceland
5. Örravatnhrústir, Iceland
6. Fnjóskadalur, Iceland
7. Hofsjökull, Iceland
8. Austdalur, Iceland
9. Kangerlussuaq, West Greenland
10. Mittivakkat-Sermilik, Greenland
11. Zackenberg, Greenland
12. Petuniabukta-Sermilik, Spitsbergen
13. Scottela-Svalbard, Norway
14. Moor House, North Pennines, UK
15. Erdalen, Norway
16. Kidisjoki, Finland
17. Latnjavagge, Sweden
18. Bodalen, Norway
19. Pasterze, Austria
20. Musala Area, Bulgaria
21. East Dabka, India
22. Godley Valley, New Zealand
23. Potrok Aike, Argentina
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Measurements began in 1996, and have continued almost each year since that time. Meteorological, hydrological and sediment delivery processes occur year-round in this subarctic oceanic environment.

In the Austdalur catchment, source-to-sink fluxes and the sediment budget have been analyzed by the integrated study and long-term monitoring of both the relevant denudative slope processes and the fluvial transport. Main focus is on studying the absolute and relative importance of the different denudative processes as well as trends of Holocene relief development in this subarctic oceanic U-shaped valley.

The Austdalur catchment was instrumented with a number of slope test sites and measuring sites for runoff and fluvial transport in 1996.


Site Summary:

Country: *Iceland*
Region: *Austfirðir*
Coordinates: 65°16’N, 13°48’W

Elevation: 0-1028 m asl

Catchment size: 23 km²

Larger drainage basin system: No

Climate: *subarctic oceanic*

Vegetation: lichens, mosses, meadows, bogs, dwarf shrubs

Topography: very steep glacially sculptured valley, plateau areas at 900-1000 m asl, knickpoints in slope and valley longitudinal profiles

Lithology: *Basalt*

Denudative geomorphic processes: *Fluvial, chemical denudation, rockfalls, boulder falls, creep, avalanches, debris flows and slides, deflation*

Storage/sink elements: valley slopes with talus cones

Human influence: grazing
Site overview
In Bødalen, research is focused on the quantitative analysis of storage elements and Holocene sedimentary fluxes and budgets, as well as on sub-recent and present-day sedimentary fluxes and budgets. A spectrum of methods is used including geophysical techniques, dating techniques and monitoring techniques for process analysis. The integration of Holocene, sub-recent and present-day process rates is expected to provide knowledge on how the inheritance of the landscape due to the influence of the Last Glacial Maximum has affected different geomorphologic processes, especially source-to-sink processes and process rates over time in a typical U-shaped valley system.

Period of Observations
Investigations on storage elements were started in 2004. Runoff occurs year-round, with high discharges occurring during spring snowmelt, summer glacier melt flow and extreme rainfall events. These periods are also the periods with the highest intensity / frequency of geomorphic processes. Monitoring of runoff and geomorphic processes will be started in 2008.

Recent or Key Publications
Site Summary:

Country: Norway
Region: Sogn og Fjordane
Coordinates: 61°48´N, 07°05´E
Elevation: 52-2082 m asl
Catchment size: approx. 61 km²
Larger drainage basin system: N/A
Climate: subarctic oceanic
Vegetation: moss and lichen, grey alder (Alnus incana), meadows, bogs
Topography: U-shaped valley
Lithology: Granitic orthogneiss, intrusive Monzonite
Denudative geomorphic processes: Glacial, fluvial, slush flows, rock falls, boulder falls, avalanches, debris flows, creep
Storage/sink elements: valley filling, lake storage, talus cones
Human influence: grazing, some tourism
# SEDIBUD Key Test Site
## Summary Sheet

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**Recent or Key Publications**

**Period of Observations**
Measurements began in October 1995, after a severe snow avalanche event, and have continued to determine the geomorphological impact of snow avalanches linked to dendrochronological studies.

**Site overview**
Botn í Dýrafjörður is a large glacial shaped valley, linked to a fjord system. Slope processes are active, supplying material to a large range of talus and cones. As remote, human influence is limited so the natural processes impacts are easily visible and long-lasting evidence of slope activity can be observed. The vegetation in the valley record the damages caused by the snow avalanches: trees provide the opportunity for dendrochronological studies, and the low vegetation reveals its dynamic to colonize devastated snow avalanche zones.
Site Summary:

Country: Westfjords, Iceland
Region: Subpolar environment
Coordinates: 65°50 N, 23°10 W
Elevation: 0-750 m asl
Catchment size: ca 11.0 km²
Larger drainage basin system: N/A
Climate: subpolar maritime
Vegetation: bare, grass, dwarf trees
Topography: fjord
Lithology: basalt
Denudative geomorphic processes: Fluvial, slope (debris flows, snow avalanches, rockfall), nivation, weathering
Storage/sink elements: Slope, channel, sea
Human influence: limited
SEDIBUD Key Test Site
Summary Sheet

CAPE BOUNTY
Canada

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Period of Observations
Measurements began in June, 2003, and have continued each melt season since that time. Typically, meteorological, hydrological and sediment delivery processes occur during June to early August period.

Site overview
Cape Bounty is the focus of a large number of interrelated watershed and landscape studies to quantify the linkages between meteorology, geomorphology, aquatic ecology, biogeochemistry and hydrology. A key dimension of this work is the use of paired and experimental watersheds that contain similar physiographic conditions and are subject to comparable weather conditions. The observatory has become one of the most comprehensive interdisciplinary terrestrial data sets available in the region to understand the impact of climate change and variability on water, vegetation and the land.

Recent or Key Publications
Site Summary:

Country: Nunavut, Canada
Region: High Arctic Islands
Coordinates: 74°55'N, 109°35'W
Elevation: 5-125 m asl
Catchment size: 7.9 and 11.0 km²
Larger drainage basin system: N/A
Climate: Cold polar
Vegetation: Dwarf prostrate tundra
Topography: Rolling, Incised Plateau
Lithology: Sandstones and siltstones
Denudative geomorphic processes: Fluvial, freeze-thaw; land slides, aeolian
Storage/sink elements: channel storage; lake storage; valley slopes
Human influence: none
SEDIBUD Key Test Site Summary Sheet

EAST DABKA
INDIA

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Recent or Key Publications


Sites overview

East Dabka Watershed is nested within the catchment of Dabka River in Kumaon Lesser Himalaya in India. It is situated in Lesser Himalayan Mountains and located with the close proximity of Main Boundary Thrust (MBT) – the major Himalayan Fault that makes tectonic boundary between Lesser Himalaya in the north and Siwalik (outer Himalaya) in the south. The entire area is therefore tectonically alive and ecologically fragile, and therefore prone to several kind of mass movement and slope failure processes, particularly, landslides, creeping and highly vulnerable to a variety of natural risks.

Period of Observations

The study started in July 2004 and shall complete in June 2008. The monitoring of water discharge, and observation of meteorological, hydrological and sediment delivery processes have been carried out during the period.

Recent or Key Publications


Department of Science & Technology Government of India
Site Summary:

Country: Uttarakhand, India
Region: Lesser Himalaya
Coordinates: 29°40'N, 79°42'W
Elevation: 700-2623 m asl
Catchment size: 27.44 km²
Larger drainage basin system: Dabka Catchment 68 sq km
Climate: Cold Temperate
Vegetation: Temperate
Topography: Mountainous
Lithology: quartzite, diamictite, siltstone, shale
Denudative geomorphic processes: Fluvial, land slides,
Storage/sink elements: channel storage; valley slopes
Human influence: Minimal
# ERDALEN

**Norway**

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## Recent or Key Publications

## Period of Observations
Investigations were started in 2004. Runoff occurs year-round, with high discharges occurring during spring snowmelt, summer glacier melt flow and extreme rainfall events. These periods are also the periods with the highest intensity / frequency of geomorphic processes.

## Site overview
In Erdalen, research is focused on quantitative analysis of storage elements and Holocene sedimentary fluxes and budgets as well as on sub-recent and present-day sedimentary fluxes and budgets. A spectrum of methods is used including geophysical techniques, dating techniques and monitoring techniques for process analysis. The integration of Holocene, sub-recent and present-day process rates is expected to provide knowledge on how the inheritance of the landscape due to the influence of the Last Glacial Maximum has affected different geomorphologic processes, especially source-to-sink processes and process rates over time in a typical U-shaped valley system.
Site Summary:
Country: Norway
Region: Sogn og Fjordane
Coordinates: N 6858832, E32403291
Elevation: 470-1749 m asl
Catchment size: approx. 50 km²
Larger drainage basin system: N/A
Climate: subarctic oceanic
Vegetation: moss and lichen, grey alder (Alnus incana)
Topography: U-shaped valley
Lithology: Northwestern Precambrian gneiss
Denudative geomorphic processes: Glacial, fluvial, slush flows, rock falls, boulder falls, avalanches, debris flows, creep
Storage/sink elements: valley filling, lake storage, talus cones
Human influence: grazing, some tourism
FNJÓSKADALUR - BLEIKSMÝRARDALUR
ICELAND

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Recent or Key Publications

Period of Observations
Measurements began in 1995 and are ongoing, investigating the snow avalanche impacts.

Site overview
The Fnjóskadakur and Bleiksmýrardalur valleys are two remote U-shape valleys in Northern Iceland. Snow avalanche activity is well-known in the valleys, leaving evidence such as scattered transported boulder at a long distance of the slope toes and boulder accumulation at the end of the avalanche path. Those boulders are both fresh and covered with vegetation (lichens, mosses), attesting a recurrent activity in the valleys and a regular debris transfer. The tree cover on some slopes enable an innovative dendrogeomorphologic approach of the snow avalanche activity in Northern Iceland.
Site Summary:

Country: Iceland
Region: Subpolar environment
Coordinates: 65°20 N, 17°30 W
Elevation: 200-900 m asl
Catchment size: from less than 10 km² to more than 30 km²
Larger drainage basin system: yes
Climate: subpolar maritime
Vegetation: bare, grass, shrubs and tree cover
Topography: Slopes, from gentle to rockwall, valley
Lithology: basalt
Denudative geomorphic processes: Slope (debris flows, snow avalanches, rockfall), fluvial, nivation, weathering
Storage/sink elements: Slope, channel
Human influence: limited
### GODLEY VALLEY New Zealand

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**Recent or Key Publications**

**Period of Observations**
Measurement of suspended sediment concentration, dissolved load and discharge will begin in early 2008 and will continue to 2011. Data will telemetered via radio onto the cell phone network and back to the University of Otago on a daily basis.

**Site overview**
The Godley Valley is located in the Aoraki/Mt. Cook National Park. There are three glaciers at the head of the valley which have experienced significant retreat in the last two decades and have well defined proglacial areas and significant stores of sediment. All three glaciers terminate in proglacial lakes which provide a unique opportunity to assess the effect of these on sediment transfer patterns. The region is very dynamic as it is located on an active plate boundary and experiences orographically induced high precipitation. Equipment for year-round monitoring will be installed early 2008.
Site Summary:

Country: New Zealand
Region: Central Southern Alps
Coordinates: 43°28'41"S 170°30'28"E
Elevation: 1100-2900 asl
Catchment size: 70 km²
Larger drainage basin system: N/A
Climate: Temperate
Vegetation: Minimal
Topography: Steep, mountainous
Lithology: Sandstones and siltstones, schist
Denudative geomorphic processes: glacial, snow and rock avalanche, debris flow, fluvial
Storage/sink elements: channel storage; lake storage; valley slopes
Human influence: none
**SEDIBUD Key Test Site Summary Sheet**

**HOFJSÖKULL FORELAND ICELAND**

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**Period of Observations**

Measurements began in 2005 and are ongoing, investigating the permafrost evolution in the glacier surroundings.

**Recent or Key Publications**


**Site overview**

The site is close to the northern margin of the Hofsjökull glacier in Central Iceland, in an area of small hills or mountain ridges from 100 to 150 m high.

Since 1950, measurements on fluctuation of the northern margin of the Hofsjökull glacier show a glacier retreat over 600 m.

The mountainous environment presents solifluction slopes of different exposure.

The site provides a survey of contemporary permafrost environments in central Iceland at the fringe of permafrost existence.
Site Summary:

Country: Iceland
Region: Subpolar environment
Coordinates: 64°58 N, 18°32 W
Elevation: 900-1100 m asl
Catchment size: ca 10 km²
Larger drainage basin system: yes
Climate: subpolar maritime
Vegetation: bare
Topography: Slopes, debris slopes, debris cones
Lithology: basalt and intermediate rocks
Denudative geomorphic processes: glacial erosion and sedimentation, fluvial erosion and sedimentation, runoff, slope processes
Storage/sink elements: flood plain, talus, small lakes
Human influence: none
SEDIBUD Key Test Site Summary Sheet

HRAFNDALUR
Iceland

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Period of Observations

Measurements began in 2001, and have continued each year since that time. Meteorological, hydrological and sediment delivery processes occur year-round in this subarctic oceanic environment.

Site overview

In the Hrafndalur catchment, source-to-sink fluxes and the sediment budget have been analyzed by the integrated study and long-term monitoring of both the relevant denudative slope processes and the fluvial transport.

Main focus is on studying the absolute and relative importance of the different denudative processes as well as trends of Holocene relief development in this subarctic oceanic environment.

The Hrafndalur catchment was instrumented with a number of slope test sites and measuring sites for runoff and fluvial transport in 2001.

Recent or Key Publications


Site Summary:

Country: Iceland
Region: Austfirðir
Coordinates: 65°28’N, 13°42’W
Elevation: 6-731 m asl
Catchment size: 7 km²
Larger drainage basin system: Fjarðara
Climate: subarctic oceanic
Vegetation: lichens, mosses, meadows, bogs, dwarf shrubs
Topography: steep glacially sculptured valley
Lithology: Rhyolite, some Basalt
Denudative geomorphic processes: Fluvial, chemical denudation, rockfalls, boulder falls, creep, avalanches, debris flows and slides, deflation
Storage/sink elements: valley slopes with talus cones
Human influence: grazing
SEDIBUD Key Test Site Summary Sheet

Kangerlussuaq
West Greenland

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Period of Observations
Previously water samples have been collected as part of scientific projects in the area. As part of the CRIK project recording stations have been established in April 2007. Hydrological, and sediment delivery processes occur during June to September period.

Recent or Key Publications

Site overview
The station is located at the outlet from Watson River into the Kangerlussuaq Fiord. The river drains about 6300 km² of the Greenland Ice Sheet. The solid rock threshold emerged from the sea about 8000 years BP and has been carved by the sediment-laden water so that beautiful bed forms appear. The present distance to the Ice Sheet is about 30-40 km. The river has two major tributaries; Ørkendalen (Desert valley) and Sandflugttsdalen (sand drift valley) where large sandurs appear. Glacial outburst have been recorded several times.
Site Summary

Country: Greenland, Denmark
Region: Dry Arctic
Coordinates: 67°00′N, 50°50′W
Elevation: 0-2000 m asl
Catchment size: 6300 km²
Larger drainage basin system: N/A
Climate: Cold polar
Vegetation: Dwarf prostrate tundra
Topography: Rolling, Incised Plateau
Lithology: Granites, Sandstones
Denudative geomorphic processes: Fluvial, freeze-thaw; aeolian
Storage/sink elements: channel storage; lake storage; valley slopes
Human influence: some
KIDISJOKI
Finland

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Recent or Key Publications

Site overview
In Kidisjoki, present-day sedimentary fluxes are studied. The goal is to analyze the absolute and relative importance of chemical and mechanical denudation in this low-relief (Precambrian Baltic Shield) catchment in subarctic Finnish Lapland.
Main focus is on studying the spatio-temporal variability and the controlling factors of runoff, water chemistry, solute and sediment fluxes by comparing different sub-systems as well as chemical and mechanical fluvial denudation rates of different sub-systems within the Kidisjoki catchment.

Period of Observations
Measurements began in 2002, and have continued each year since that time. Typically, meteorological, hydrological and sediment delivery processes occur during April to October period.
Site Summary:

Country: Finland
Region: Finnish Lapland
Coordinates: 69°47’N, 27°05’E
Elevation: 75-365 m asl
Catchment size: 18 km²
Larger drainage basin system: Tana river system
Climate: subarctic
Vegetation: Mountain birch woodland, Scots pine, Alpine heaths, bogs, mosses, lichens
Topography: Precambrian Baltic Shield, low relief
Lithology: gneisses and granulites
Denudative geomorphic processes: Fluvial, freeze-thaw
Storage/sink elements: delta at the outlet
Human influence: extensive grazing, gravel road through the valley
SEDIBUD Key Test Site
Summary Sheet

LATNJAVAGGE
Sweden

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Period of Observations

Measurements began in 1999, and have continued each summer season since that time. Typically, meteorological, hydrological and sediment delivery processes occur during late May to October period.

Recent or Key Publications


Site overview

In the Latnjavagge catchment, source-to-sink fluxes and the sediment budget have been analyzed by the integrated study and long-term monitoring of both the relevant denudative slope processes and the fluvial transport. Main focus is on studying the absolute and relative importance of the different denudative processes in this Arctic oceanic environment. The catchment was instrumented with a number of slope test sites and measuring sites for runoff and fluvial transport in 1999. Ongoing process geomorphologic research in Latnjavagge is integrated with a number of ecological projects and long-term monitoring programs.
Site Summary:

Country: Sweden
Region: Swedish Lapland
Coordinates: 68°20’N, 18°30’E
Elevation: 950-1440 m asl
Catchment size: 9 km²
Larger drainage basin system: Kårsavagge, Abiskojåkka valley system
Climate: Arctic oceanic
Vegetation: lichens, mosses, dwarf shrub heaths, Alpine meadows and bogs

Topography: glacially sculptured valley, plateau areas at 1300 m asl, flat valley floor at 1000 m asl
Lithology: Cambro-Silurian mica-garnet schists, inclusions of marble, intrusions of granites

Denudative geomorphic processes: Fluvial, slush flows, chemical denudation, rockfalls, boulder falls, ploughing boulders, solifluction, creep, avalanches, debris flows and slides, deflation
Storage/sink elements: delta and lake storage; valley slopes with talus cones

Human influence: reindeer husbandry (extensive grazing), some hiking tourism, field research
SEDIBUD Key Test Site
Summary Sheet

Mittivakkat
Sermilik, Greenland

Principal Investigator

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Period of Observations

Continuous measurements began in August, 2004, and have continued each melt season since that time. Typically, meteorological, hydrological and sediment delivery processes occur during May to early October period.

Recent or Key Publications

Hasholt, B.1996 Sediment transport in Greenland IAHS publ. 236: 105-114

Site overview

The Mittivakkat Glacier was first monitored in 1933. Runoff was measured as part of the IGY programme in 1958. The focus was on glaciology. In 1970 a permanent field station, the Sermilik station was built. Sediment transport was measured in 1972. The focus shifted toward integrated landscape studies. In order to study effect of climate, two recording climate stations were installed in 1993 and 1998. The whole catchment is now studied as a model of a typical arctic landscape, representative of this climatic environment. Data are integrated into models.
Site Summary

Country: Greenland, Denmark
Region: East Greenland
Coordinates: 65°40’N, 38°10’W
Elevation: 0-900 m asl
Catchment size: 18.4 and 30.0 km²
Larger drainage basin system: N/A

Climate: Subarctic
Vegetation: Dwarf prostrate tundra
Topography: Alpine, fissure valleys
Lithology: Gneiss, anorthosites

Denudative geomorphic processes: Glacial, Fluvial, freeze-thaw

Storage/sink elements: channel storage; lake storage; valley slopes, delta

Human influence: none
SEDIBUD Key Test Site  
Summary Sheet

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Period of Observations
Measurements began as far back as the 1930s. The ECN collects a long-term data base of key physical, chemical and biological variables which drive and respond to environmental change. Sediment budget work began in earnest in 1998 and strategic studies have continued for the last decade. Work by Crisp (1960) provides a valuable early baseline of observations.

Site overview
The site is England’s highest and largest terrestrial National Nature Reserve (NNR), a UNESCO Biosphere Reserve and a European Special Protection Area. The Moor House NNR was first created in 1952. In the 1960s and 1970s the area was intensively studied as part of the International Biological Programme and in the 1990s as a flagship site of the Terrestrial Initiative in Global Environmental Research (TIGER). Since 1992 the site has been part of the UK Environmental Change Network (ECN) which is the UK’s long-term environmental monitoring programme collecting information on the terrestrial and freshwater environment.
http://www.ecn.ac.uk/sites/moorh.html

Recent or Key Publications
**Site Summary:**

Country: *Northern England*

Region: *North Pennines*

Coordinates: 54°42’N, 2°22’W

Elevation: 530-850 m asl

Catchment size: Trout Beck 11.5 km²

Larger drainage basin system: *River Tees* (1930 km²)

Climate: Annual precipitation 2000 mm; Mean annual air temperature 5.8 °C; 110 Frost days

Vegetation: *Blanket peat bog and Calluna-Eriophorum*

Topography: Extensive peat moorland, exposed plateau and incised river valleys

Lithology: Interbedded sandstones, shales and limestone

Denudative geomorphic processes: *Fluvial, aeolian, freeze-thaw and chemical*

Storage/sink elements: slopes, floodplain, channel, reservoir

Human influence: Managed moorland (shooting & grazing), historic mining
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**Recent or Key Publications**

**Site overview**
This is the highest part of Bulgarian tallest mountain – Rila.
Consist of two adjacent catchments, parts of two separate larger basins – Maritsa catchment (12 km²) belongs to Maritsa basin (larger basin area: down to 1400 m a. s. l. – 39,9 km², down to 850 m a. s. l. – 96,6 km²), Bistrica catchment (10 km²) belongs to Iskar basin (larger basin area: down to 1400 m a. s. l. – 20 km²; down to 1000 m a. s. l. – 57 km²; down to 950 m a. s. l. – ca. 450 km²).
Here cryogenic and cryonival morphology and morphodynamics are mostly well expressed. The two separate catchments provide a nice basis for comparative analyses of processes in different conditions of aspect, slope tilts and altitude.

**Period of Observations**
Measurement collection began in the summer of 2005. Some test polygons defined in summer 2006. Still no regular observations of sediment transfer processes due to lack of funding. Usually field season is from June to November.

**Musala Area**
Bulgaria
Site Summary:

Country: Bulgaria

Region: Sofia region, SW Bulgaria

Coordinates: 42°12’N, 23°35’E

Elevation: 1830-2925 m a s l

Catchment size: 12.0 and 10.0 km²

Larger drainage basin system: Maritsa (Aegean sea), Iskar (Danube)

Climate: submediterranean – mountain modification

Vegetation: 1830m-2100 m— Picea abies, Pinus silvestris, Pinus peuce, 2100m – 2600 m— dwarf pine (Pinus mugo), > 2600m – alpine grassland

Topography: Mountain ridges, relict cirques and U-shaped valleys

Lithology: Granitoides

Denudative geomorphic processes: Rockfalls, debris movement in talus, avalanches, creep, land slides.

Storage/sink elements: colluvial fans, slope hollows, lakes

Human influence: hiking tourism
Principal Investigator

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Period of Observations

Measurements began in 2001 and are ongoing, investigating the active layer thickness on the palsas.

Recent or Key Publications


Site overview

The Orravatnsrústir is a palsa site located north of the Hofsjökull ice cap. The palsas are located in a small valley like depression about 3 km², at 710-715 m a.s.l. All the palsas in the area are well vegetated, with grasses, sedges and lichens. A small creek inundate the water system in the palsa site from the south and the system is drained by two streams, indicating that the main part of the water entering the system is a ground water. All together ten palsas are under investigation to follow the evolution of the permafrost in the area.
Site Summary:

Country: Iceland
Region: Subpolar environment
Coordinates: 65°05' N, 18°32' W
Elevation: 600-900 m asl
Catchment size: less than 10 km²
Larger drainage basin system: yes
Climate: subpolar maritime
Vegetation: grasses, sedges and lichens
Topography: flat, wetland, palsas
Lithology: basalt and intermediate rocks, mostly detritic on the surface
Denudative geomorphic processes: permafrost, runoff, bank erosion, running water
Storage/sink elements: lakes, pounds
Human influence: none
Principal Investigator

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Period of Observations

LiDAR technique is applied for glacier, solifluction and slope process monitoring 1-3 times a year. Solifluction rates and measurements of suspended load and concentration of solutes is carried out at least once a year.

Recent or Key Publications


Site overview

The proposed key test site ‘Pasterze’ consists of the partly debris-covered Pasterze Glacier (Austria’s largest glacier; 17.5 km²) and the headwaters of the Möll River. This area is the focus of glaciological studies since many decades (University of Graz) and the focus for studies on distribution, characteristics, thermal regime and dynamics of supra- and proglacial sediments and solifluction monitoring since a few years (Universities of Graz and Salzburg). This site allows to study the linkage between meteorology, glaciology, permafrost, geomorphology and hydrology under the influence of climate change.
Site Summary:

Country: Carinthia, Austria
Region: Central Eastern Alps
Coordinates: 47°05’N, 12°42’E
Elevation: 2060-3798 m asl
Catchment size: 34 km²
Larger drainage basin system: yes
Climate: Cold alpine with relatively high precipitation
Vegetation: between upper tree line to vegetation free areas
Topography: steep alpine relief with flat basins and plateaus
Lithology: metamorphic rocks (calc. mica schist and prasinite)
Denudative geomorphic processes: gravitational, periglacial, fluvio-glacial and glacial
Storage/sink elements: channel storage; basin storage; valley slopes
Human influence: little
SEDIBUD Key Test Site
Summary Sheet

PETUNIABUKTA
Spitsbergen

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Recent or Key Publications

Period of Observations
Research are based on summer expeditions (July - mid-September), while denudation processes connected with glaciers ice and snow cover melt occur, were first done in 1985 and continued annually since 2001.

Site overview
In Petuniabukta (Petunia Bay) surrounding, glaciated in ca. 40%, several glaciated and non-glaciated catchments of various area are located. Main goals of the studies are to characterize denudation system and quantify mass fluxes rates in high Arctic catchments, describe main changes in the last 25 years and since the Little Ice Age and investigate the influence of various environmental factors on the dynamics and spatial variability of cryo-hydro-geomorphological processes in catchment systems. This site is the only one within monitored on Spitsbergen, which is located in the inner-fiord part.
Site Summary:

Country: Svalbard (Norway)
Region: Spitsbergen,
Coordinates: 78°44’N, 16°35’W
Elevation: 0-1100 m asl
Catchment size: 1.4; 70 & 75 km²
Larger drainage basin system: N/A
Climate: Cold polar, semi-arid
Vegetation: High-Arctic dry tundra
Topography: Coastal mountains; steep walls; slopes; alluvial fans
Lithology: Metamorphic and clastic (carbonate and sulphate) rocks
Denudative geomorphic processes: Glacial; fluvial; freeze-thaw; slope; aeolian
Storage/sink elements: Glaciers; ice-cored marginal zones; channel storage; alluvial cones; valley slopes
Human influence: none
SEDIBUD Key Test Site
Summary Sheet

POTROK AIKE
Argentina

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Period of Observations
Measurements began in February, 2002 and have continued since then. Meteorological and sediment delivery processes are monitored continuously, stable isotopes only during field seasons of the southern summer. Long sediment records are recovered for reconstruction of past conditions.

Site overview
At the site of Laguna Potrok Aike regionally consistent climatic, hydrological and environmental records have been developed with up to decadal resolution on a calendar-year timescale. The main goals are: 1. monitoring of modern processes to provide in-depth knowledge of forcing factors; 2. combination of process studies with a wide range of sedimentary proxy parameters for improved climatic interpretation; 3. comparison with global to regional climate model output. Overall, a better understanding of forcing factors on different parameters including sediment budgets are envisioned.

Recent or Key Publications
Site Summary:

Country: Santa Cruz, Argentina

Region: southern Patagonia

Coordinates: 51°57´S, 70°23´W

Elevation: 100 m asl

Catchment size: 200 km²

Larger drainage basin system: N/A

Climate: semi-arid and cool semi-dessert

Vegetation: Patagonian steppe

Topography: Patagonian plains

Lithology: fluvioglacial and moraine deposits with occasional basaltic scatter cones and plateaus

Denudative geomorphic processes: Fluvial, aeolian

Storage/sink elements: alluvium

Human influence: sheep farming since the 1870’s
SCOTTELVA
Svalbard/Norway

Principal Investigator

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Recent or Key Publications


Period of Observations

The observations started in 1986 and with few intervals they are carried out each polar summer. They include: meteorology, geomorphology, glaciology, hydrology and hydrochemistry.

Site overview

Scottelva represents a glaciated basin within which it is possible to examine correlations between atmosphere, cryosphere, hydrosphere and biosphere. The researches conducted within the basin are of an interdisciplinary nature and aim at a complex recording/registration of data which will make it possible to determine the functioning of the basin dependent upon local environmental conditions as well as on supraregional factors such as climate which, in turn, is tied to a mutual interaction of the following environments: marine, glacial and terrestrial.
Site Summary

Country: Norway
Region: Svalbard
Coordinates: 77°34’N, 14°27’E
Elevation: 0-780 m a.s.l.
Catchment size: 10 km²
Larger drainage basin system: N/A
Climate: polar, semi-marine
Vegetation: High-Arctic dry tundra
Topography: Mountain ridge, steep wall and slope incision, ice-cored moraine ridges, sandur, raise marine terrace, alluvial fan
Lithology: grey to rusty to yellow quartzite-clast sandstone, sandstone and shale complex with coal-seams
Denudative geomorphic processes: nivation, glaciation, solifluction, mass movements, periodic outflow, littoral
Storage/sink elements: snow cover, coarse-grained alluvial fan, marine basin
Human influence: negligible
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Period of Observations
Measurements began in July 2004 and are ongoing.

Recent or Key Publications

Site overview
The Tindastóll Mountain located in the Skagafjörður fjord is orientated NNW–SSE and has relatively flat summits at 800–900 m a.s.l. Numerous deep gullies dissect the rock wall, leading material to large colluvial cones. Several cirques also develop within the rockwall. Most of the colluvial cones exhibit specific landforms related to debris-flow, snow-avalanche or landslide activity. The site is particularly adapted for Holocene cone development studies as several well known tephra layers can be recognised within the colluvial material. Also, sites where slope process are active are easily accessible for long term monitoring.
**Site Summary:**

Country: *Iceland*

Region: *Subpolar environment*

Coordinates: 65°49 N, 19°53 W

Elevation: 30-900 m asl

Catchment size: *from less than 10 km² to more than 15 km²*

Larger drainage basin system: *n/a*

Climate: *subpolar maritime*

Vegetation: *bare, grass*

Topography: *Slopes, from gentle to rockwall*

Lithology: *basalt and rhyolite*

Denudative geomorphic processes: *Slope (debris flows, snow avalanches, rockfall), nivation, weathering*

Storage/sink elements: *Slope, channel*

Human influence: *limited*
Zackenberg NE-Greenland

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Period of Observations
Measurements of sediment transport began in June, 1997, and have continued each melt season since that time. The Zackenberg river typically breaks up in late May/early June and freeze back in mid September.

Recent or Key Publications


Site overview
In Zackenberg a comprehensive monitoring programme ‘Zackenberg Basic’ has been running since 1995. The programme collects long term series of baseline data that describes the dynamics of the marine and terrestrial ecosystems in this High Arctic area. The sub-programme ‘GeoBasis’ provide data of seasonal and spatial variations in snow cover and microclimate in the area as well as water discharge, sediment- and solute transport in the Zackenberg river. GeoBasis is operated by the National Environmental Research Institute, Department for Arctic Environment in co-operation with Department of Geography and Geology, University of Copenhagen.

More details about Zackenberg Research Station and the monitoring programme are available from the Zackenberg homepage:
www.zackenberg.dk
Site Summary:
Country: Greenland
Region: High Arctic
Coordinates: 74°28'N, 20°34'W
Elevation: 0-1,450 m asl
Catchment size: 512 km²
Larger drainage basin system:
Climate: High-arctic
Vegetation: Well-drained heath, fen
Topography: valley system surrounded by mountains up to 1,450 m
Lithology: Gneiss and granite, sedimentary rocks and basalt
Denudative geomorphic processes: Fluvial, freeze-thaw; land slides, aeolian
Storage/sink elements: channel storage; lake storage; valley slopes
Human Influence: none