Test 2

• Part 1 will be returned today
• Part 2 grade on paper in Blue. Will be returned Thursday
• Add 1 point to score on test
• Distribution 14 As, 16 Bs, 7 Cs, 1 "other"

Field Trips

BRING LUNCH & drink. Bathrooms few & far between.
In lieu of lab on 24th and 26th March

Pick which trip. Sign up today!
If you can't make either one, see me ASAP.
Field Trips

Saturday
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Potomac Headwaters –

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Wills Mountain Anticline Focus
Narrows, Cumberland, Greenland Gap
~ some hiking on gentle-smooth & rugged-bouldery terrain.
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Periglacial (Cryogenic) Geomorphology

Gelifluction, Cryoturbatuion

VS.

Glacial, Proglacial, Paraglacial
Circum-Arctic Map of Permafrost and Ground Ice in EASE-Grid format

http://nsidc.org/NOAA/caps_ftp_documentation.html
National Snow and Ice Data Center. 1999.
Digital data available from nsidc@kryos.colorado.edu.
NSIDC Distributed Active Archive Center, University of Colorado at Boulder.

Legend for EASE-Grid Permafrost and Ground Ice Map

<table>
<thead>
<tr>
<th>Permafrost (percent of area)</th>
<th>Ground Ice Content</th>
<th>Ice caps and glaciers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent (90-100%)</td>
<td>High (3-5%)</td>
<td>Ice caps and glaciers</td>
</tr>
<tr>
<td>&lt; 3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Determined (50-60%)</td>
<td>Medium (25-35%)</td>
<td></td>
</tr>
<tr>
<td>&lt; 25%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific (20-30%)</td>
<td>Low (10-20%)</td>
<td></td>
</tr>
<tr>
<td>&lt; 10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolated (5-10%)</td>
<td>Very low (5%)</td>
<td></td>
</tr>
<tr>
<td>&lt; 5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolated (5-10%)</td>
<td>Very low (5%)</td>
<td></td>
</tr>
</tbody>
</table>
| Northern Hemisphere Permafrost Distribution National Snow & Ice Data Center, 1999

http://nsidc.org/NOAA/caps_ftp_documentation.html
Temperature Profiles

- 0 C +

Active zone

Permafrost

Mean

Winter

Summer

Aquiclude

Talik

Temperature Profiles

- 0 C +

Active zone

Permafrost

Aquiclude

Summer

Talik
Surface Armoring

Felsenmeer, Northern Manitoba.  
Photo by Lynda Dredge, GSC

Boulder Fields (Felsenmeer)  
Hickory Run State Park, Eastern PA  
Photo by Gary Fleeger, PGS
Late-Pleistocene sand wedges (tan) in massive icy sediments (gray); Holocene ice wedge (white), Summer Is., Mackenzie Delta region, NWT, Canada

Used with permission of H. French


Active Ice Wedge, Prudhoe Bay, AK

Photo by R.D. Reger
Alaska Division of Geological & Geophysical Surveys
http://wwwdggs.dnr.state.ak.us/photogallery.html
Ice-wedge Trough in Peatland, Hudson Bay Lowlands, Manitoba.

Photo by Lynda Dredge, GSC


Mechanism for Sorted Polygons

1. Surface in Summer

   Cobbles

2. Surface in Winter

   Isotherms
Mechanism for Sorted Polygons

Ice Wedges Form in Winter

Mechanism for Sorted Polygons

3. Surface in “Next” Summer

Mechanism for Sorted Polygons

4. Surface in “Next” Winter
Mechanism for Sorted Polygons

6. Surface in “Next” Winter

Mechanism for Sorted Polygons

7. Surface in “Next” Summer

Cross-Section of Sorted Polygons

Gelifluction, Cryoturbation
Ice-Wedge Polygons, Fairbanks, AK

Photo by R.D. Reger

Alaska Division of Geological & Geophysical Surveys
http://www.dggs.dnr.state.ak.us/photogallery.html

Ice-wedge polygons, Hudson Bay Lowlands, Manitoba.

Photo by Lynda Dredge, GSC


Ice-wedge Polygons & Thermokarst Ponds in Peatlands, Hudson Bay Lowlands, Manitoba

Photo by Lynda Dredge, GSC

sts.gsc.nrcan.gc.ca/tsdweb/landscapes/photo_details.asp?numero=489
Sorted Polygons Formed in Till, Bernard Harbour, Nunavut

Photo by Isabelle McMartin, GSC

Ice-wedge polygons in peat & frost-shattered bedrock, Seal River, Northern Manitoba

Lynda Dredge, GSC photo

Stone Nets near Point May, Burin Peninsula, Newfoundland

Rectangular Ice-Wedge Network
Prince Patrick Island, NWT


Concentric Patterned Ground, Prince Patrick Island, NWT


Concentric Polygons
Photo: J. R. Mackay
http://www.gi.alaska.edu/ScienceForum/ASF6/690.html
web site by Larry Gedney, University of Alaska, Fairbanks
Patterned Ground
Cabin Mountain, West Virginia
Blow Up of Aerial Photo

Stone Stripes Formed on Till, Baffin Island, Nunavut

Boulder Streams
Coarse Stone Stripes
Cryoturbation & Solifluction, Melville Island
Polygons and Circles on Flat Land, Stripes on Slopes

Solifluction Lobe, Jotunheim Mtns., Norway
Photo: S. D. Gurney
Reading Univ.
http://www.rdg.ac.uk/~sgsgurne/gallery.html

Solifluction Lobe, Jotunheim Mtns., Norway
Photo: © Steven Gurney
Reading Univ.
http://www.rdg.ac.uk/~sgsgurne/gallery.html
Solifluction Lobes & Terraces, Gros Morne NP, Newf.

Solifluction Apron, Melville Island, NWT

Ice-Shattered Shale, Eastern Melville Island, NWT
Rock blisters in dolomite, Bernard Harbour area.

Photo by Isabelle McMartin, GSC
sts.gsc.nrcan.gc.ca/tsdweb/landscapes/photo_details.asp?numero=212

Pingos, Prince Patrick Island, NWT, Canada

Photo: Unknown Photographer, GSC

-up to 100 m across-

Pingo in Outwash, Bylot Island, NWT

Photo: Ron DiLabio, GSC
Pingo on glacial outwash plain, Bylot Island, NWT.

- Author: Ron DiLabio

Tuk Pingo, NWT

Pingo, GSC Photo
Pingo near Harding River, Nunavut

- photo by Isabelle McMartin, 1989
- 22 m high rock pingo was formed in heavily fractured dolomite

Rock Pingo in Fractured Dolomite, near Harding River, Nunavut

Photo by Isabelle McMartin, GSC, 1989

Palsa in Fen near Churchill, Manitoba.

Photo by Lynda Dredge, GSC
Rock Glaciers

• Interstitial Ice
• Ice-Cored

Rock glacier near Tungsten, Northwest Territories.

Photo: Lionel E. Jackson, Jr., GSC

A Rock Glacier, Atlin Mountain, British Columbia

© Scott McCreer http://crevassezzone.org/photos/glacier_features.htm
Same Rock Glacier, Atlin Mountain, B.C.

http://crevassezone.org/Photos/glacier_features.htm

Rock Glacier, Fryingpan Basin, CO. 1966. (George L. Snyder, USGS, photograph)

www-nsidc.colorado.edu/glaciers/gallery/Rockglacier_large.html

Rock Glacier, Baxter State Park, Maine
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