



Glacier Change Detection



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Overview

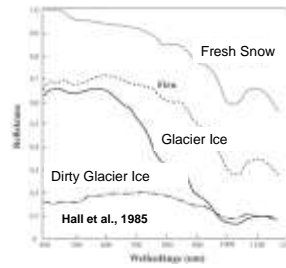
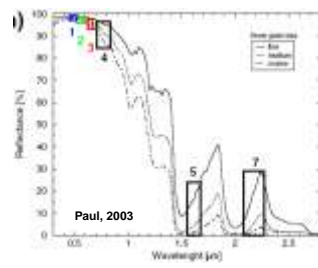


- Glacier mapping
- Derivation of drainage basins
- Glacier inventory
- Change detection
- Mass balance



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Spectral properties of ice and snow



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Glacier mapping - algorithms

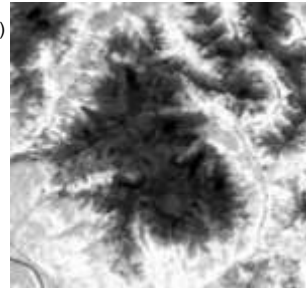


- **Normalized Difference Snow Index (NDSI):**

$(TM2-TM5)/(TM2+TM5)$ (for Landsat)

- **Ratio Images:**

- TM3/TM5 -> good results in shadow zones (for Landsat)
- TM4/TM5 -> good results in areas facing sun (for Landsat)



These methods are:

- robust, simple, accurate (partly better than manual -> consistency)




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Derivation of drainage basins

1. Calculation of drainage basins with DEM


2. Intersection with glacier outlines

3. Deriving of topographical parameters by zonal statistics


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Glacier Inventory




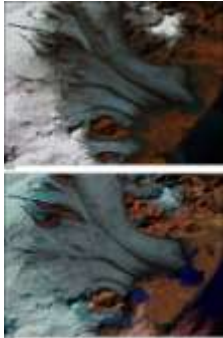
available @ GLIMS



The National Centre for Earth Observation logo features a stylized globe and the text 'National Centre for Earth Observation' and 'NATIONAL ENVIRONMENT RESEARCH COUNCIL'. The Earth Observation Technology Cluster logo is a simple text-based logo.

A glacier inventory is actually nothing else than a catalogue of all glacier and ice caps worldwide. An inventory is needed to follow glacier fluctuations in time. RemSen allows to detect glaciers all around the globe.

Change Mapping




Necessary input data:

- Imagery of two different points in time

Method:

- Georeference data (if necessary)
- Map glacier extends
- Calculate basins
- Derive topographical parameters

<http://earthobservatory.nasa.gov/IOTD/view.php?id=1329>



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As global climate changes glaciers and icecaps change in size and volume. Repeat imagery allows these changes to detect.