Towards better long-term integration of earth science data from landscape scale to detail studies

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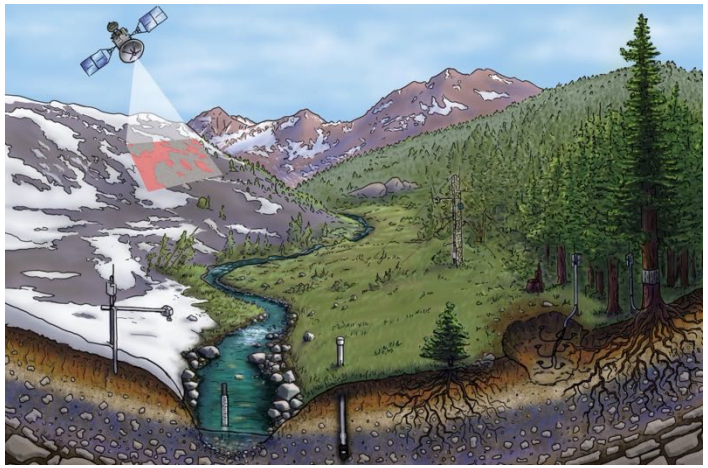


https://doi.org/10.5194/egusphere-egu22-4630, 2022

Take home message:

Use decimal Latitude Longitude (dLL) to better specify locations, data points and directions,
Specify your metadata for future generations……

Earth Science Studies can be …

Detailed, location-based, then perhaps in inventories
At larger-scales, eg catchment or regional studies
    Portrayed by mapping, maps in some form, and (latterly) in GIS
Perhaps linked to other studies: biosciences, engineering etc
Often have associated images, analyses, data points etc
Brought together in papers, reports, theses (or not published!)
Related (perhaps) to previous studies by a 'previous work' section

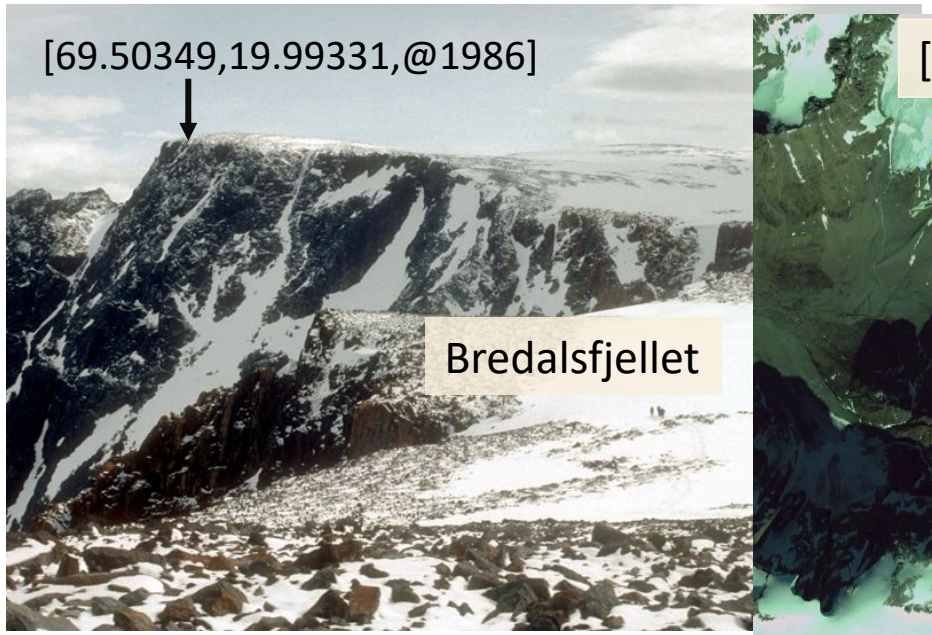
Characterized by place name – process name – time specification
On maps, perhaps located by (generalized) latitude – longitude: ° ' ''

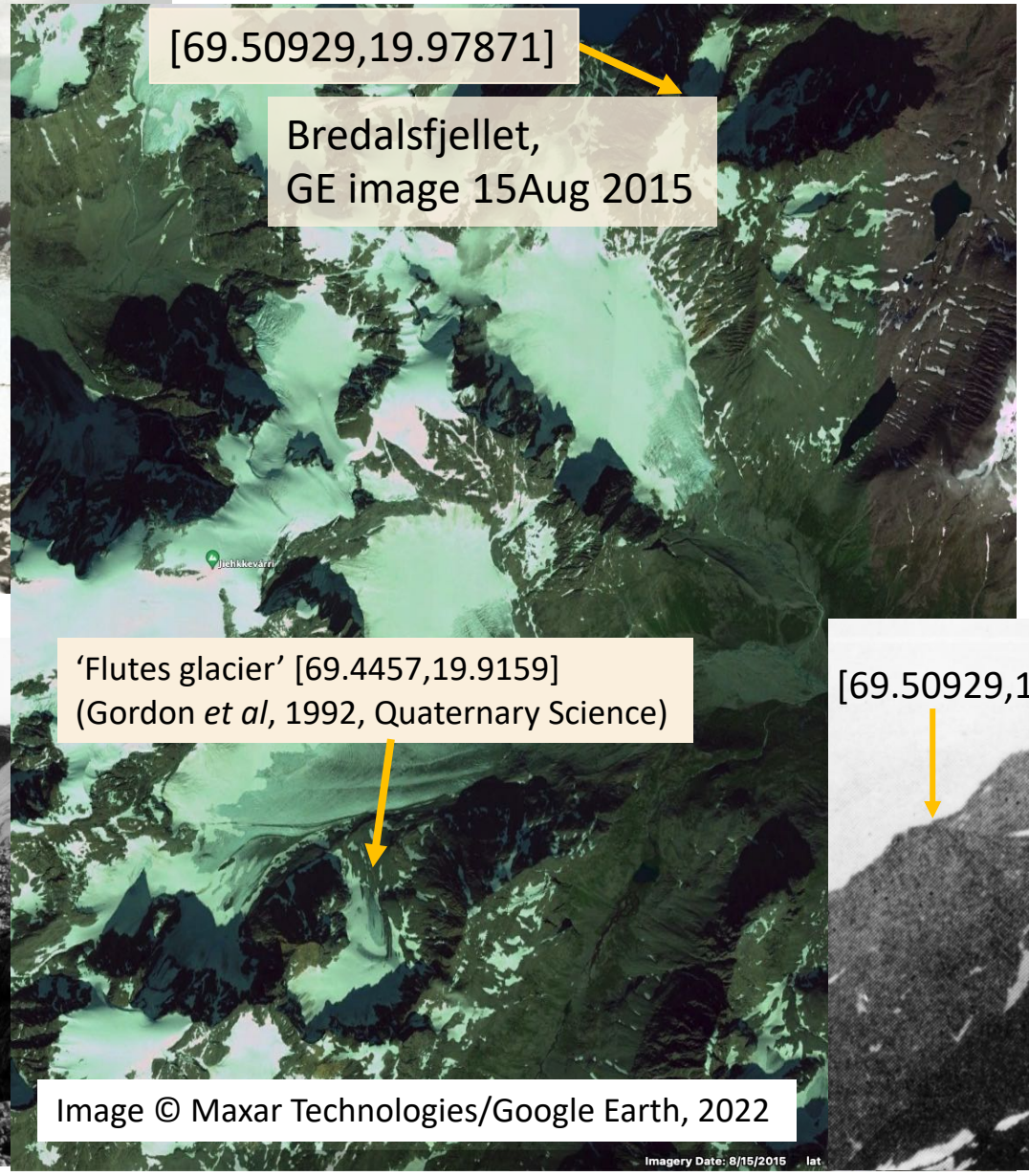
Suggesting using decimal Lat Long as csv: [69.433650,19.865506]
- ve indicates southern hemisphere (Lat) or west of prime meridian (Long)
Transect (bearing) specified by csv: {69.433650,19.865506,010}

Archiving and exploring images using dLL

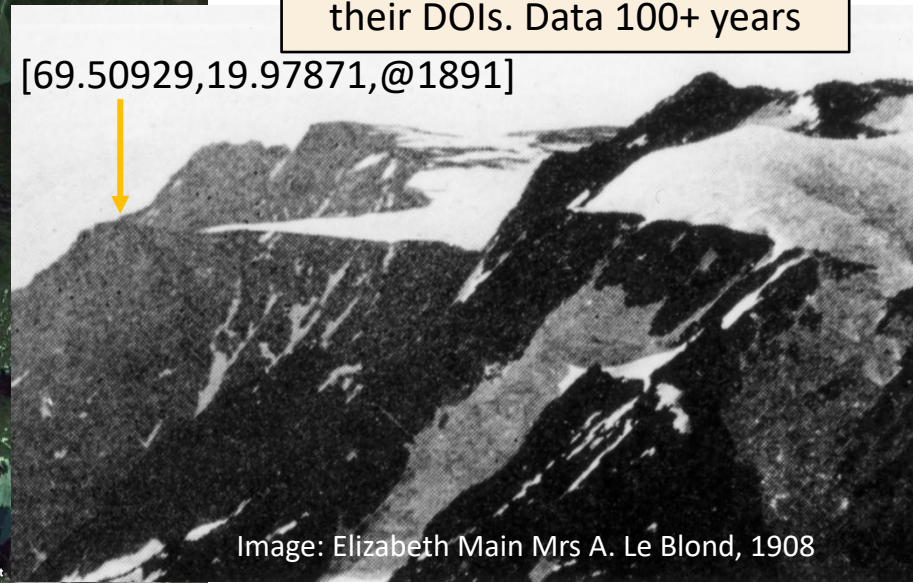
[69.50929,19.97871,@1975]

(Plateaus and glaciers of Lyngen, Norway)





Images relate to papers and maps, glacier inventories etc of this area, preferably by their DOIs. Data 100+ years



dLL in Critical Zone Studies

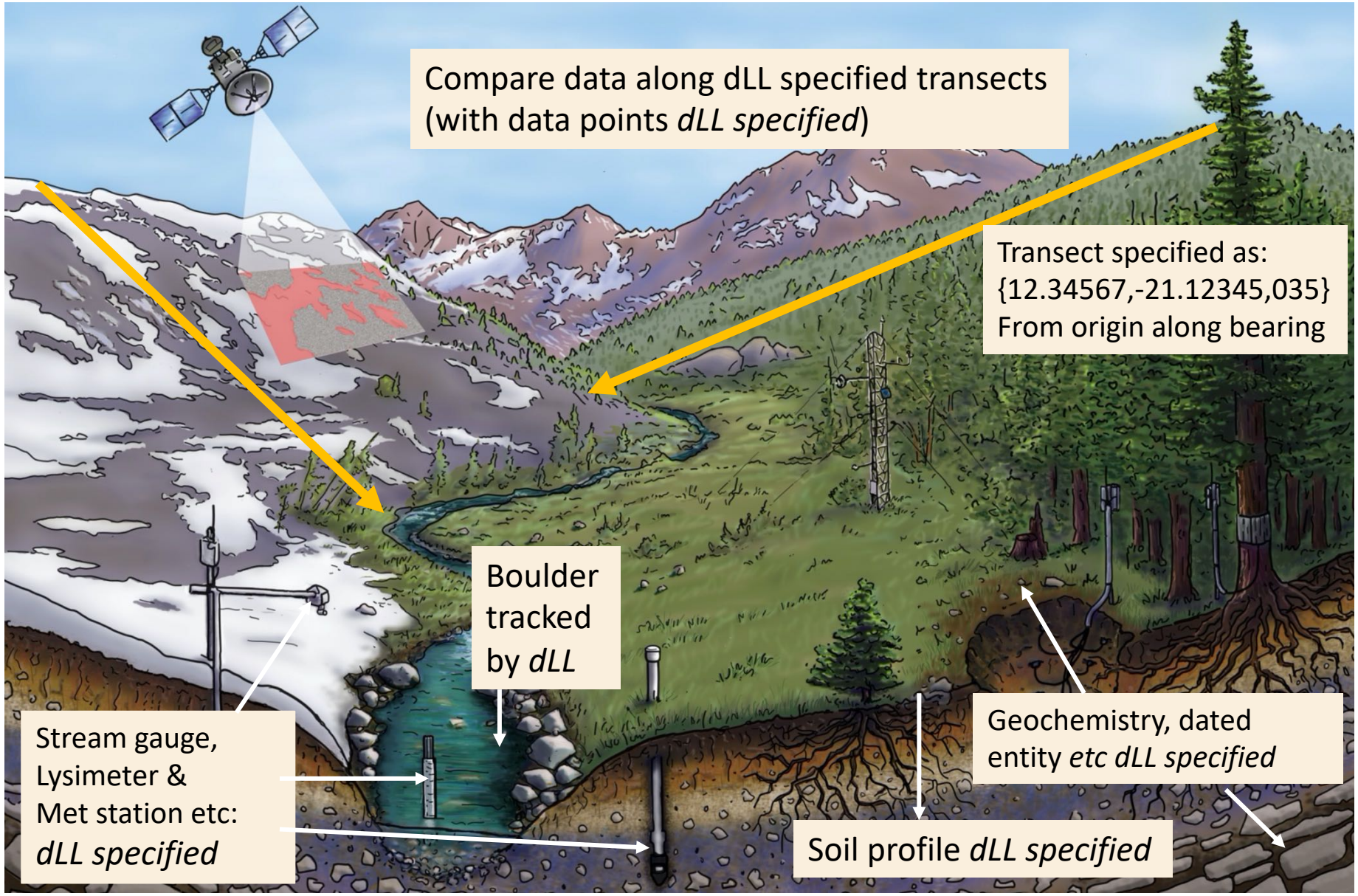


Image: © Jenny Parks & Roger Bales, University of California Merced

Critical Zone studies can incorporate dLL specified data.

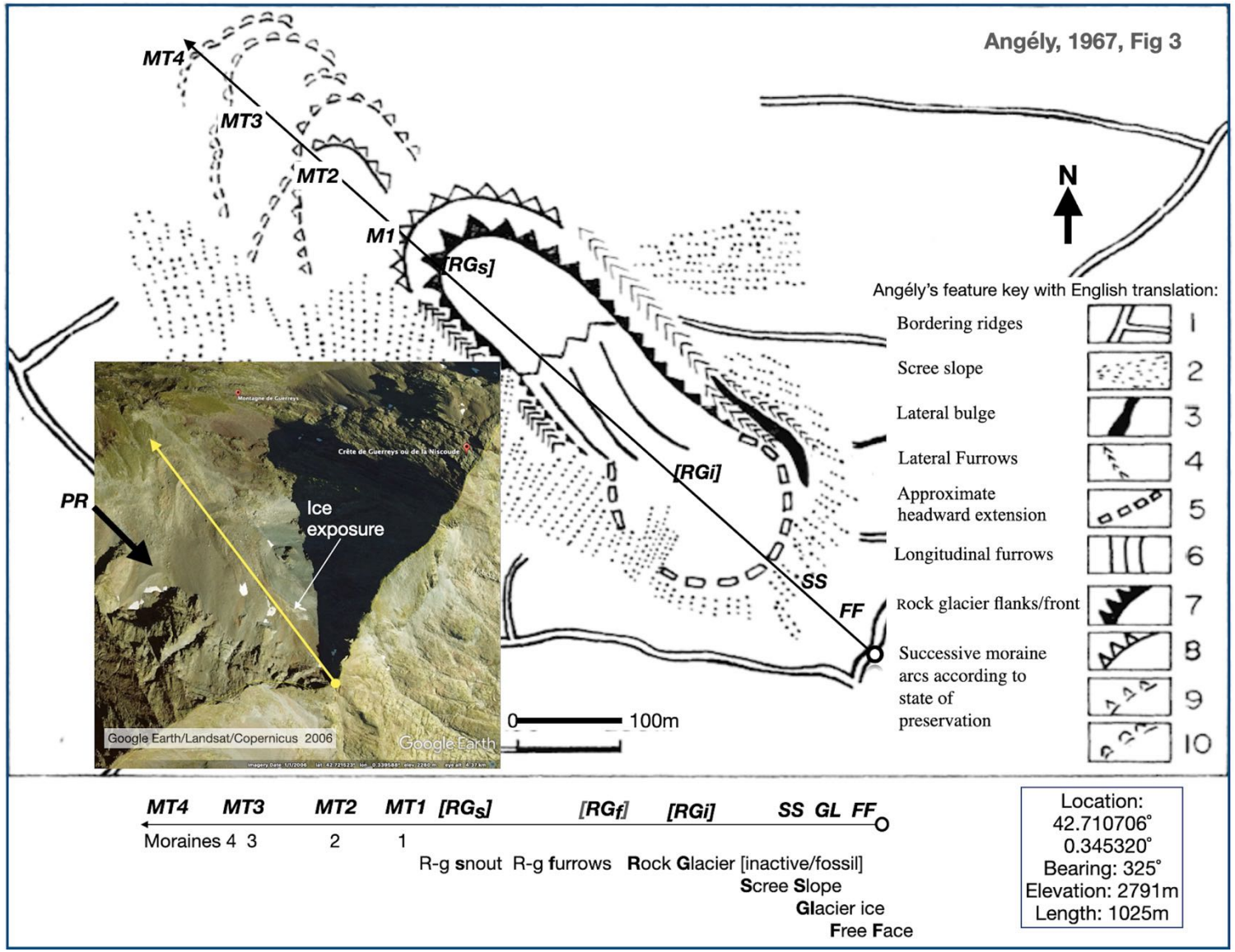
Also in

Environmental management, Hazard and risk appraisal, Policy making etc

Topography on map and/or DEM and representing an aerial or satellite or UAV image linked to sensor data.

A dLL specification becomes part of the metadata of an image, data point etc

Adding to and improving on geomorphological (etc) maps
Transects using dLL, summarize data and relate elsewhere



Whalley, W.B. 2021, GFDQ Fig. 4. DOI 10.4461/ GFDQ.2021.44.4

Using dLL specified in transects in landsystem analysis

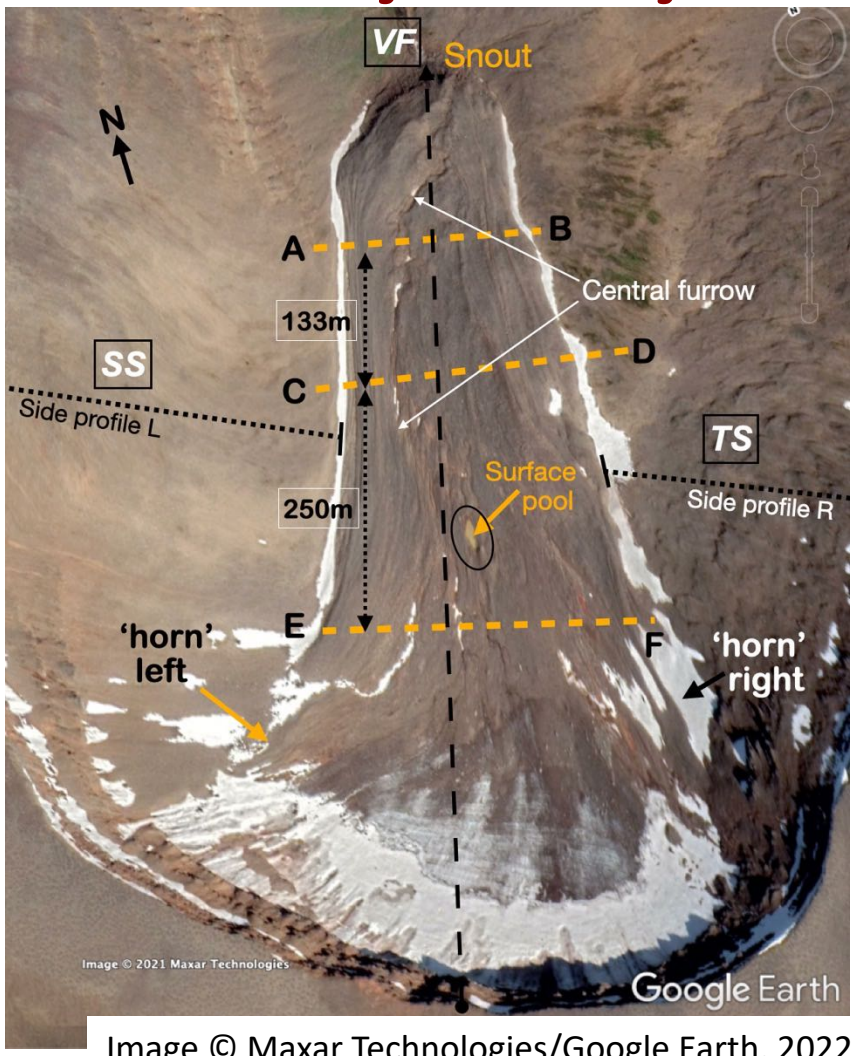


Image © Maxar Technologies/Google Earth, 2022

Whalley, W.B. 2021, Geografiska Annaler, Fig. 4.
https://doi.org/10.1080/04353676.2021.1986304

How can we bring these diverse studies together and benefit from it as a community?

Studies are traditionally, in titles especially, specified by place – locations shown in maps, use dLL embedded in caption so it becomes machine readable.

Geomorphology doesn't really have a uniform classification system – whether by 'location', 'process' or 'landform'

FAIR: findable, accessible, interoperable, reusable

Use metadata to apply DLL to images, tabulated and analytical data and (especially) in inventories.

Connectivity & continuity via Eulerian and Lagrangian co-ordinate systems

Landsystems undergo
Erosion – transport – deposition etc
E ↠ T ↠ D ↠
where the arrows represent 'geomorphic operators' connecting dLL locations to investigate connectivity

Whalley, W.B. 2022, ESP&L. https://DOI: 10.1002/ESP.5418