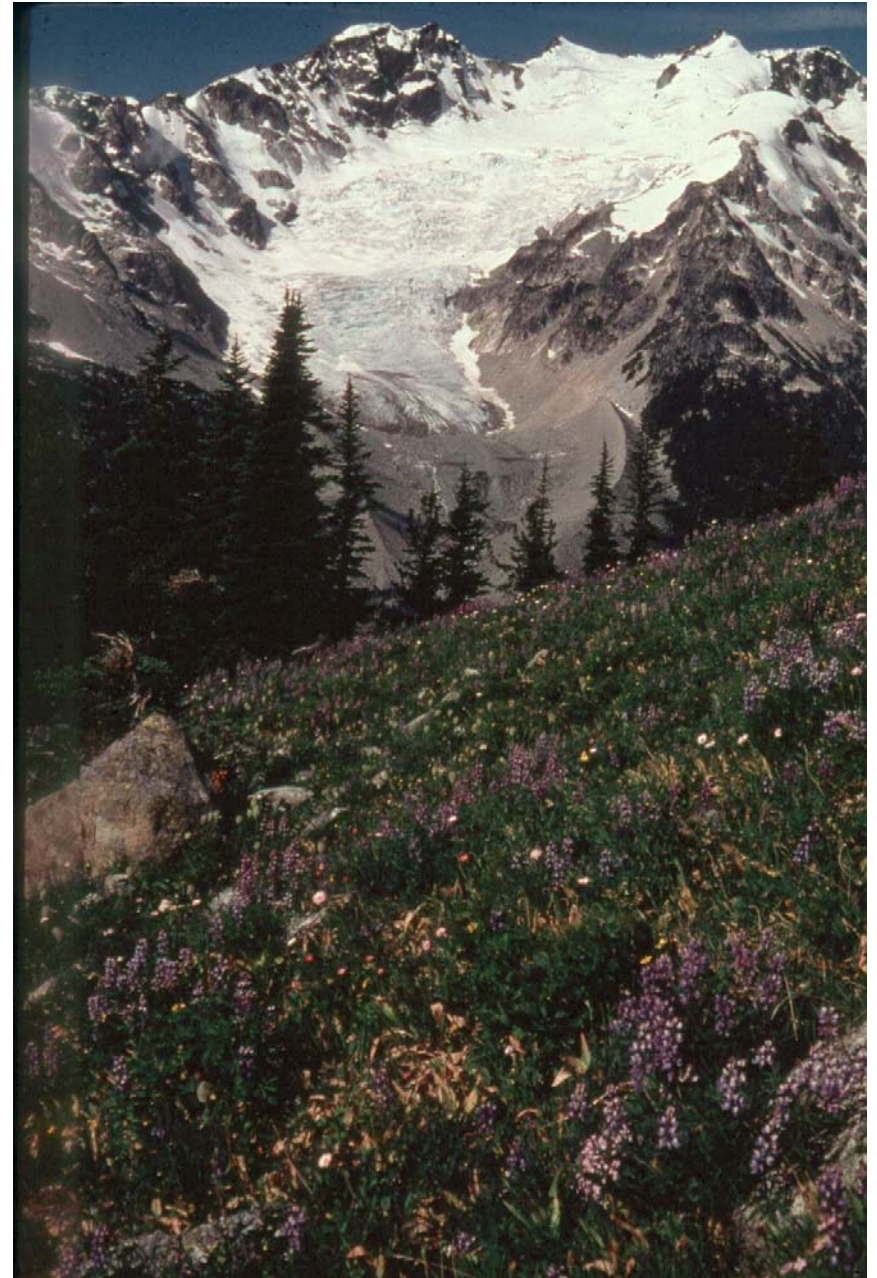


PUB 2011

High Mountains



What is a data-rich region?

- ♣ streamflow
- ♣ weather stations at high and low elevations
- ♣ topography and land cover
- ♣ soil information
- ♣ glacier mass balance

High mountain areas are generally not data-rich, except for research basins

What methods are currently being used for flood estimation in PUB applications

- ♣ rational method
- ♣ regional analysis
- ♣ geomorphic approach
- ♣ remote sensing to monitor development of impounded lakes (e.g., due to landslides)

What methods are currently being used for water resource estimation in PUB applications – example of small hydroelectric projects (1)

♣ New Zealand method

- ♣ estimate mean annual discharge based on maps of P and ET
- ♣ check for consistency with nearby gauged catchments
- ♣ use maps of monthly flow ratios to estimate seasonal distribution
- ♣ issue: does not account for interannual variability

What methods are currently being used for water resource estimation in PUB applications – example of small hydroelectric projects (2)

- ♣ identify “similar” gauged catchment and adjust flows for drainage area, with back-of-envelope adjustments for glacier cover
- ♣ regionalization of flow duration curves (geology, land use, elevation)
- ♣ running a SVAT model with ECMWF output for forcing

Critiques of data-based methods

- ♣ Cannot account for changing climatic conditions
- ♣ Cannot account for land cover changes

Why aren't models being used by practitioners?

- ♣ Cost – client typically unwilling to pay for more than they perceive to be necessary
 - ♣ government should set higher standards for data requirements for project evaluation
 - ♣ need to consider cost of analysis versus risk of failure

Issues in application of process-based models

- ♣ generating forcing data
 - ♣ interpolation from regional station network
 - ♣ adjustment of PRISM fields based on nearby station
 - ♣ downscaling from re-analysis fields (NARR, ECMWF)
- ♣ reliable method for parameter estimation and transfer

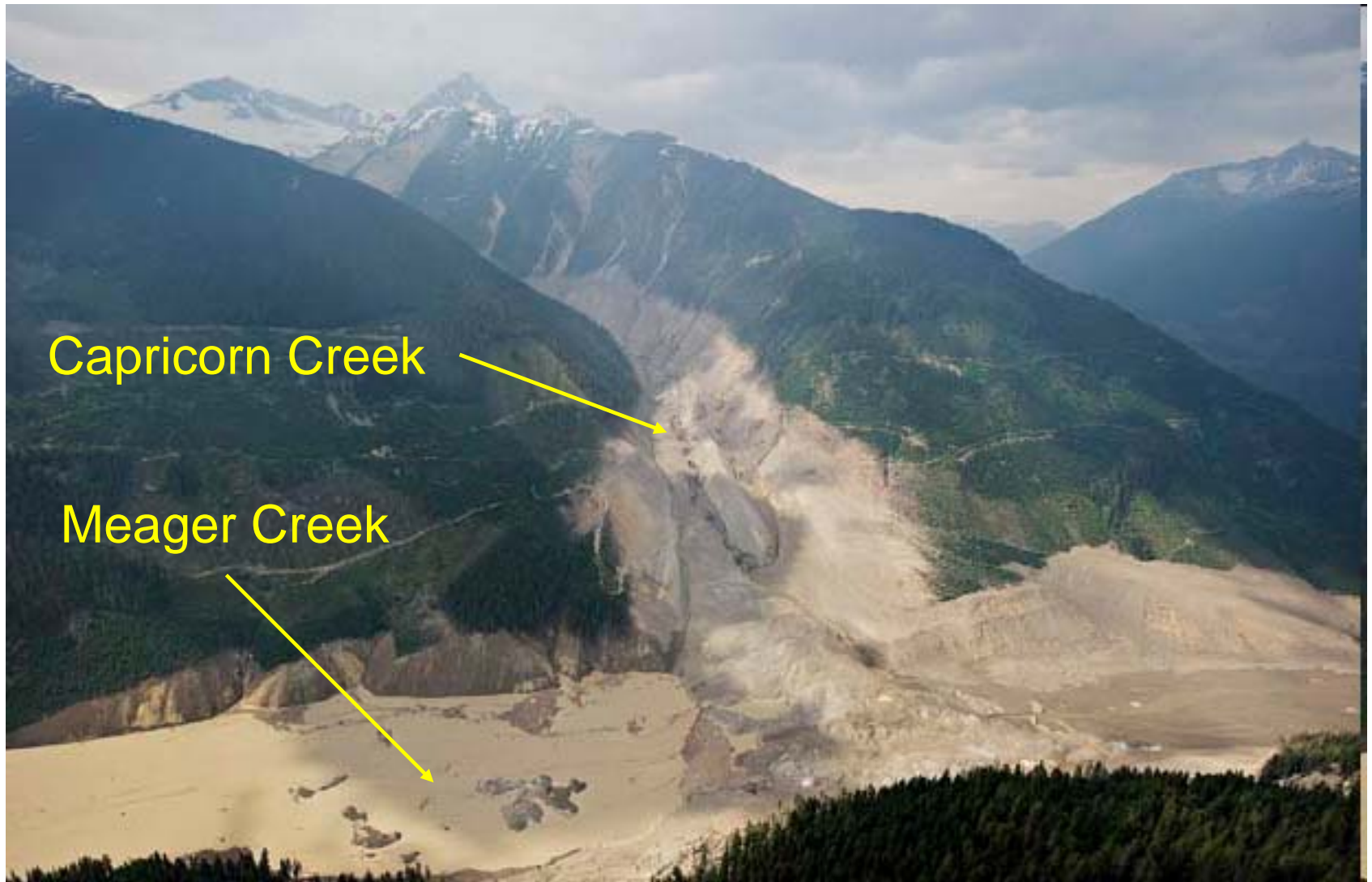
Testing model performance

- ♣ nearby gauged stream
- ♣ remotely sensed snow cover

Not all flood generating mechanisms can be modelled!

Effect of glacier retreat – Capricorn Creek





<http://daveslandslideblog.blogspot.com/2010/08/images-of-meager-creek-landslide-in.html>



Lillooet River

<http://daveslandslideblog.blogspot.com/2010/08/images-of-meager-creek-landslide-in.html>

Lillooet River Streamflow ~ 50 km below landslide

■ Discharge

3:30 am – landslide occurs

