

**PUB 2011**

**High Mountains**

**Data-sparse  
regions**



# Participants

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# How can predictive approaches be improved?

- ♣ Catchment characterization
- ♣ Scale influences
- ♣ Glacier-related processes
- ♣ Phase of precipitation

# Catchment characterization (1)

- ♣ Grouped response unit (GRU) delineation
  - ♣ elevation
  - ♣ aspect (radiation loading)
  - ♣ land cover
  - ♣ underlying geology
  - ♣ landscape dependence
  - ♣ scale influences (e.g. representation of blowing snow or avalanching)
  - ♣ parsimony

## Catchment characterization (2)

- ♣ HRU delineation
  - ♣ storage, connectivity, thresholds
  - ♣ subjective
  - ♣ testable?

# Catchment characterization (3)

- ♣ Classification

  - ♣ Geology!

# Scale considerations

- ♣ How to deal with information at different spatial resolutions: degrade higher resolution?
- ♣ High spatial resolution = pseudo-information?

# Glacier-related processes

- ♣ Glacier dynamics
  - ♣ diurnal
  - ♣ seasonal
  - ♣ multi-year
  - ♣ transient boundary conditions
  - ♣ glacier response time as a similarity metric
- ♣ Debris-covered glaciers and ice-cored moraines
- ♣ Volume-area scaling vs. dynamic modelling



# Phase of precipitation

- ♣ Air temperature not always a reliable or transferable discriminator for rain vs snow
- ♣ Need new observations and analysis of existing data sets

# How to transfer information from data-rich to data-poor situations

- ♣ Catchment characterization
  - ♣ Thermal regime
  - ♣ Seasonality of precipitation
  - ♣ Land cover
  - ♣ Topographic complexity
- ♣ Models can be transferred if they incorporate the correct physics
- ♣ But, highly parameterized physics-based models can be pathologically sensitive to errors in input variables

# How to transfer information from data-rich to data-sparse situations (2)

- ♣ Research basins are important for
  - ♣ developing and testing simplified representations
  - ♣ determining appropriate scales for process representation

# How to transfer information from data-rich to data-poor situations (3)

- ♣ Precipitation is the most critical input yet is the least well characterized, even when gauged
  - ♣ Why not just install a stream gauge – the PUB problem then disappears?
  - ♣ Back-calculate accumulated winter precipitation based on SWE reconstruction

# How to transfer information from data-rich to data-poor situations (4)

- ♣ Need to maintain data-rich infrastructure
- ♣ But short-term data richness can be useful
- ♣ Need to consider why, where and how accurate PUB applications should be: remember the user!