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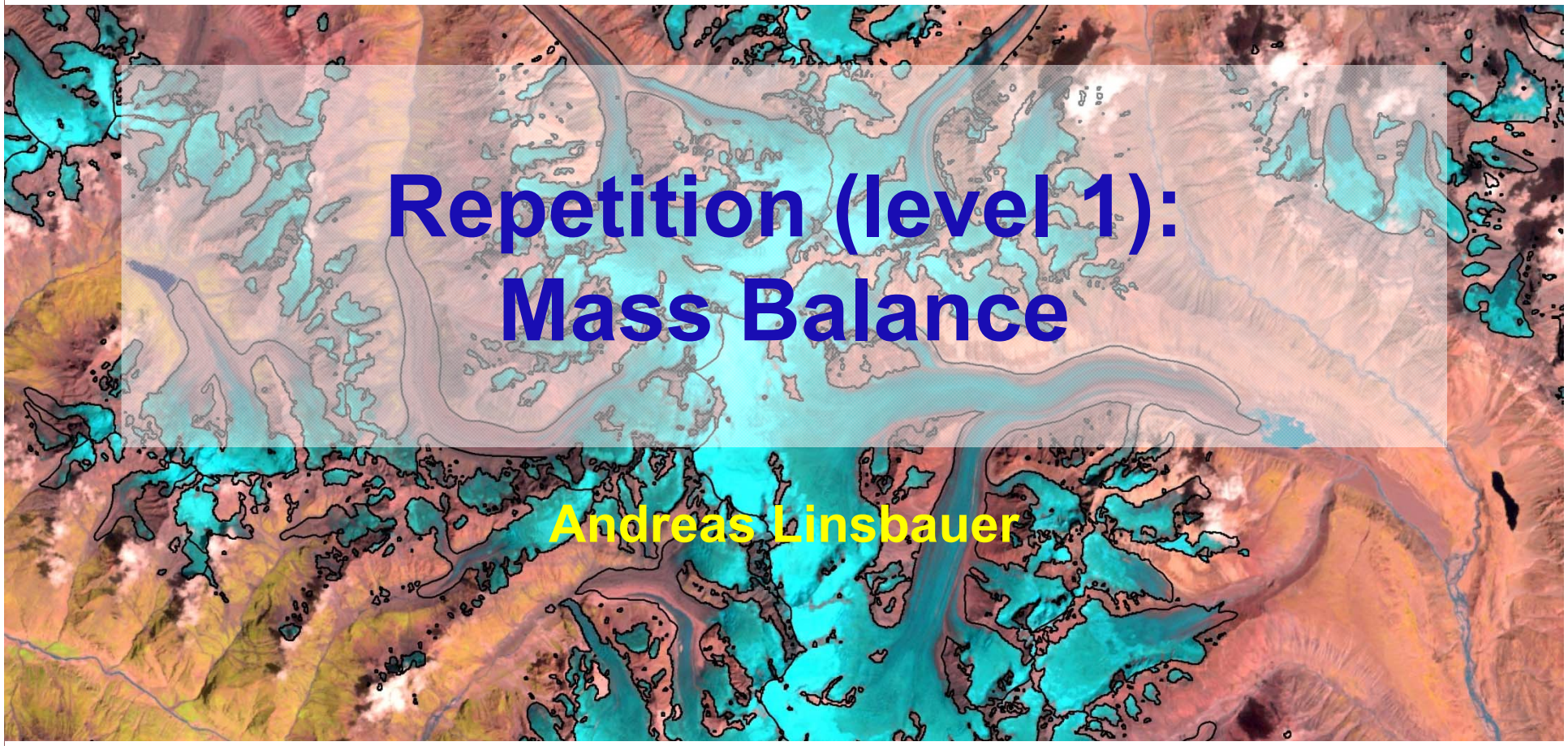
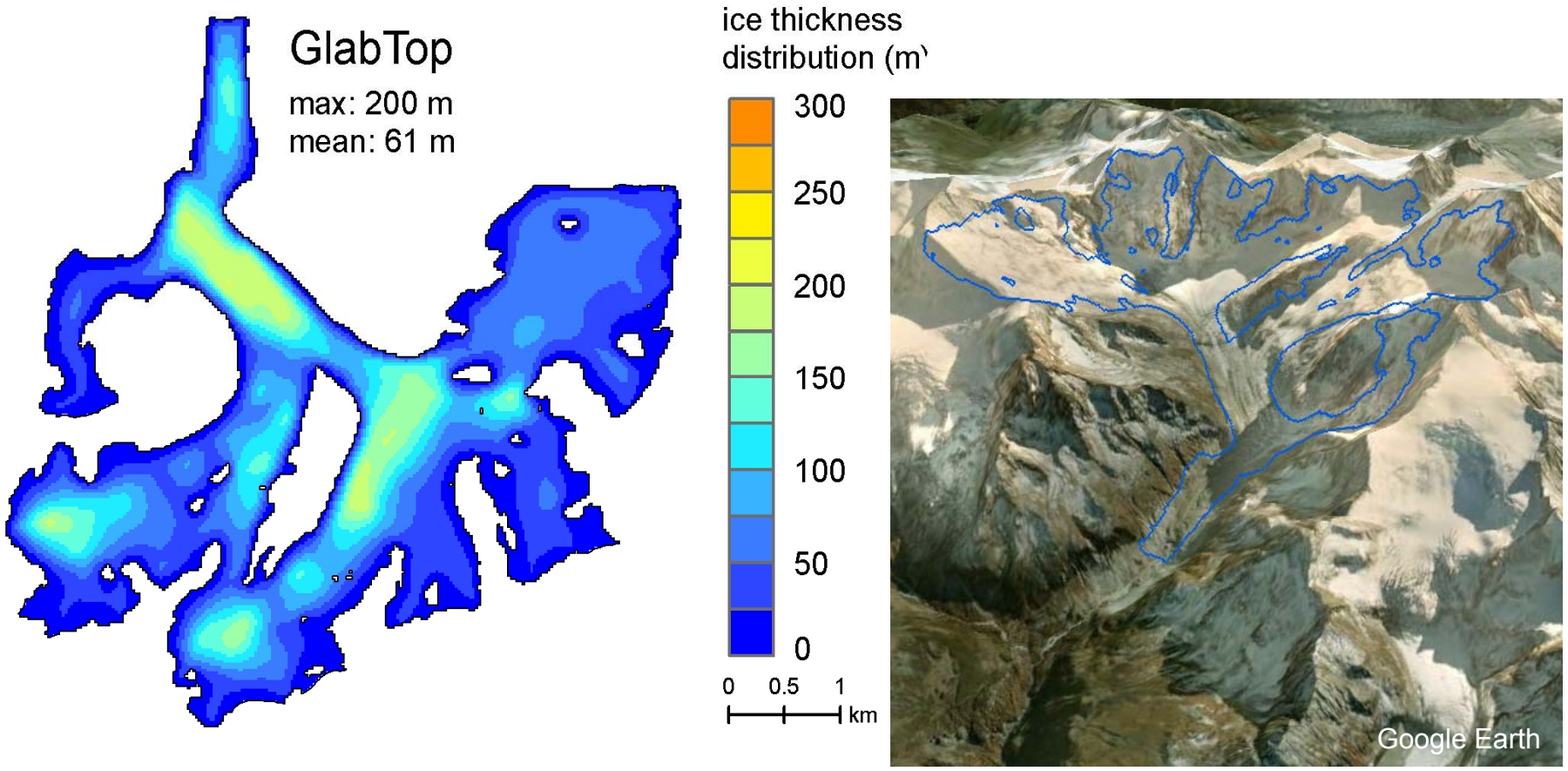


Repetition (level 1): Mass Balance

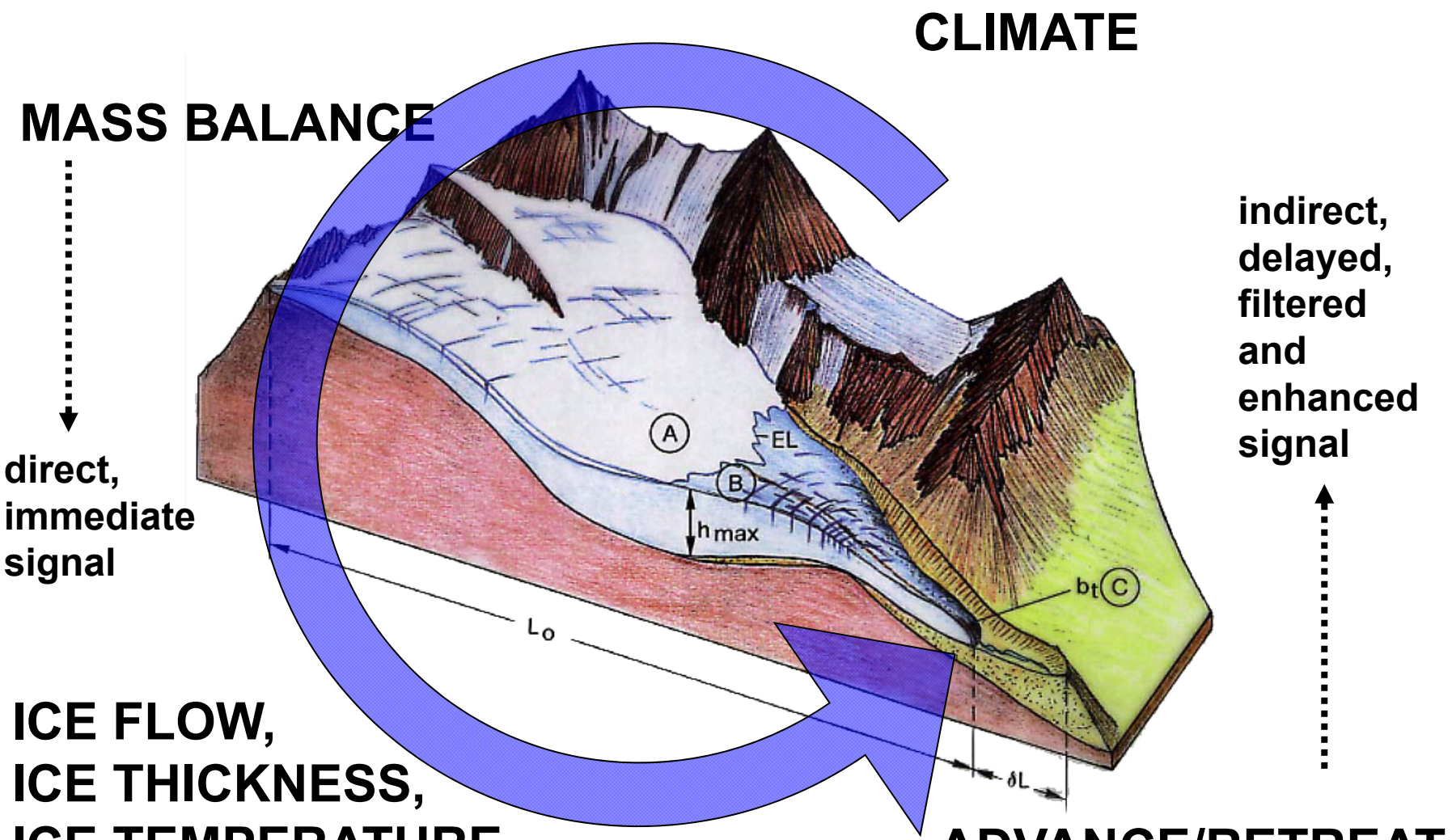
Andreas Linsbauer

IHCAP – Indian Himalayas Climate Change Adaptation Programme
Capacity building programme “Cryosphere” Level-2 (Jan 5 – Feb 13, 2015)

Glacier volume assessment



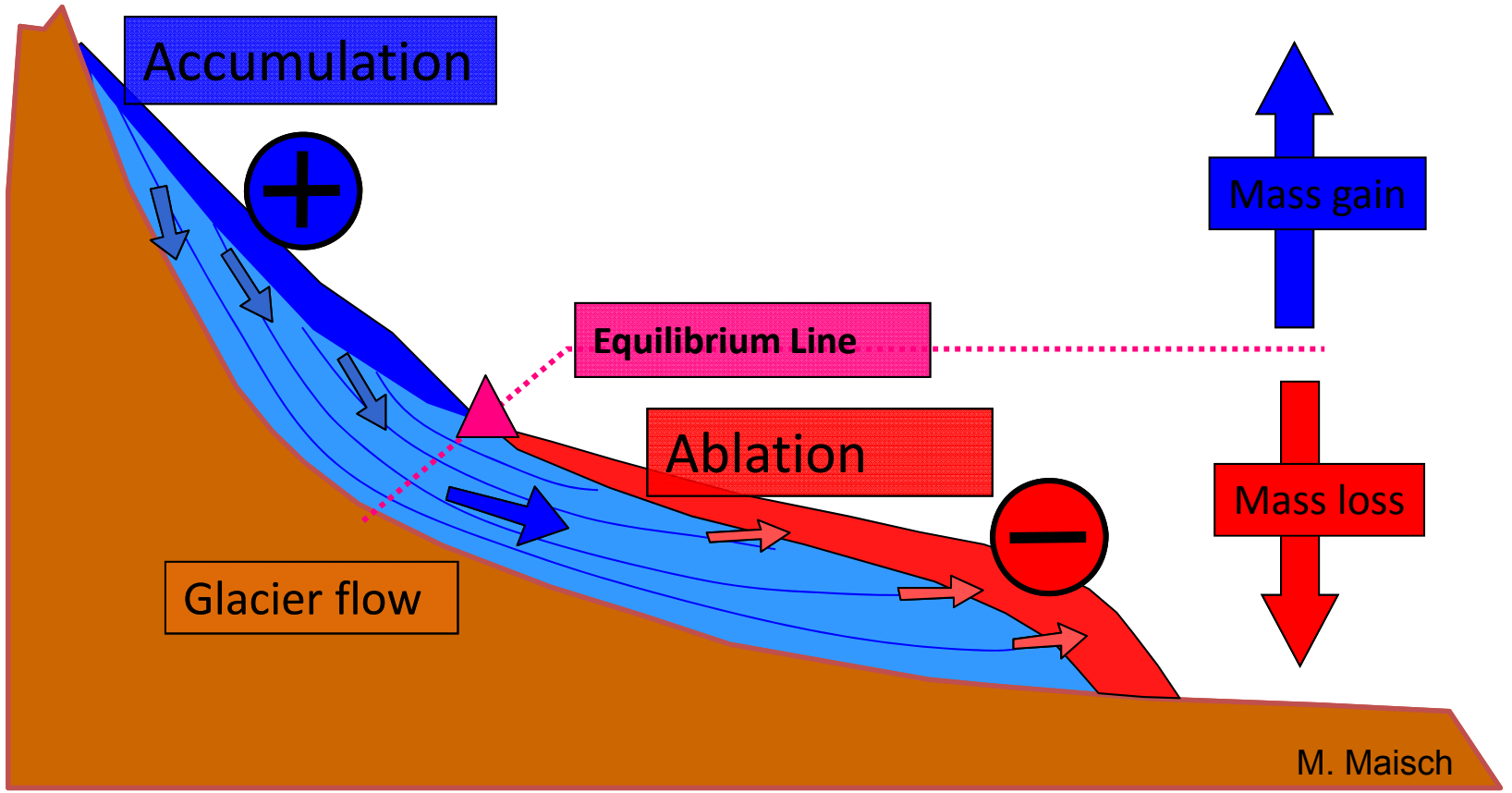
Understanding the process chain



Haeberli, 2014

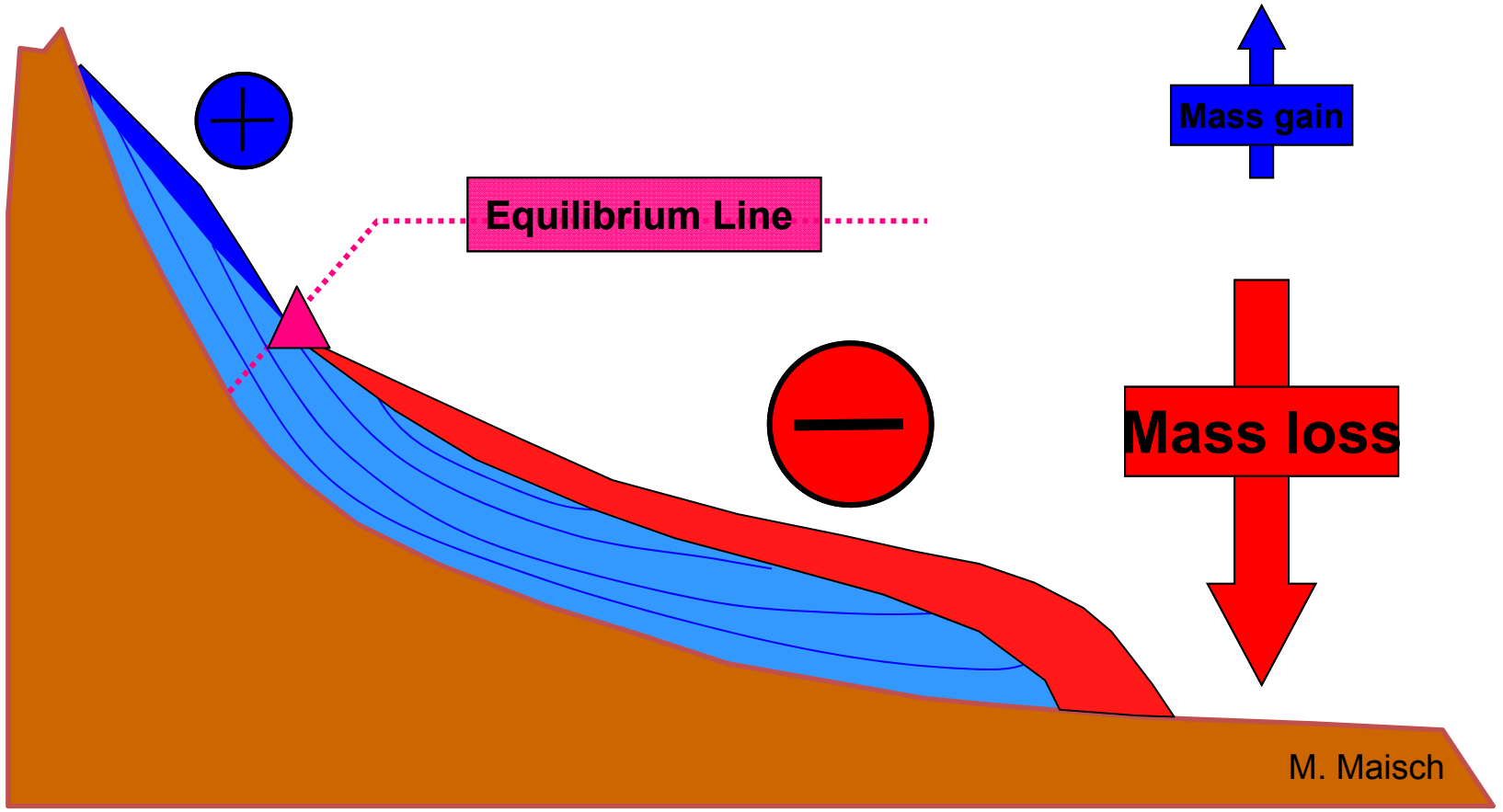
Mass budget of a glacier

Balanced budget year



Mass budget of a glacier

Negative budget year



Negative mass budget

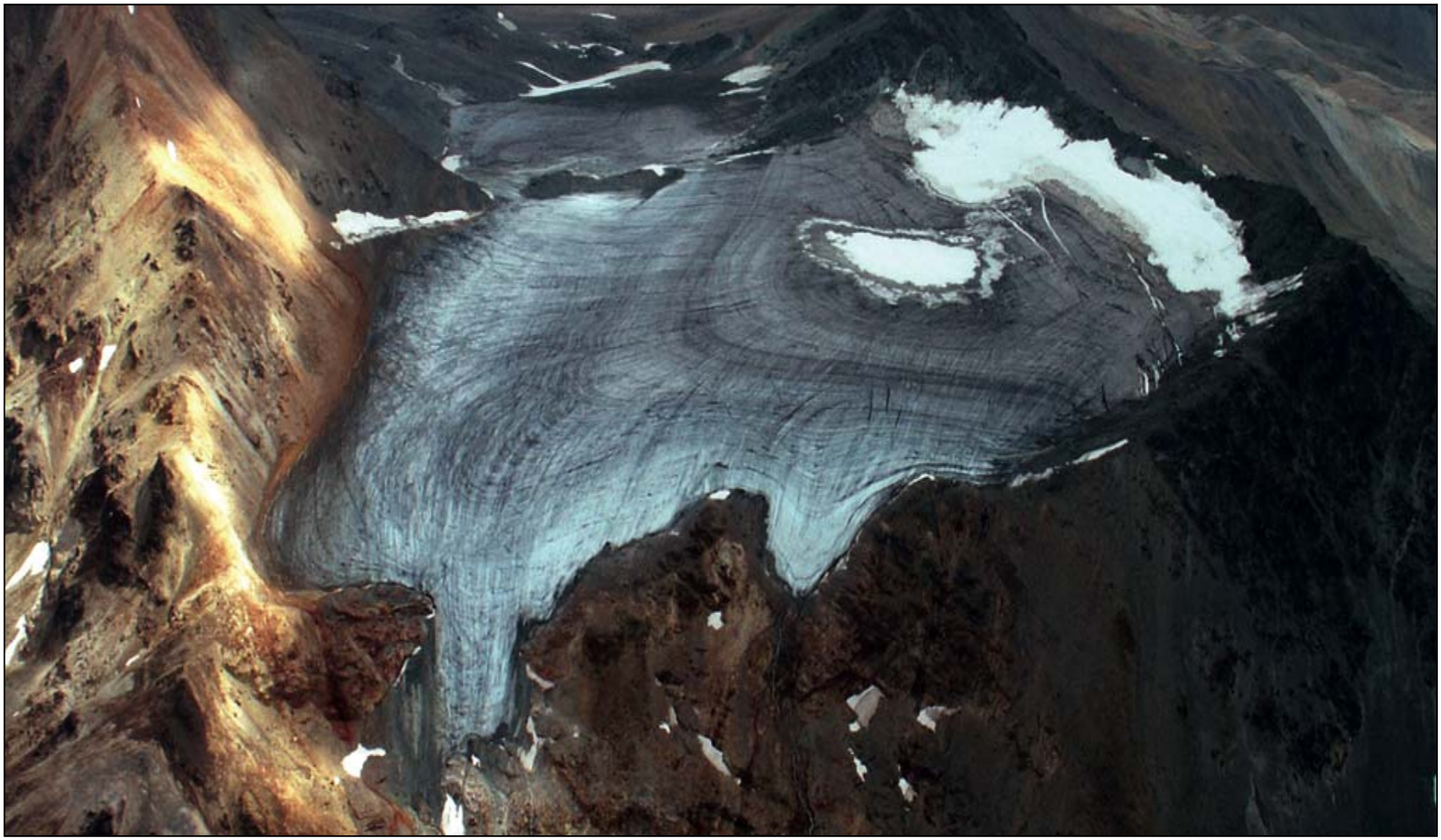
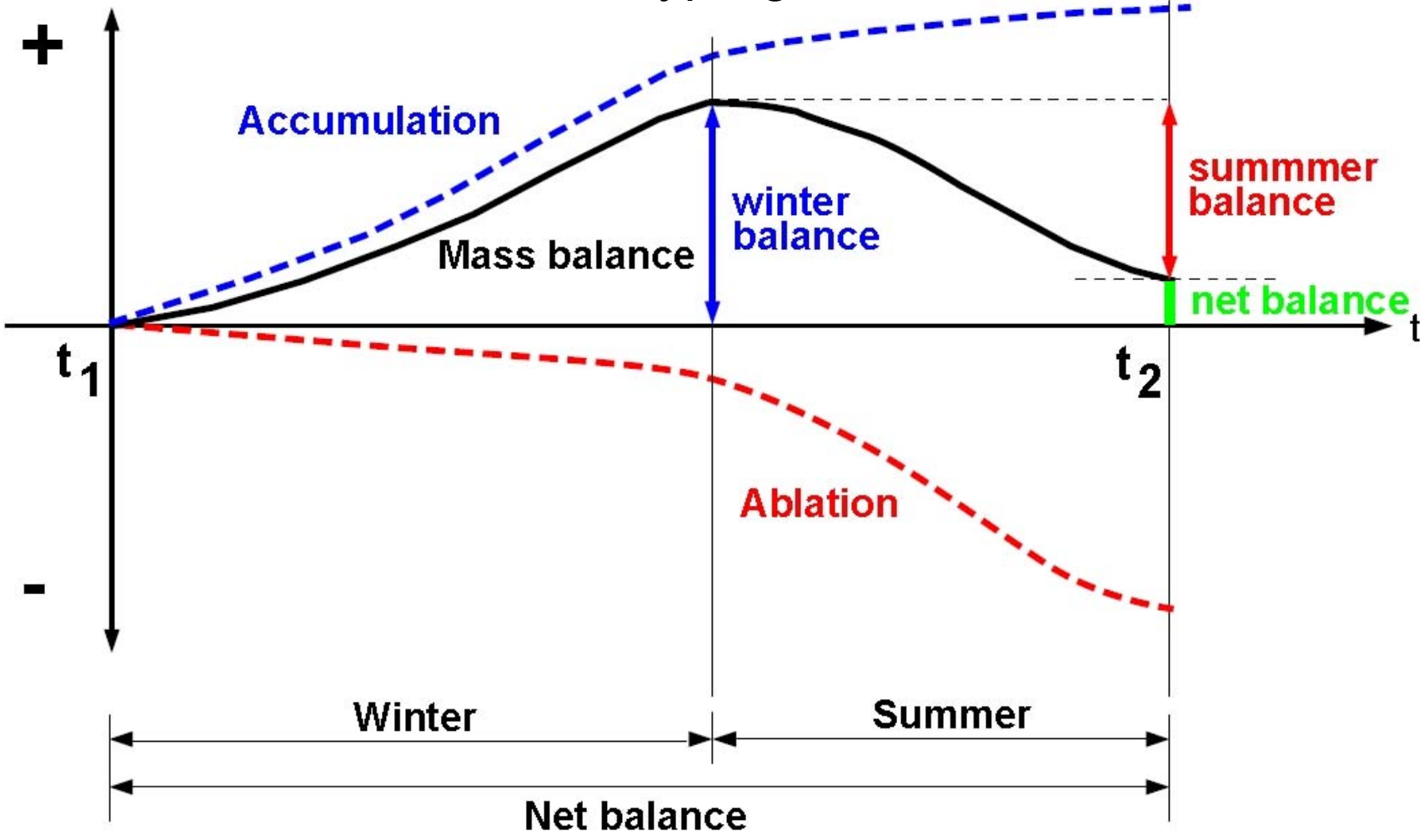


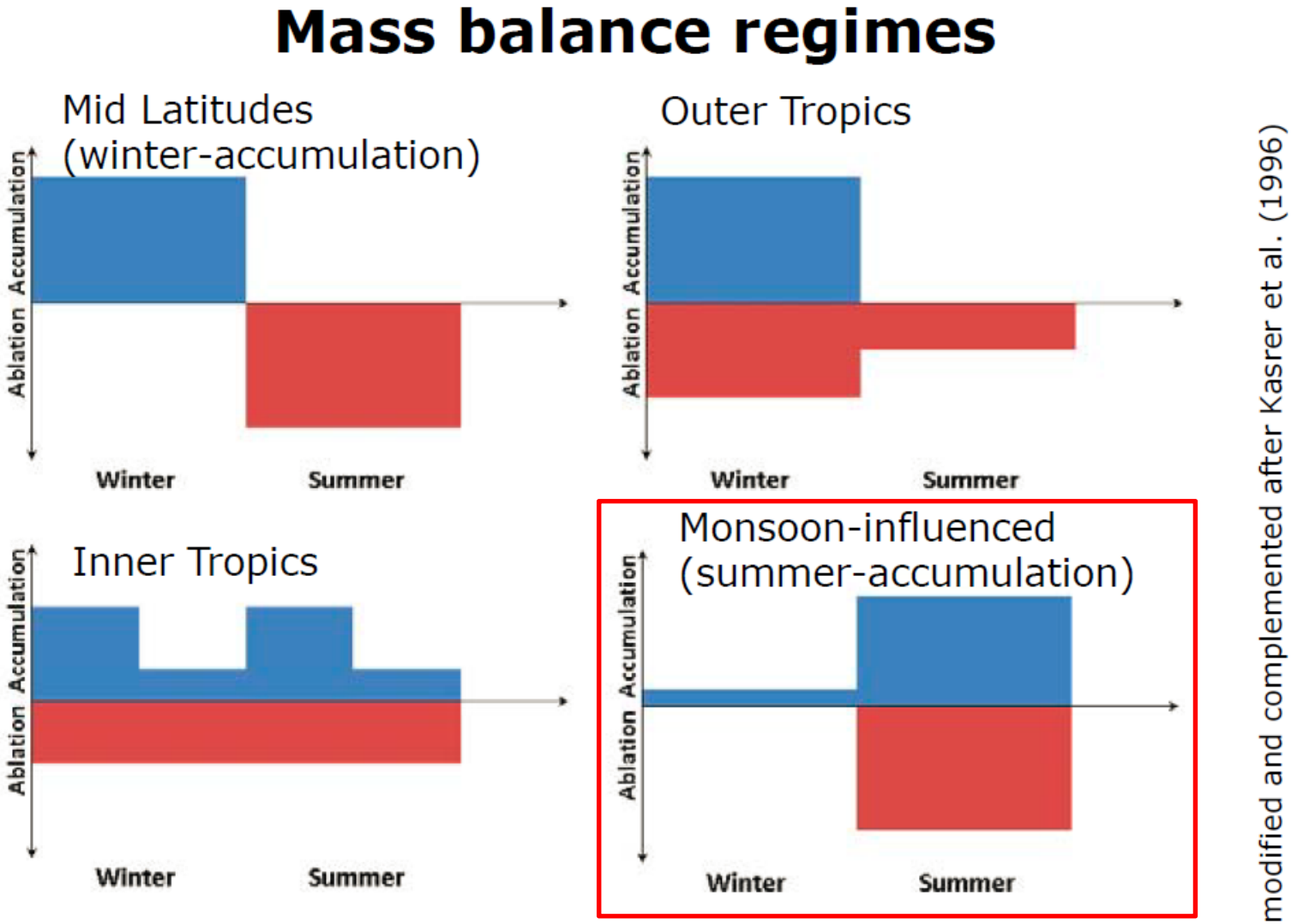
Foto: Rothenbühler 2003

Mass balance year

for a winter-accumulation-type-glacier



Mass balance regimes



Mass turn over

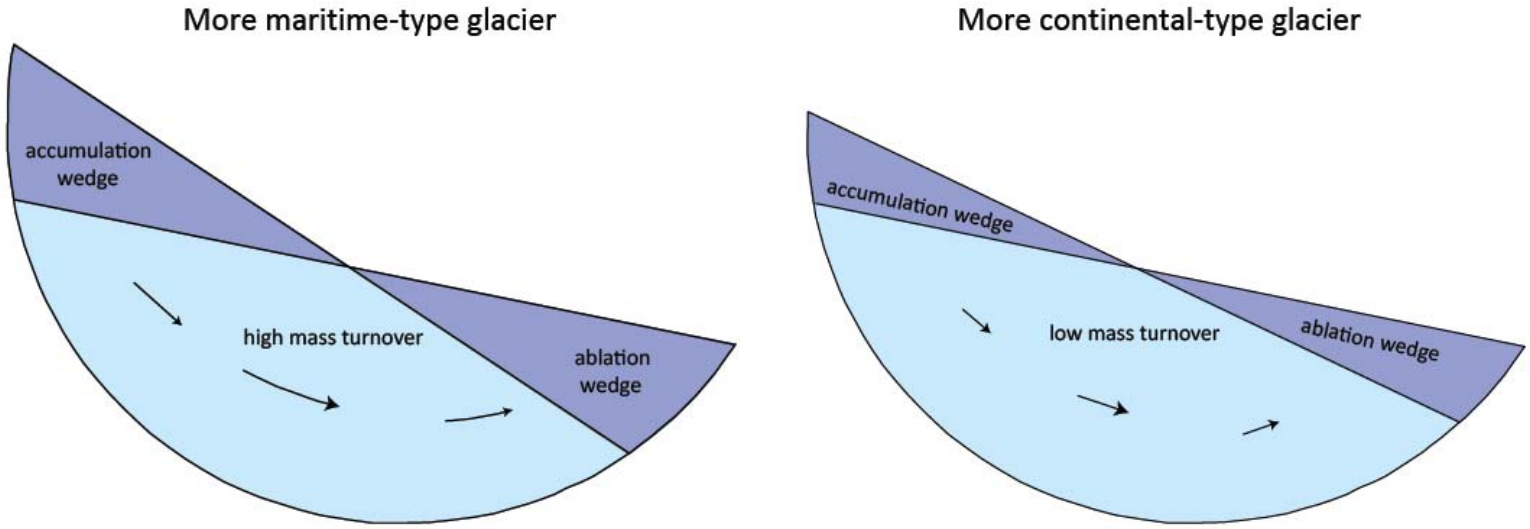
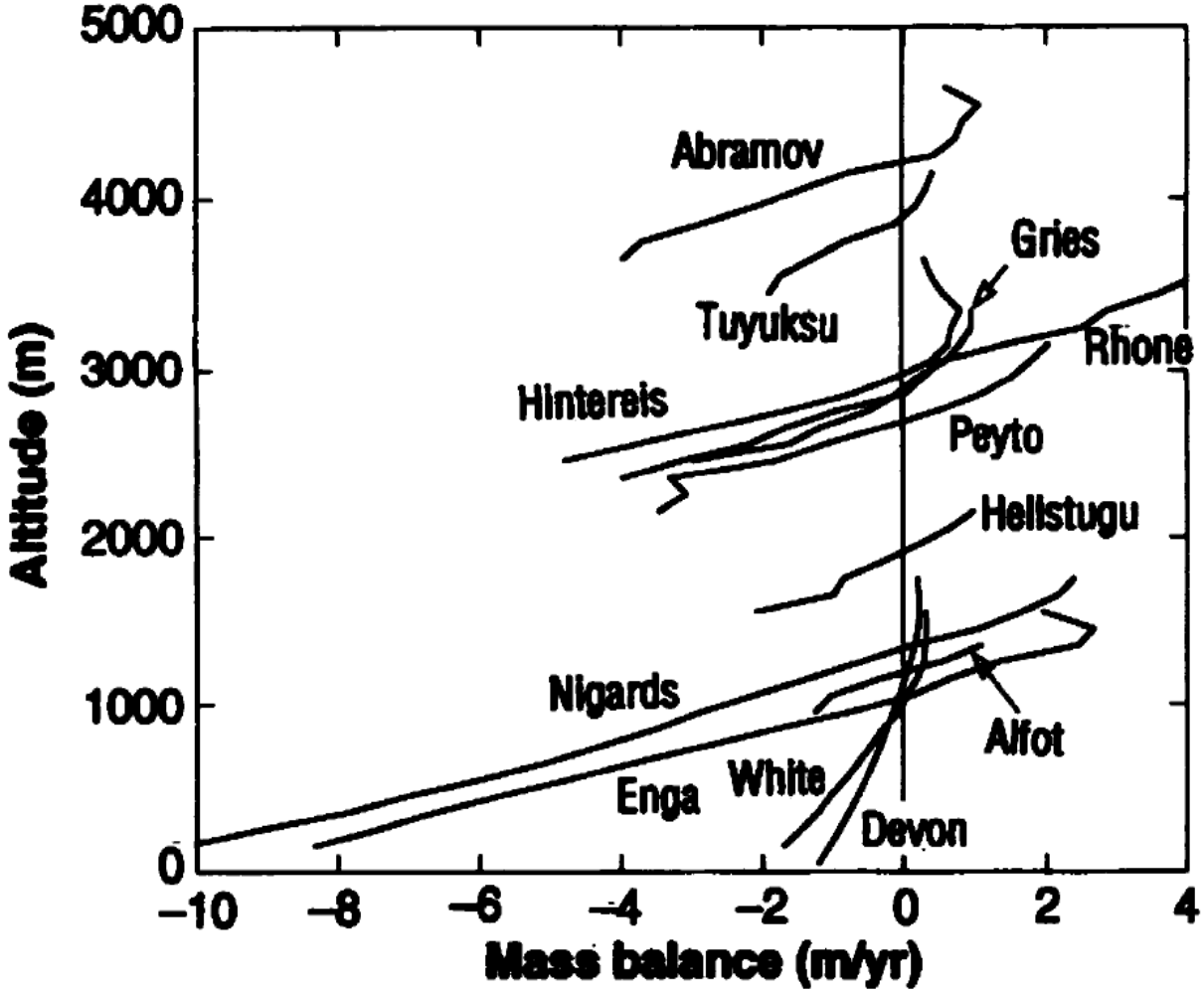


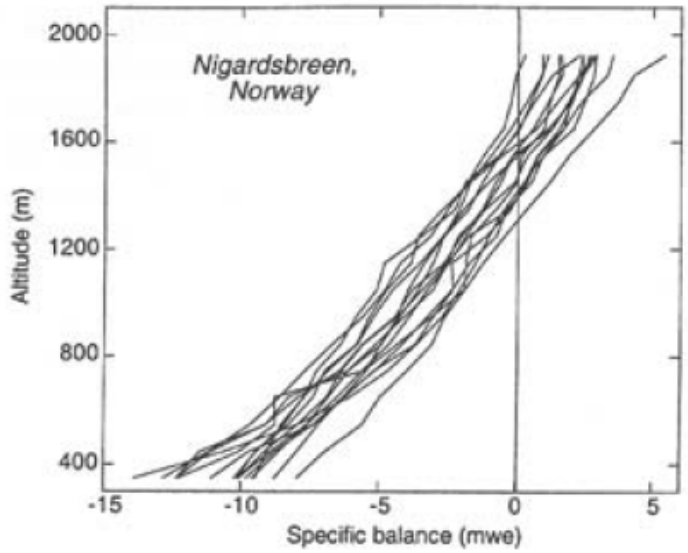
Fig. 2.4: The idea of balance velocity, illustrated using the wedge concept. The more maritime-type glacier has a steeper mass balance gradient than the more continental-type glacier, so it requires higher velocities to balance the mass gained and lost in the two wedges. After Benn and Evans (2010), modified from Sugden and John (1976).

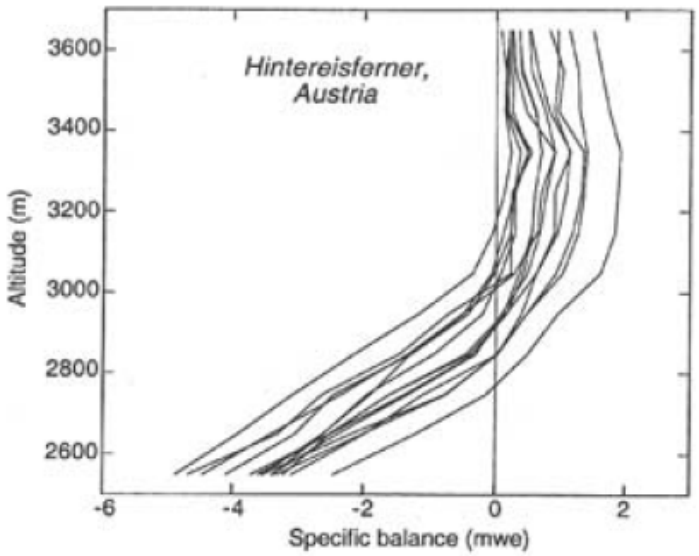
maritime	climatic regime	continental
> 1 m/100m	mb gradient	< 0.3 m/100m
low	solar radiation	high
< 15 °C	monthly mean temperature difference	> 30 °C

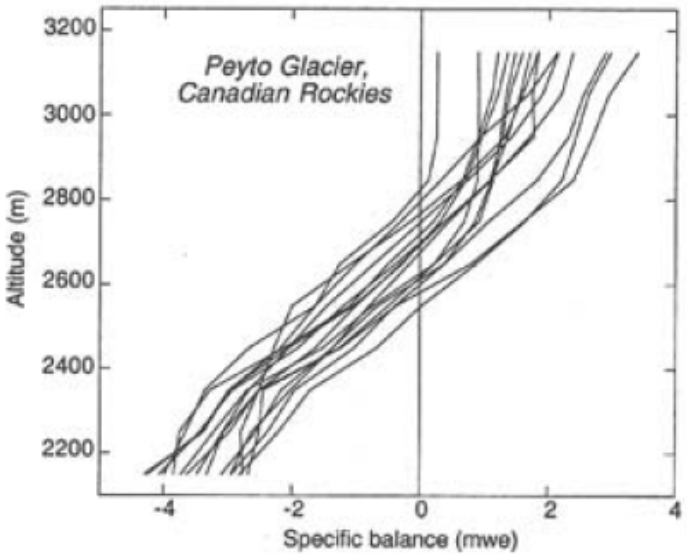
Mass balance gradients

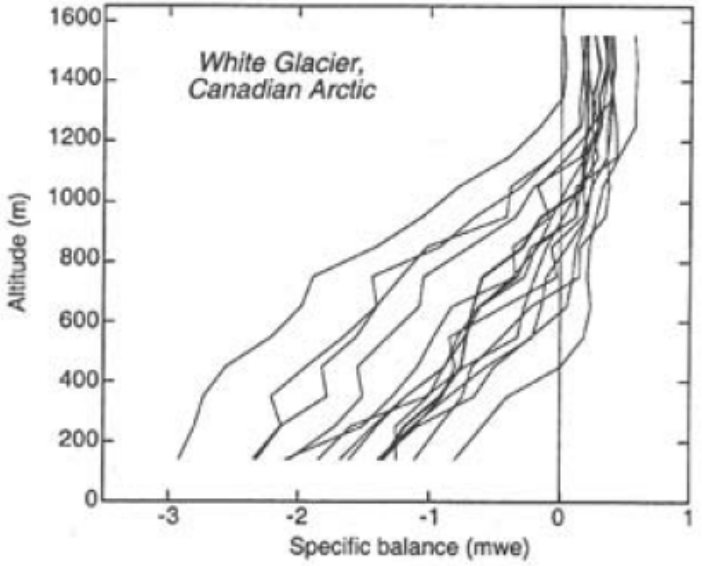


Mass balance profiles

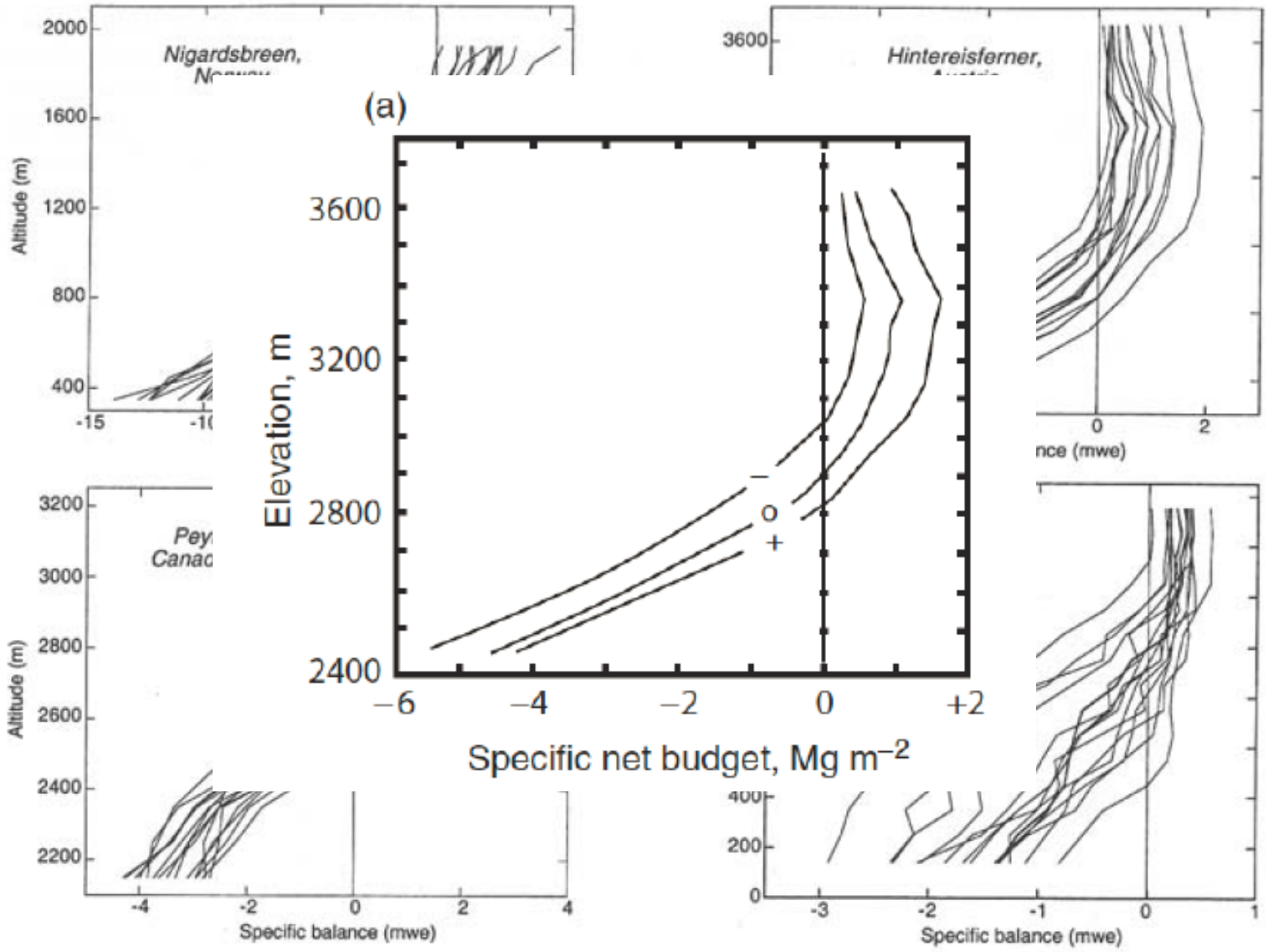








Mass balance profiles



Measuring the mass balance

- Direct glaciological method
- Geodetic method
- Hydrological method
- Index method
- Linear mass balance model