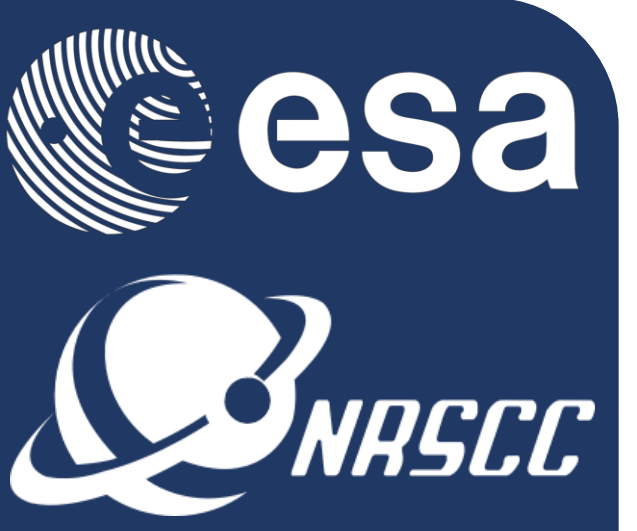




# Land surface modelling in the Himalayas: on the importance of evaporative fluxes for the water balance of a high elevation catchment



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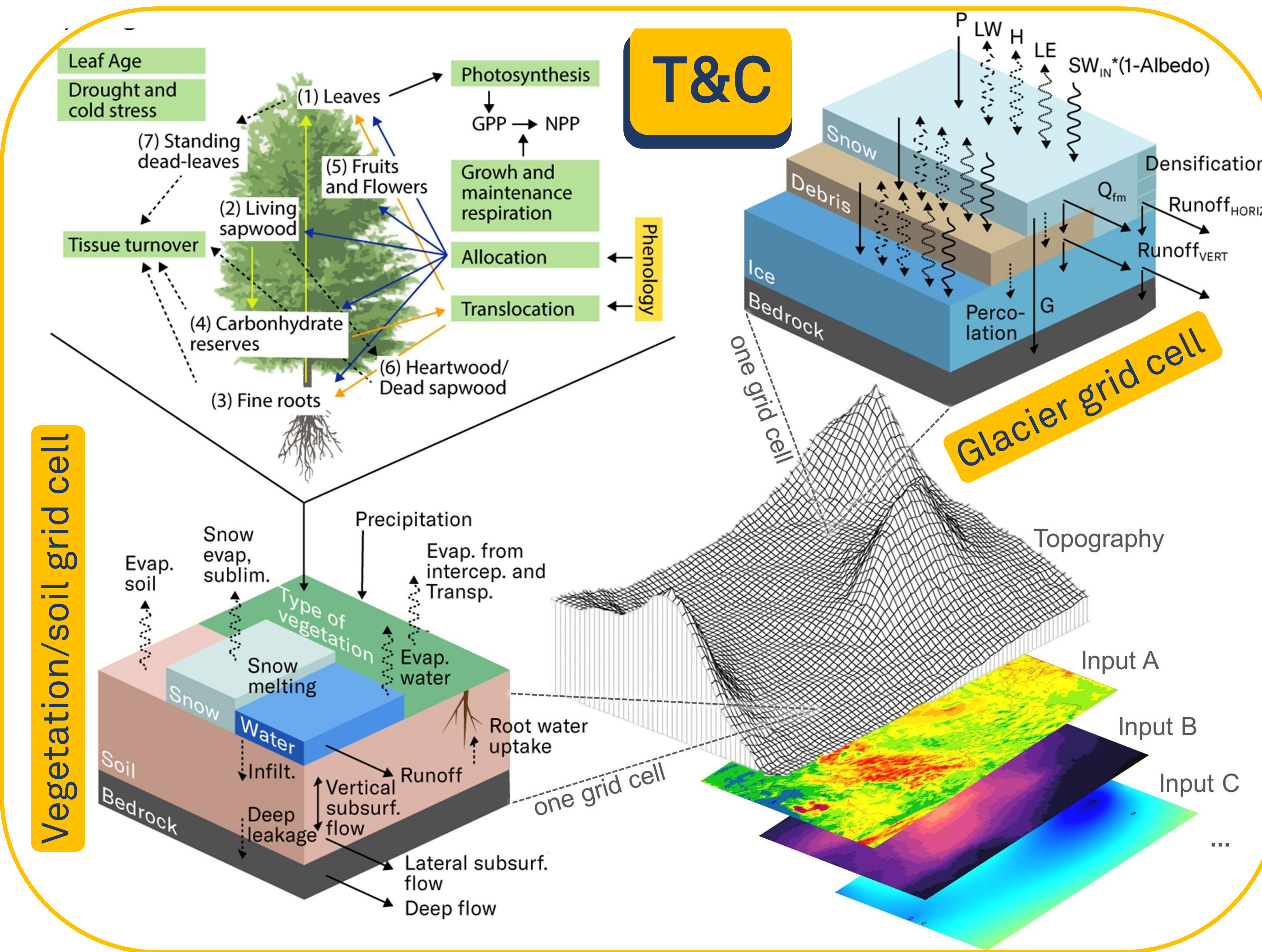
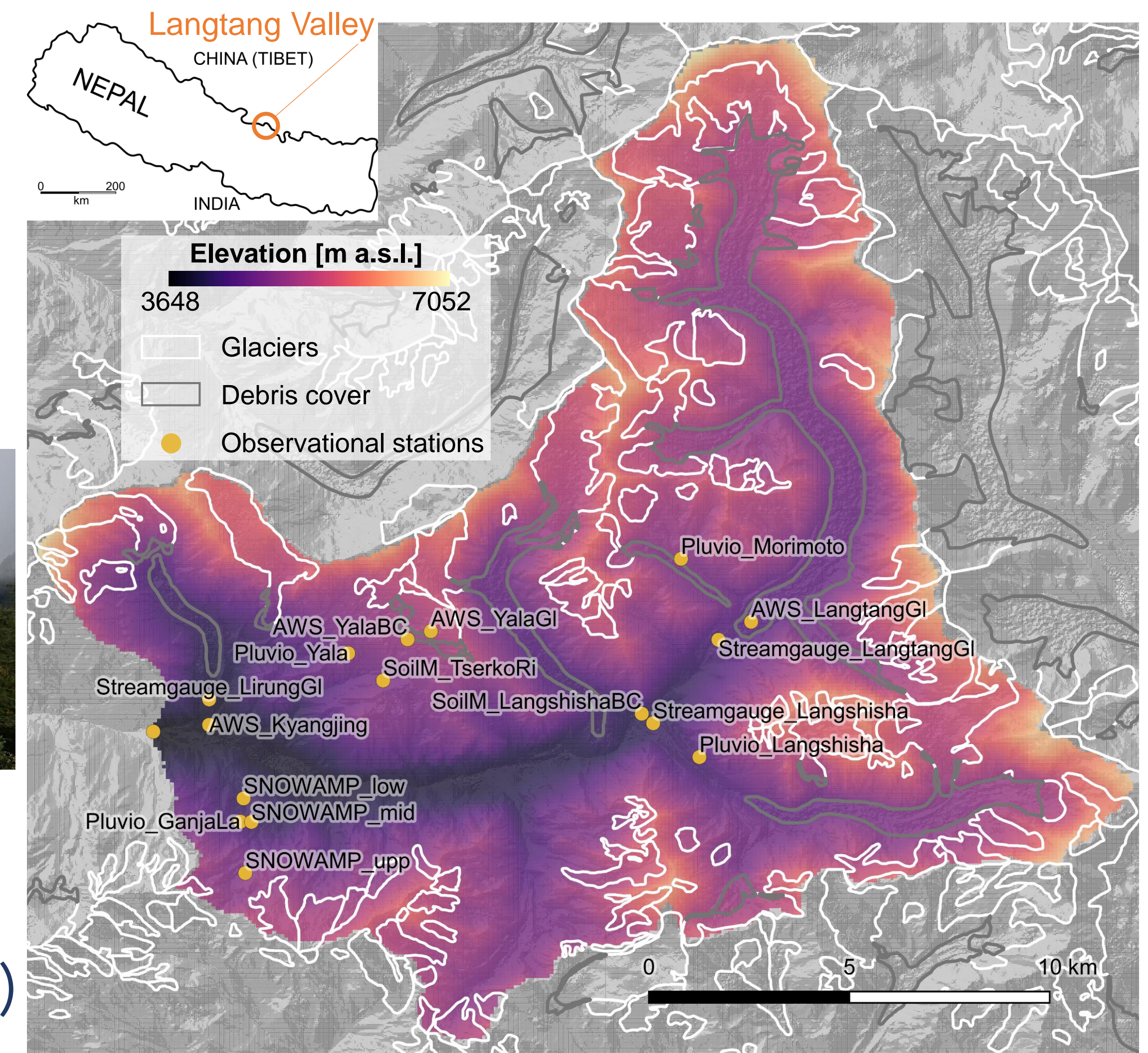
## 1. Introduction

- Unknown:** hydrologic response to environmental changes in complex mountainous, glacierized regions of High Mountain Asia
- Required:** mechanistic modeling approaches that simulate cryospheric, hydrological and vegetation processes in high spatial, temporal and physical detail

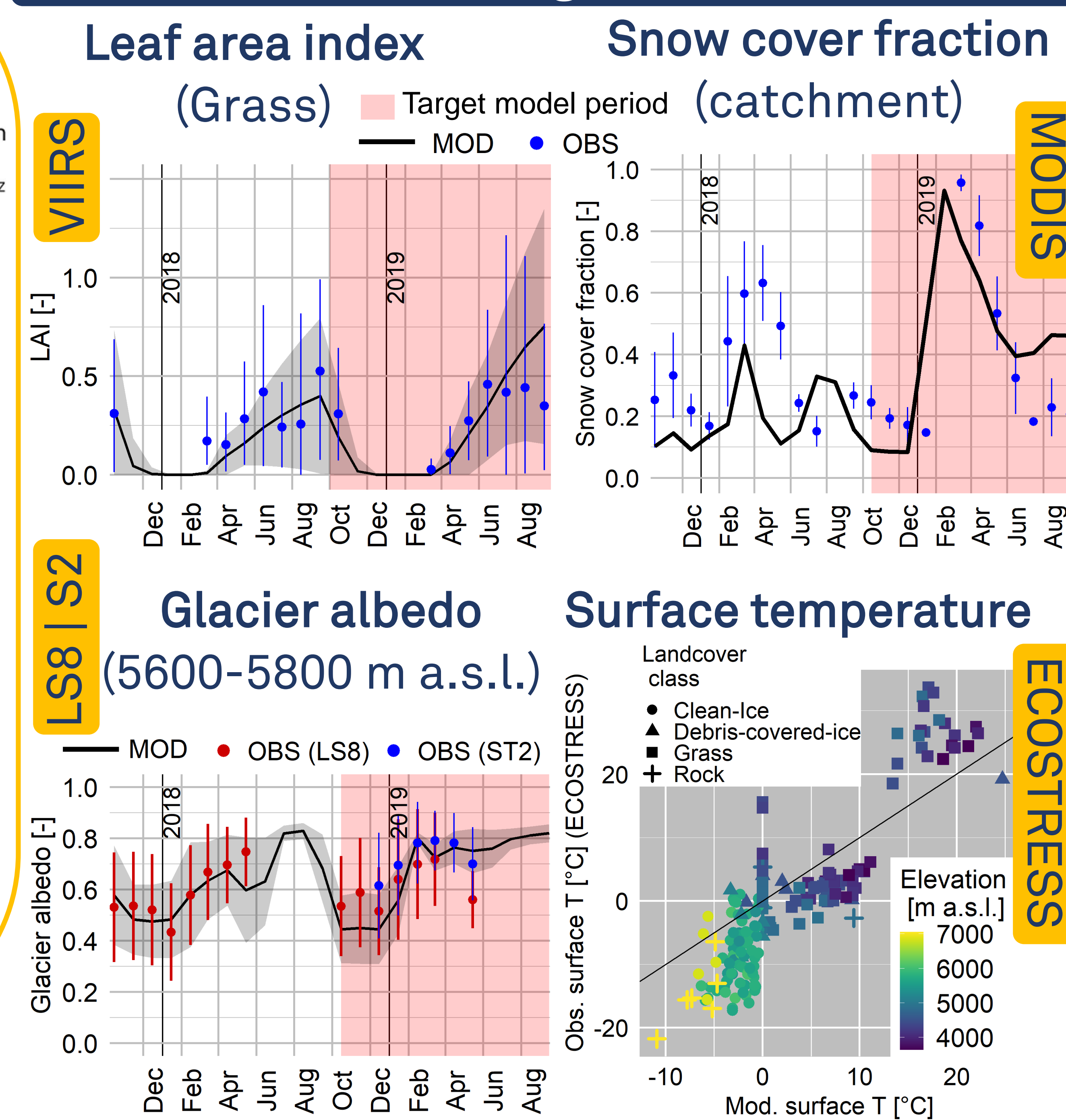


## 2. Model

- Land surface model *Tethys & Chloris* (T&C; Fatichi et al., 2012)
- 100 m spatial resol., hourly timesteps, 1 y. simulation (+2 y. spin-up)
- Physically-based, no calibration

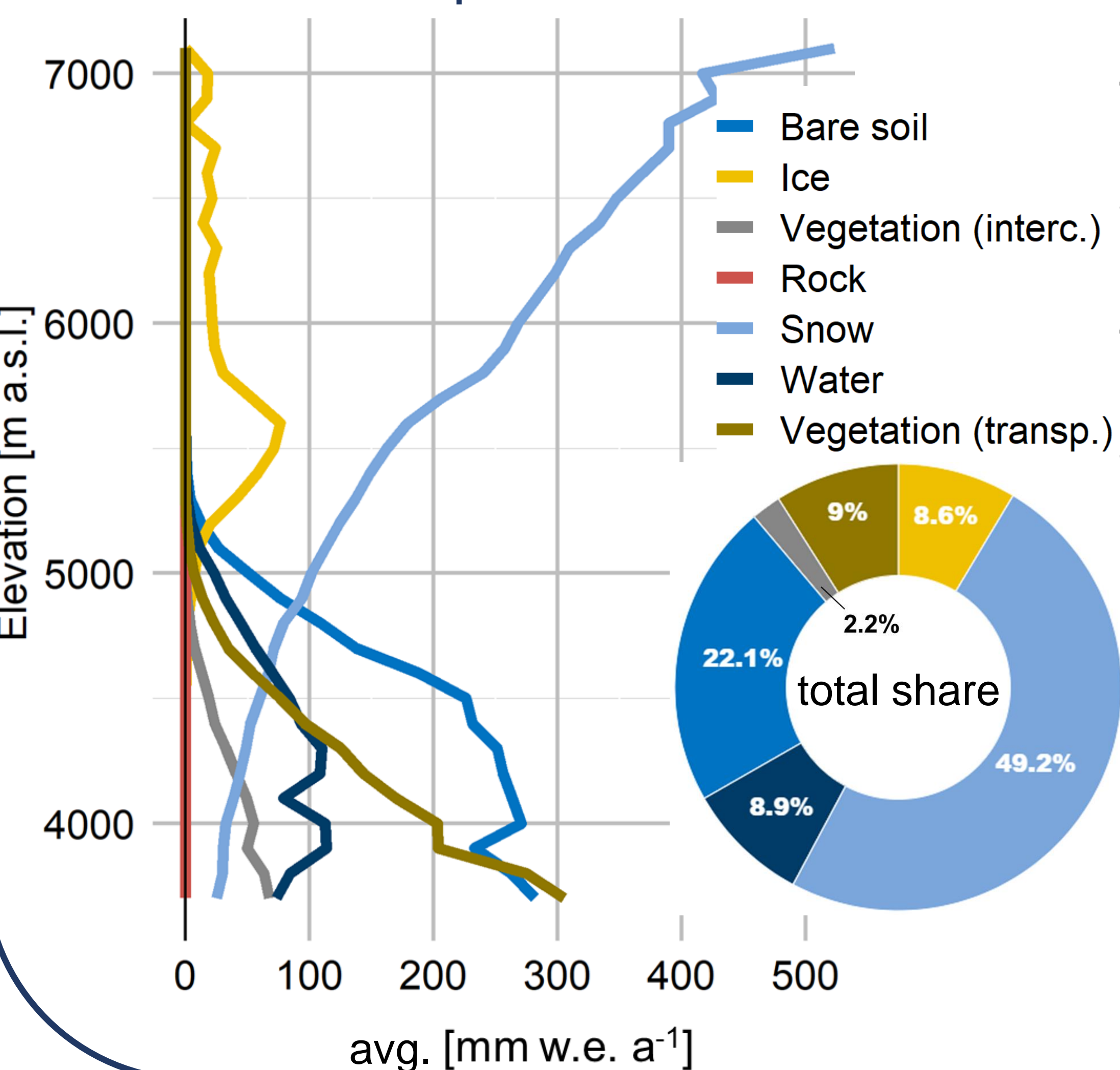


## 3. Model evaluation against RS data

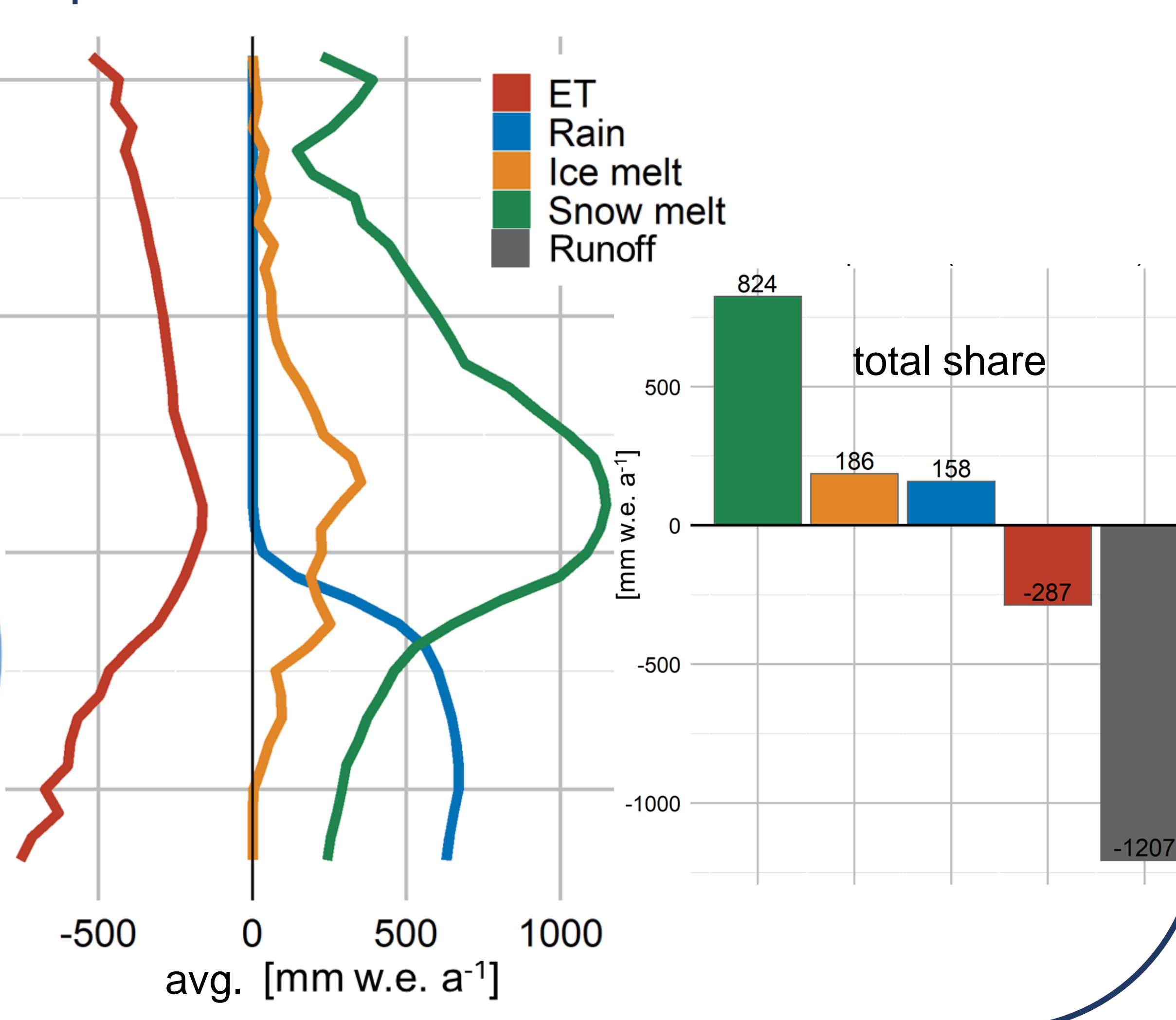


## 4. Results

### Altitudinal evaporative fluxes partition



### Altitudinal water balance partition



## Conclusions

### Evapotranspiration:

- returns 20% of all precip. or 154% of glacier melt water directly to the atmosphere

### Snow sublimation:

- 49% of total vapor flux
- accounts for 11% of snowfall, 17% of snowmelt and 75% of ice melt, respectively
- balances out snow and ice melt above 6500 m a.s.l.

### Importance of vegetation for water balance:

- increasing impact downvalley with increasing evaporation and transpiration rates