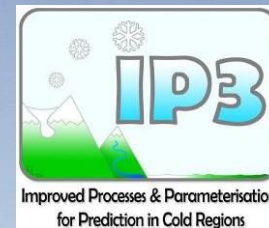


Snow Processes and Parameterisation in Complex Landscapes

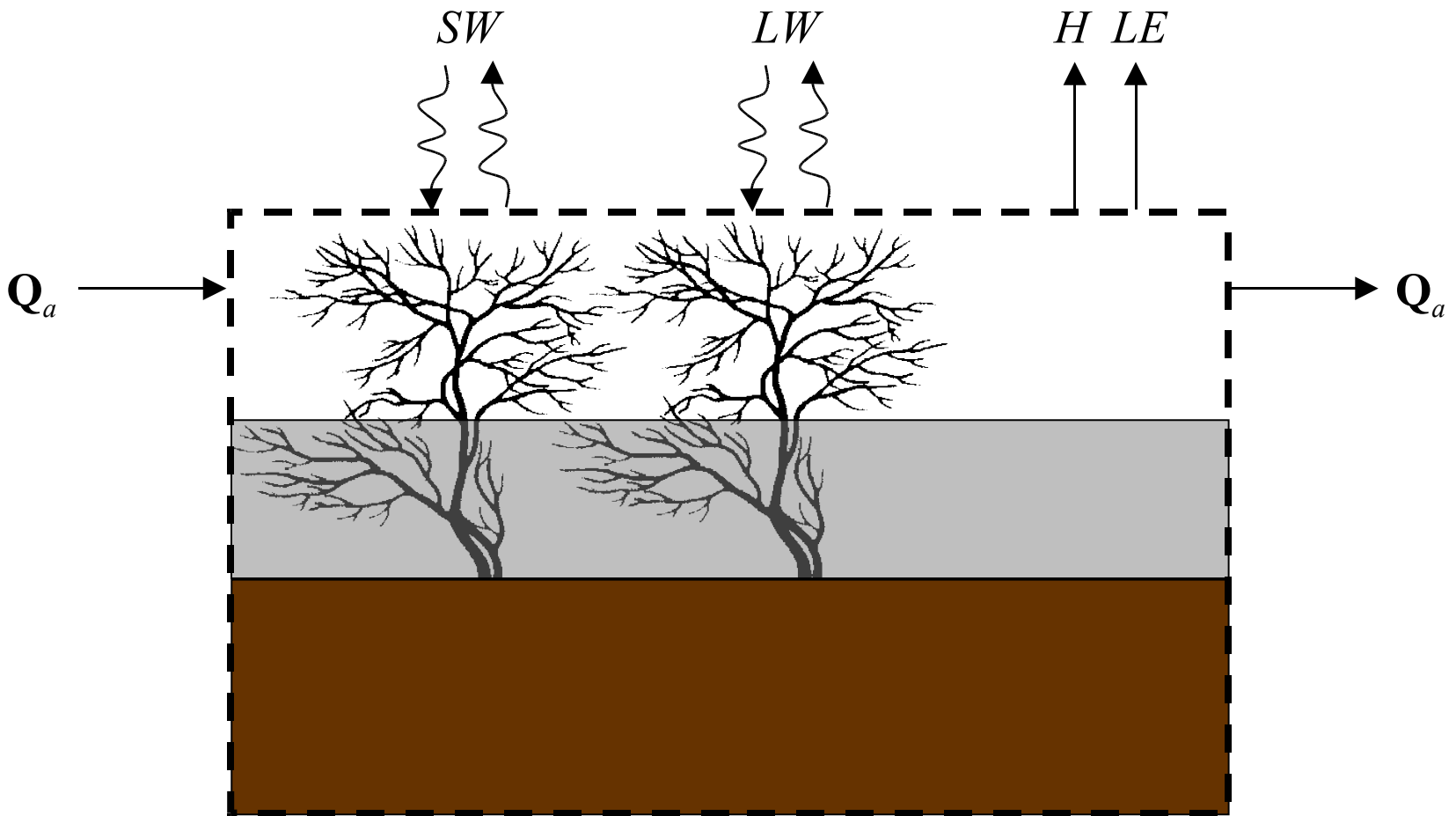
Richard Essery



IP3 Workshop, 12 – 15 November 2008, Whitehorse

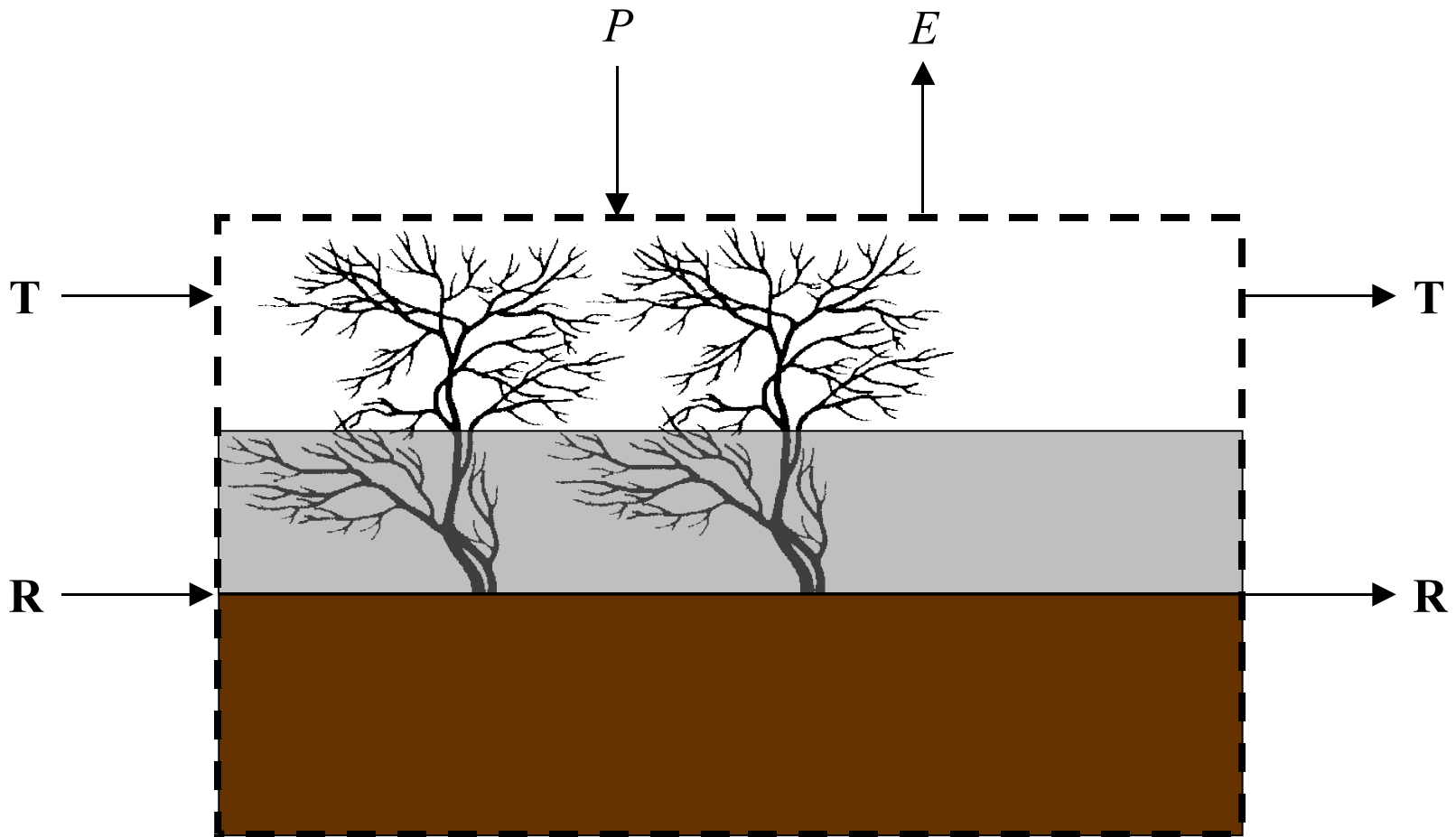
Energy Balance

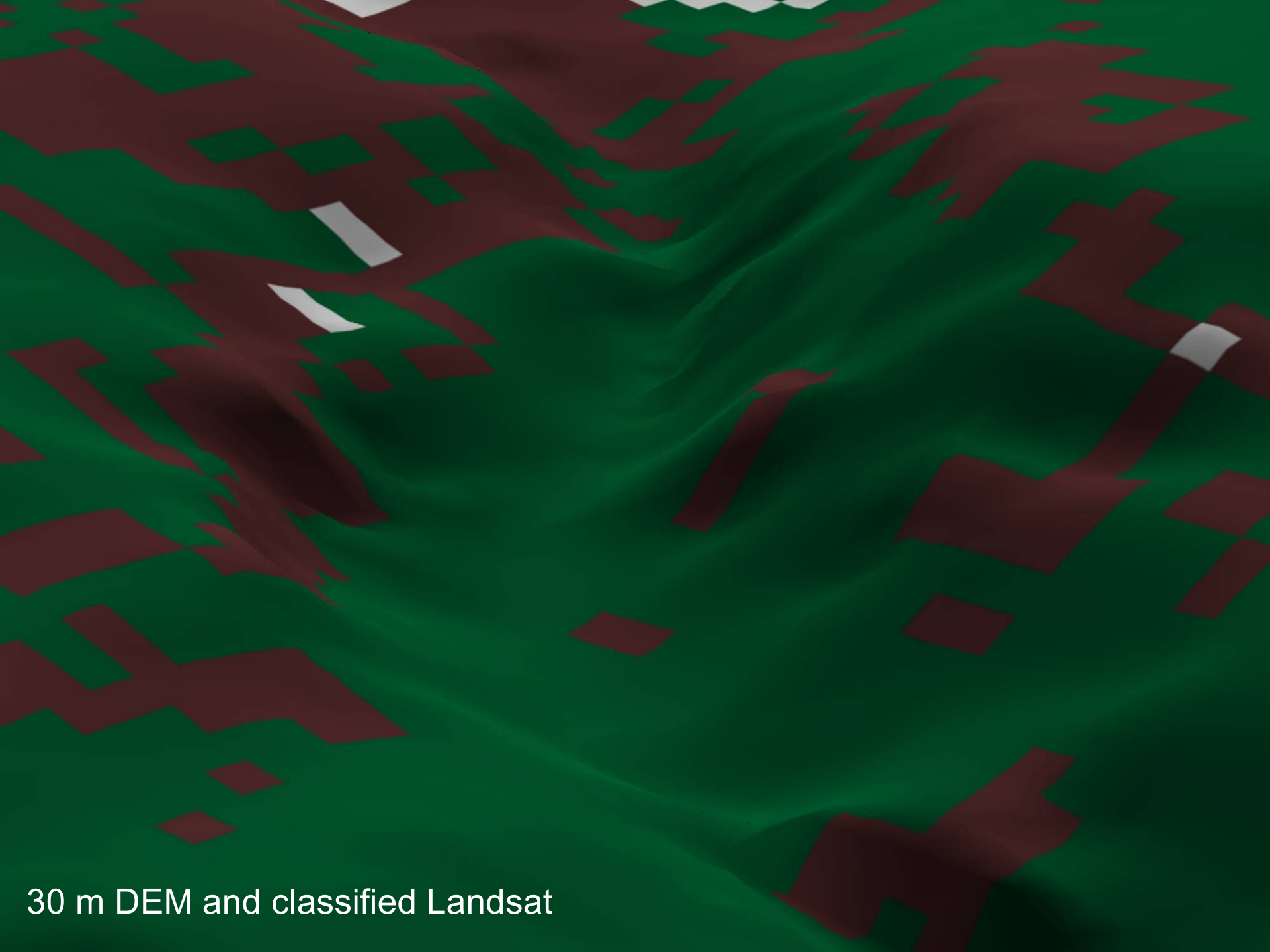
$$\frac{dU}{dt} = (1 - \alpha)SW_{\downarrow} + \varepsilon(LW_{\downarrow} - \sigma T^4) - H - LE - \nabla \cdot \mathbf{Q}_a$$



Mass Balance

$$\frac{dM}{dt} = P - E - \nabla \cdot \mathbf{T} - \nabla \cdot \mathbf{R}$$



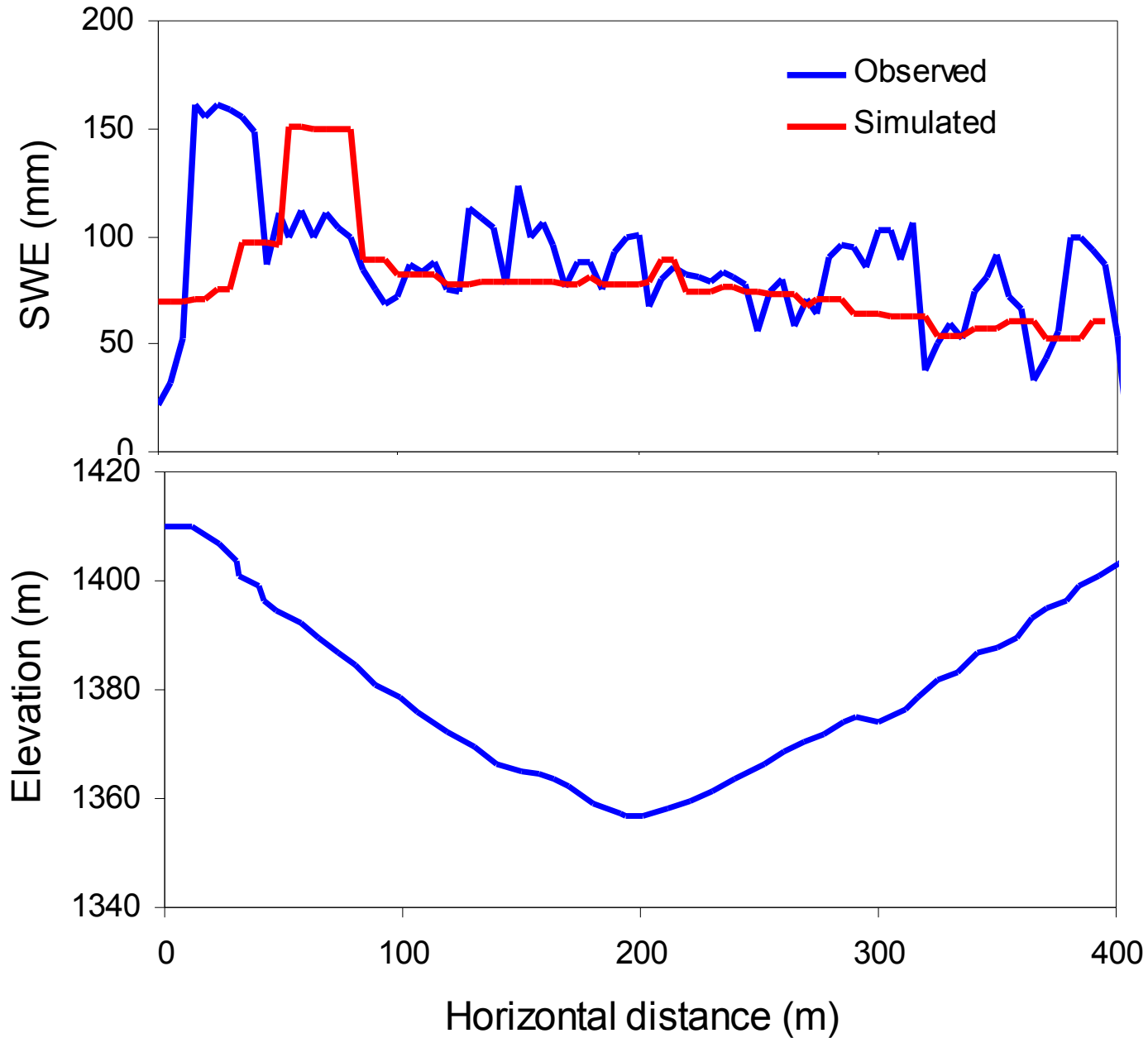


30 m DEM and classified Landsat

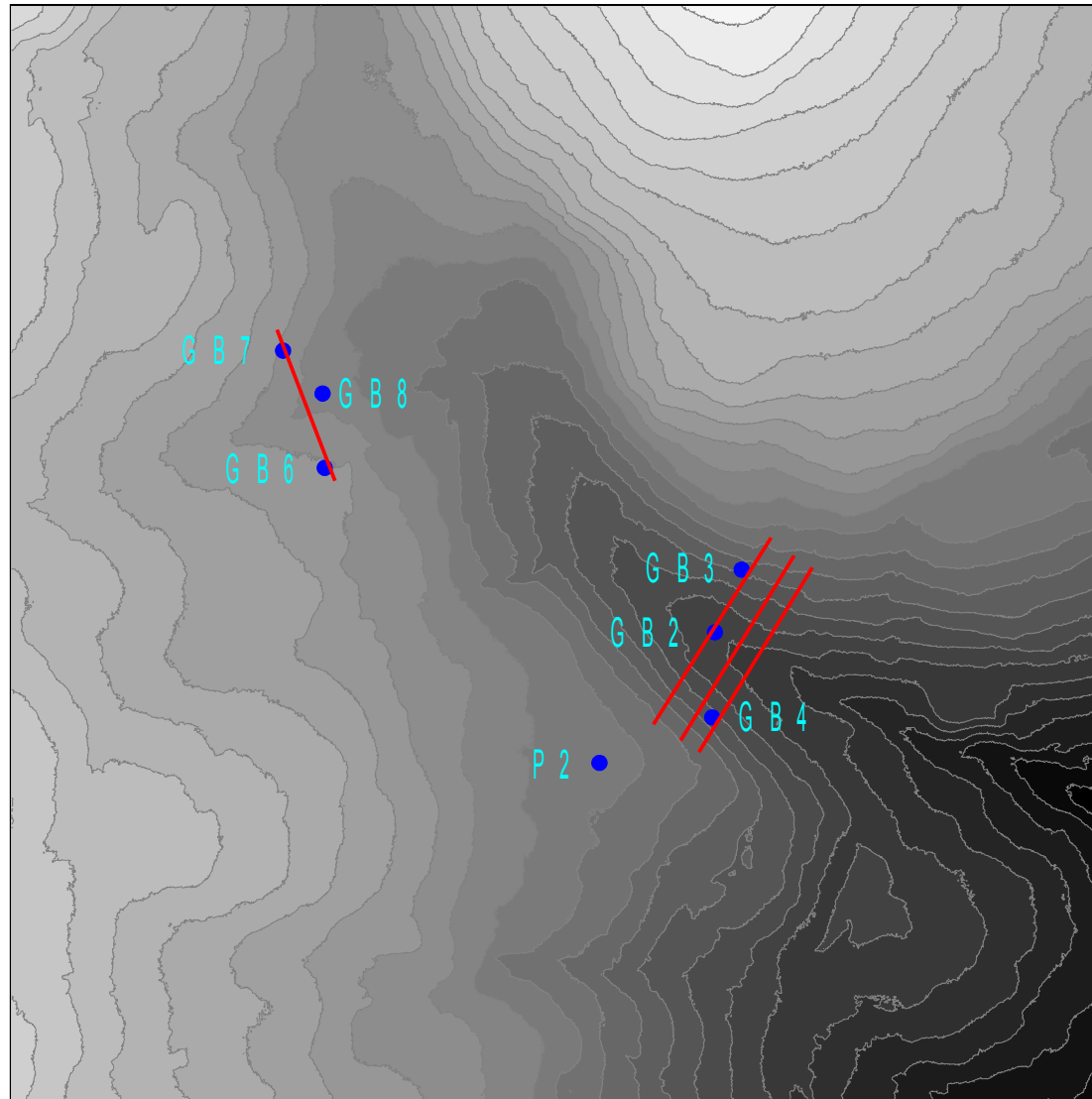


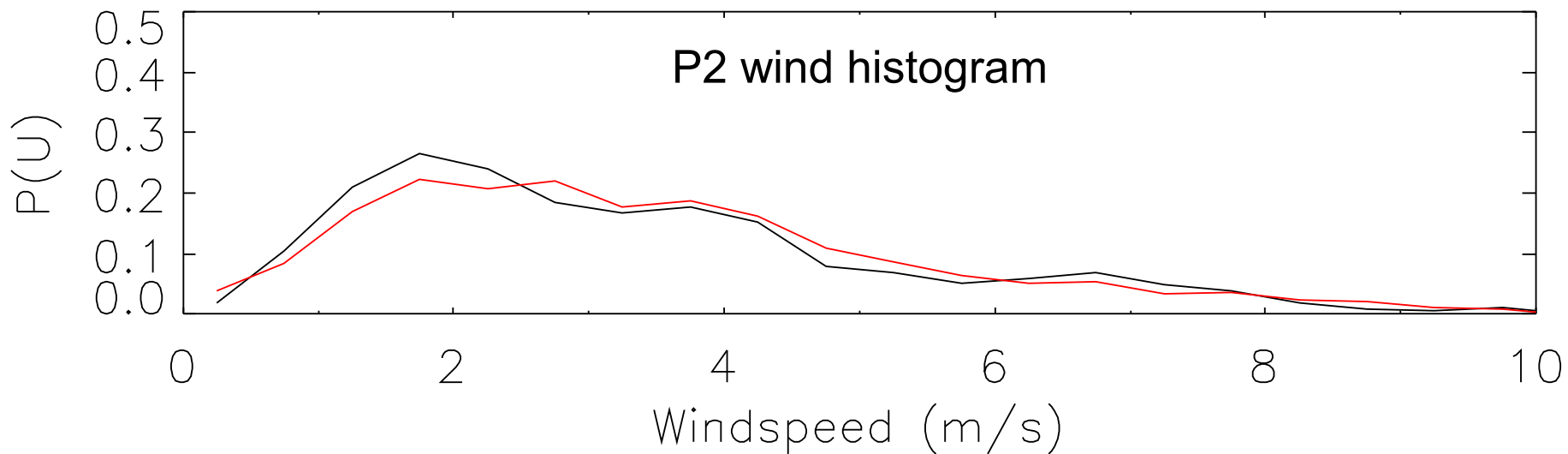
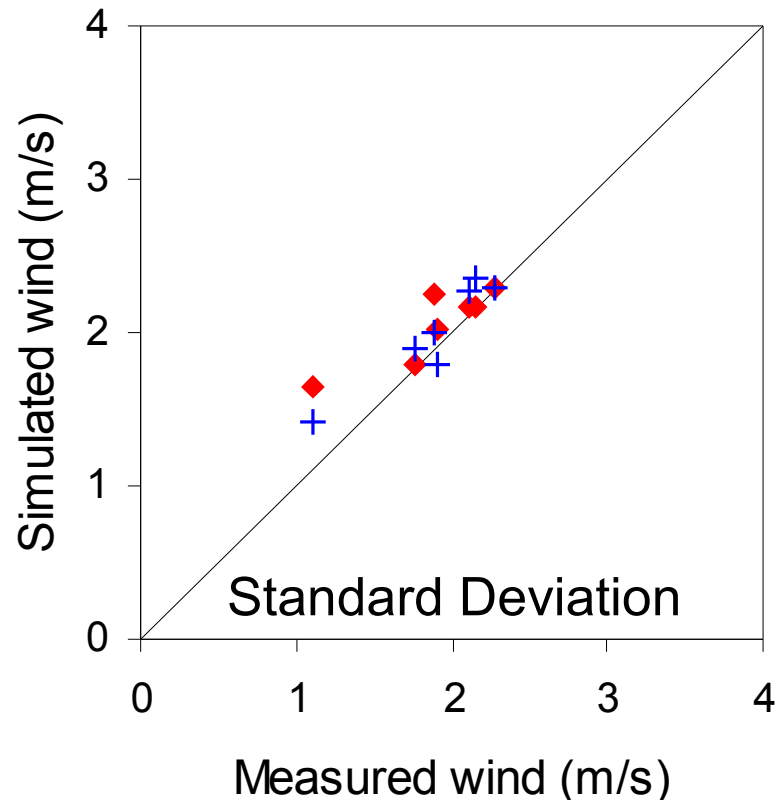
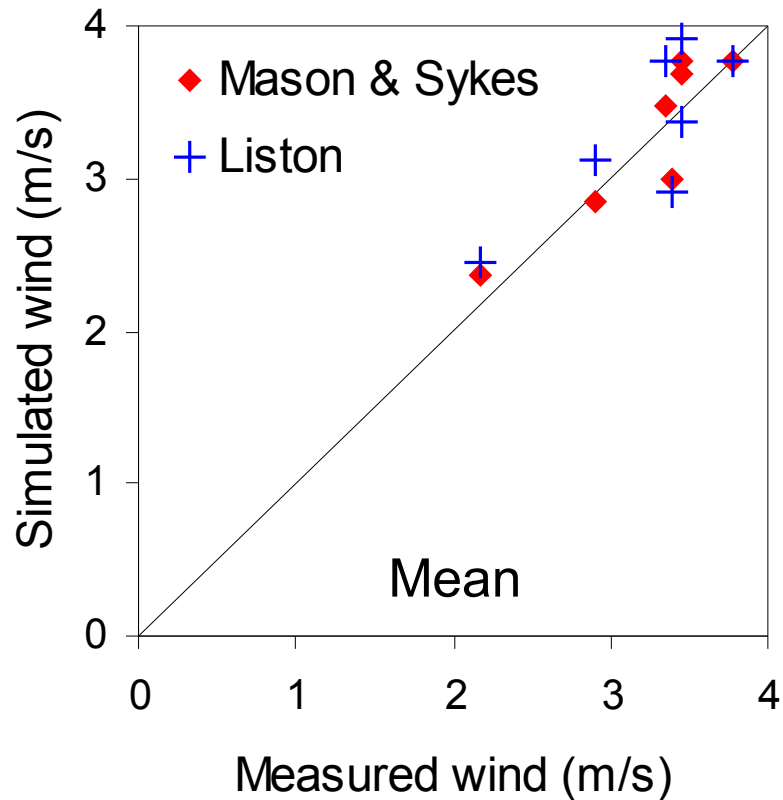
Lidar 4 m DEM and vegetation height

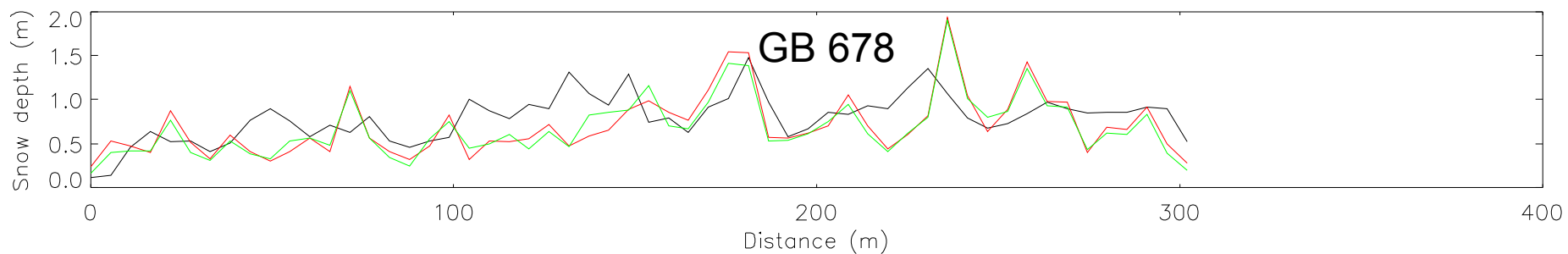
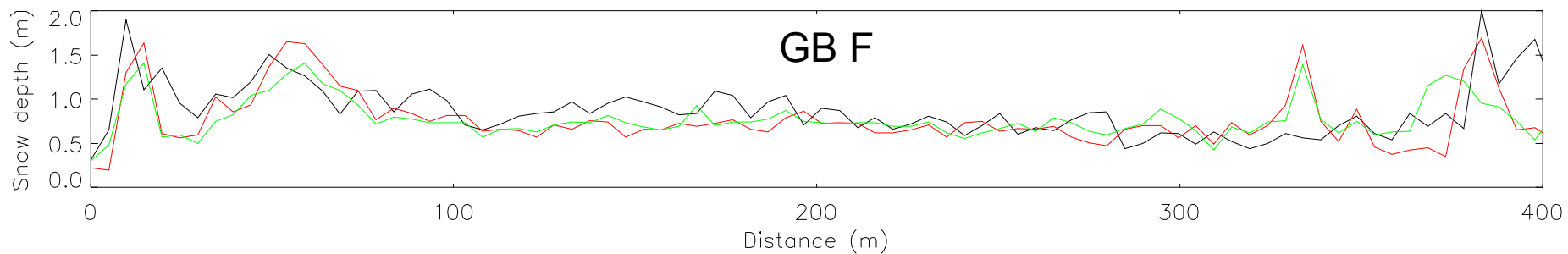
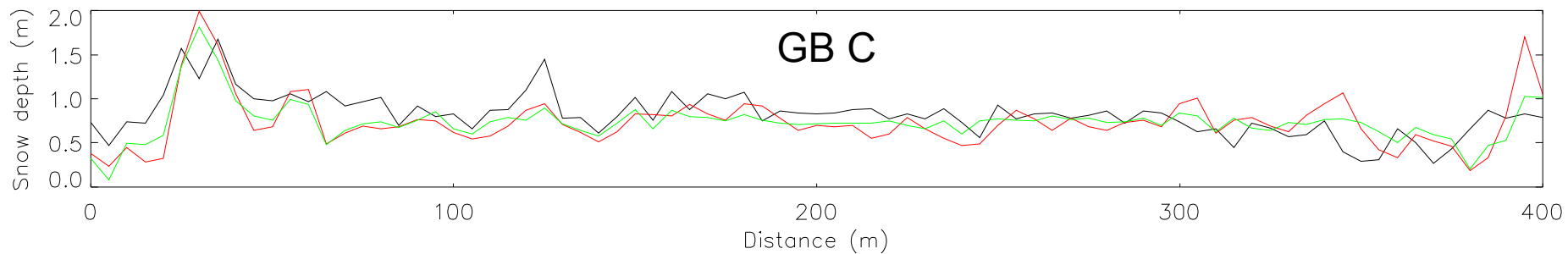
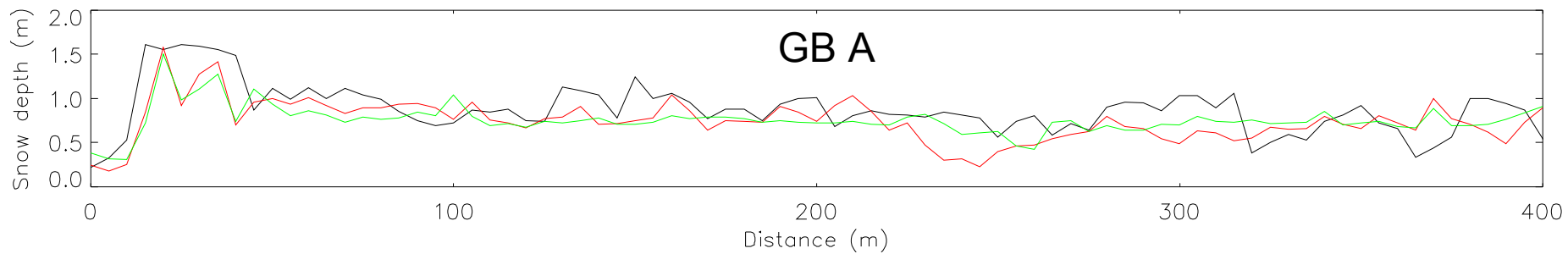
Snowdrift Simulation (IP3 Waterloo Meeting)

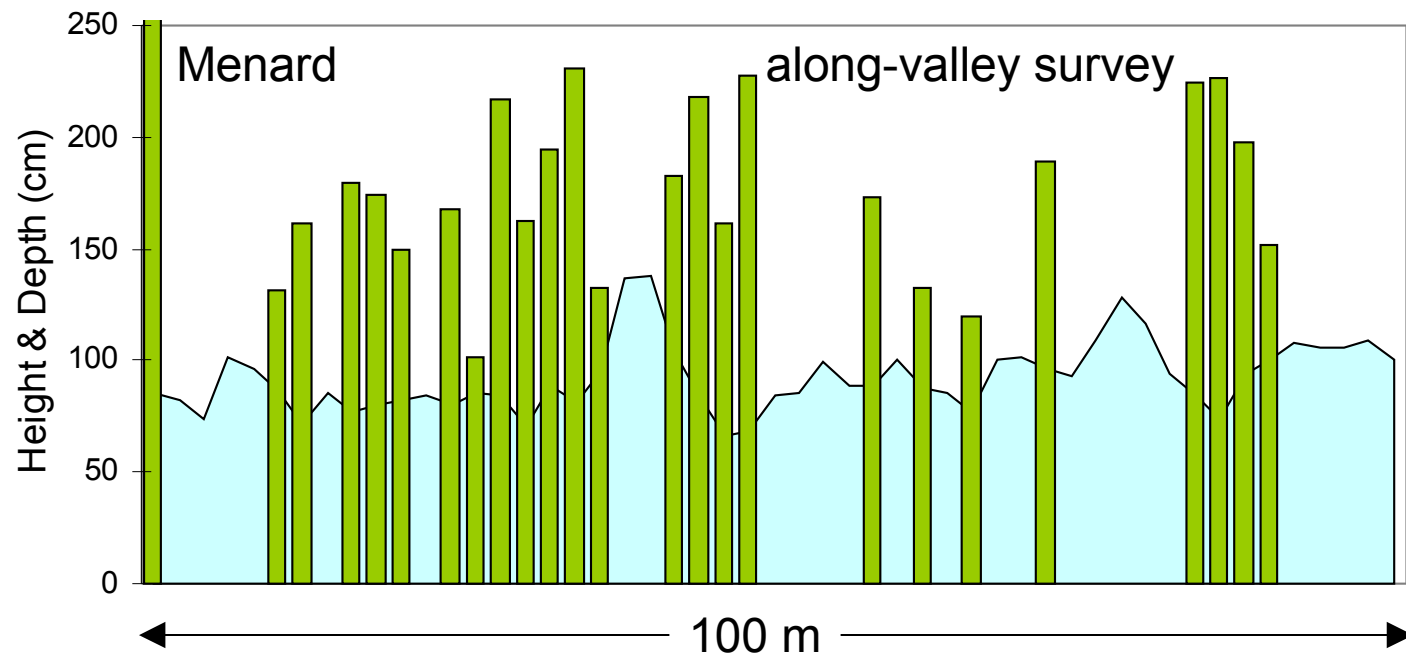
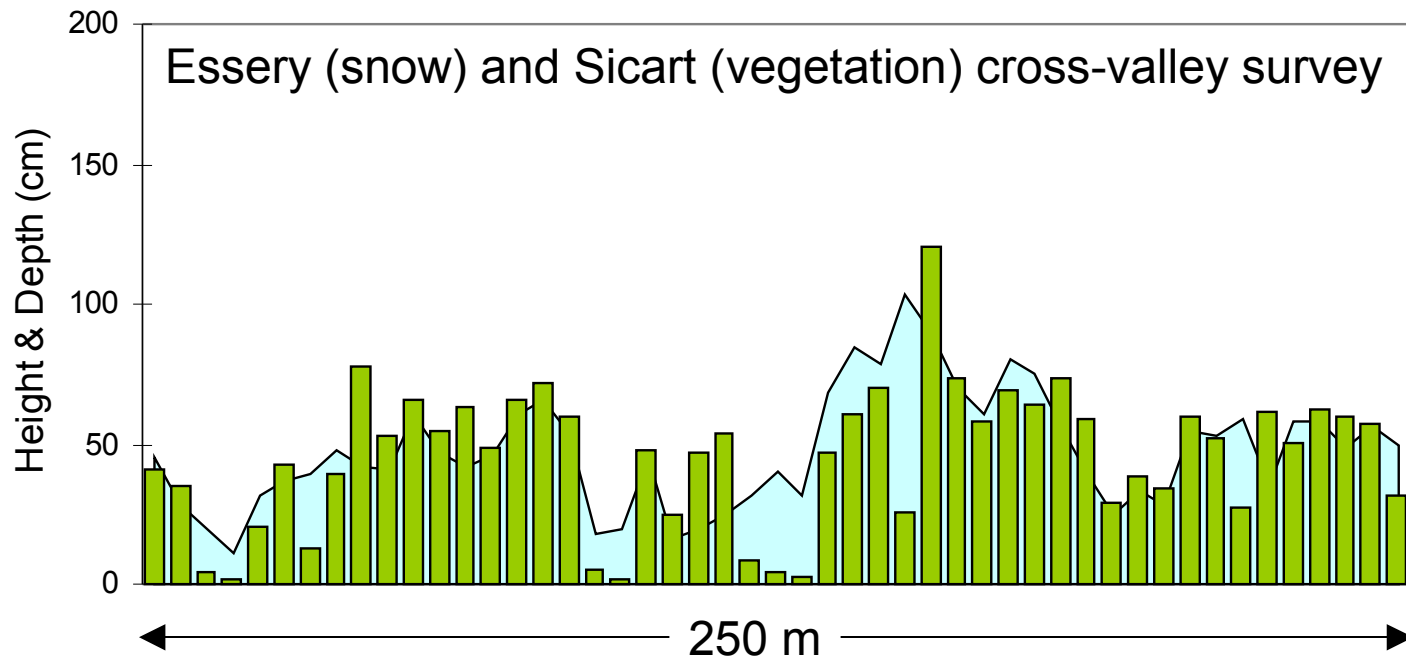


Granger Basin Micrometeorology Study, 2003-4

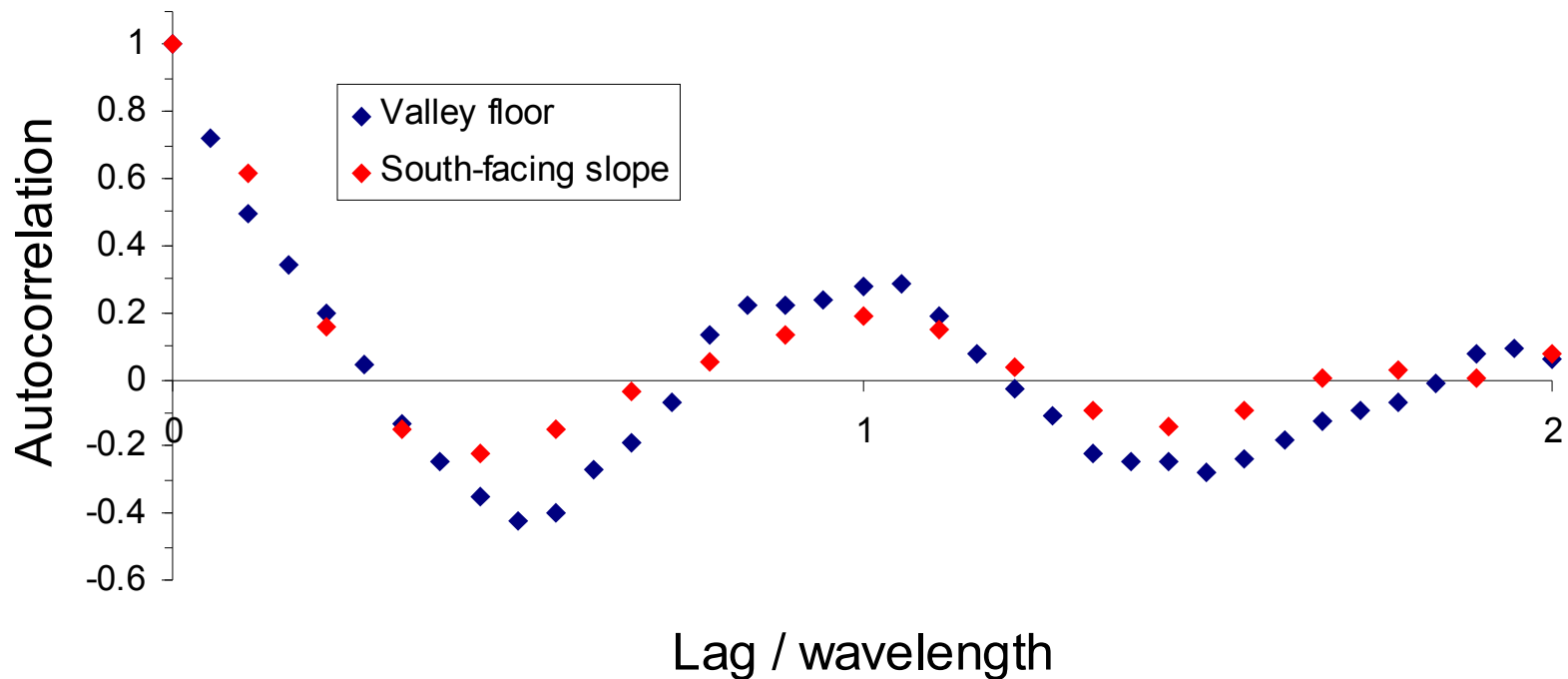








Drift Length Scales



Wavelength ~ 40 m along-valley
 ~ 100 m cross-valley

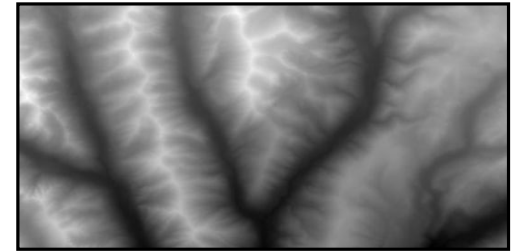
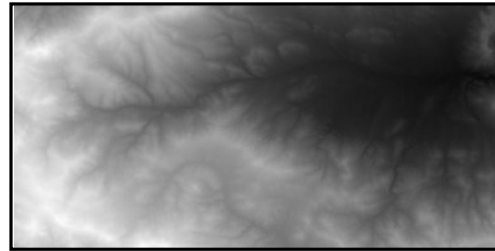
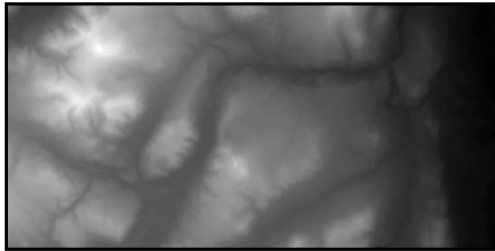
Topographic Length Scales

Wolf Creek

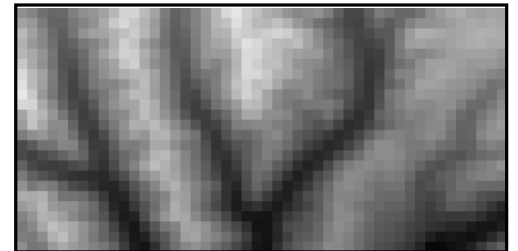
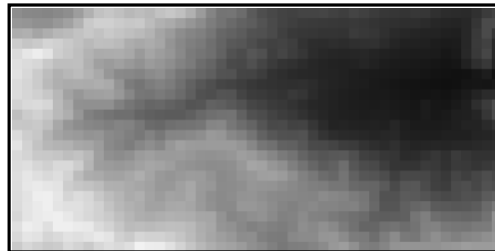
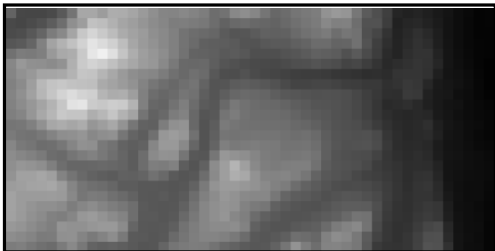
Reynolds Creek

Maroon Creek

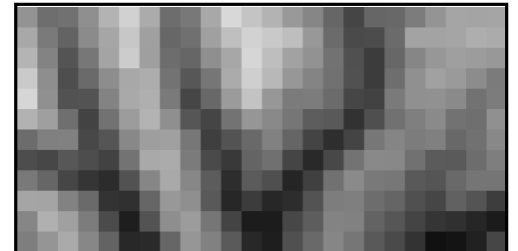
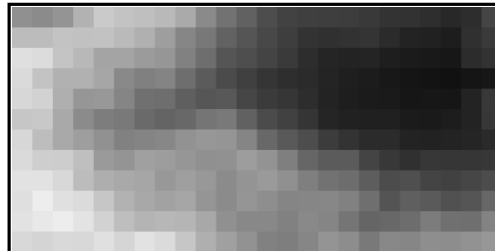
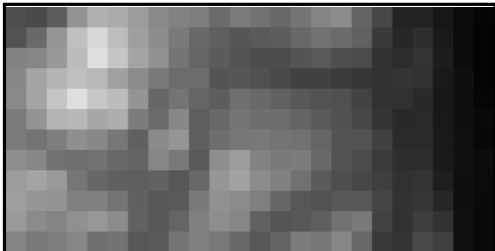
30 m



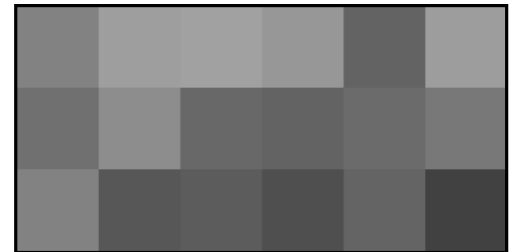
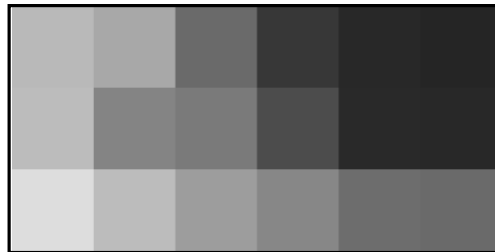
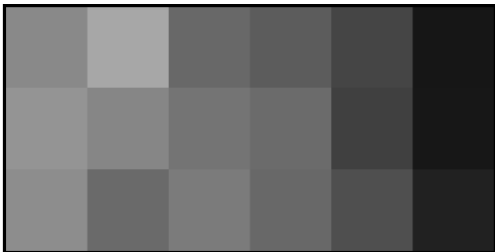
500 m



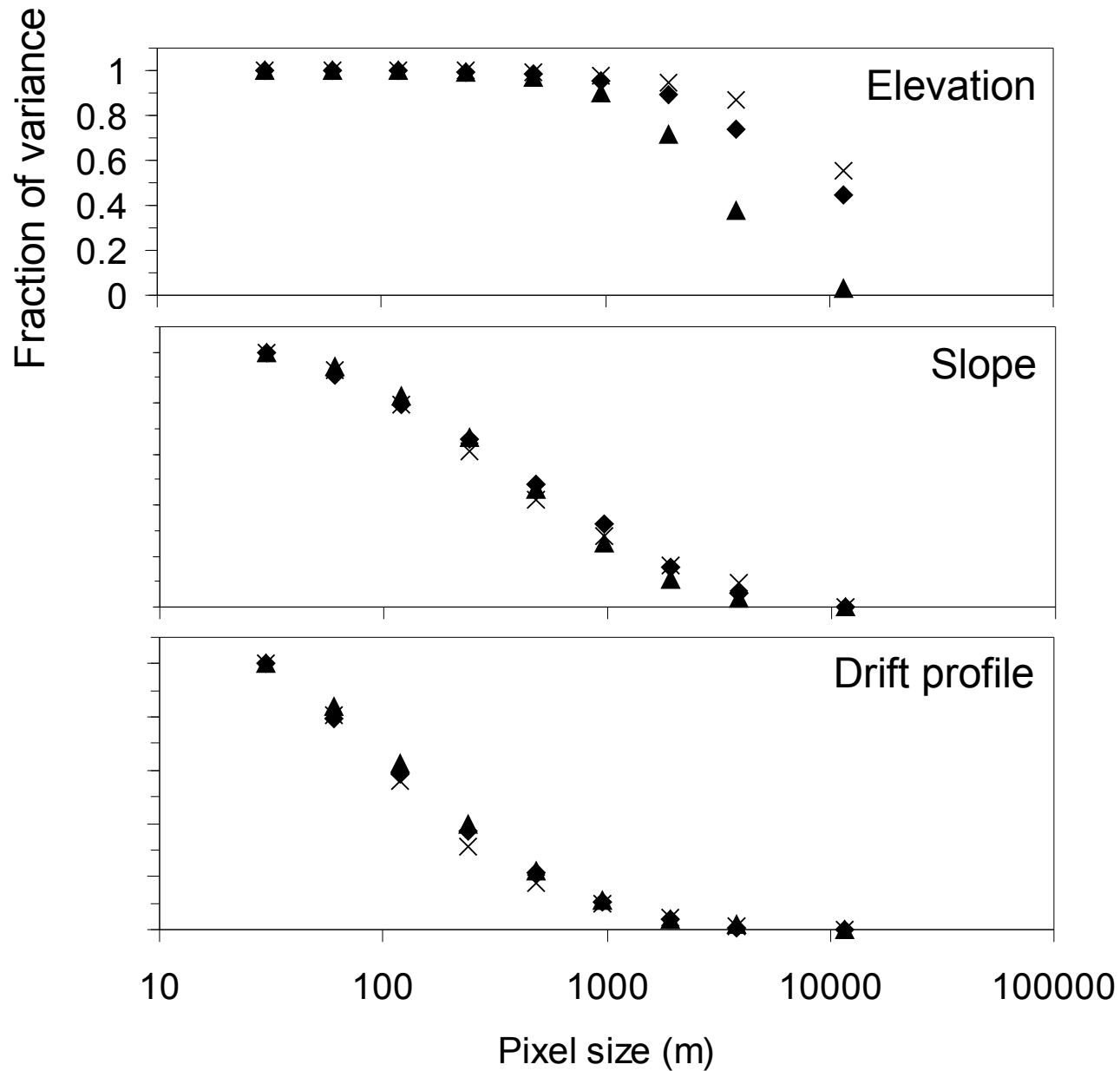
1 km



4 km



Topographic Length Scales



Next Steps

- Incorporate full PBSM in distributed blowing snow model
- Couple DBSM and canopy energy balance model
- Basin-scale implementation of distributed model (30 m) with GEM fields (200 m)?
- Compare with aggregated parameterisations