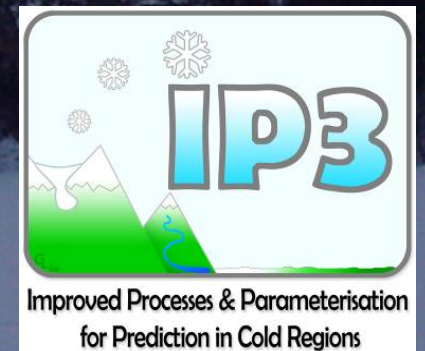


Snow processes and parameterisation in complex landscapes

Richard Essery and Cécile Ménard
School of GeoSciences
University of Edinburgh



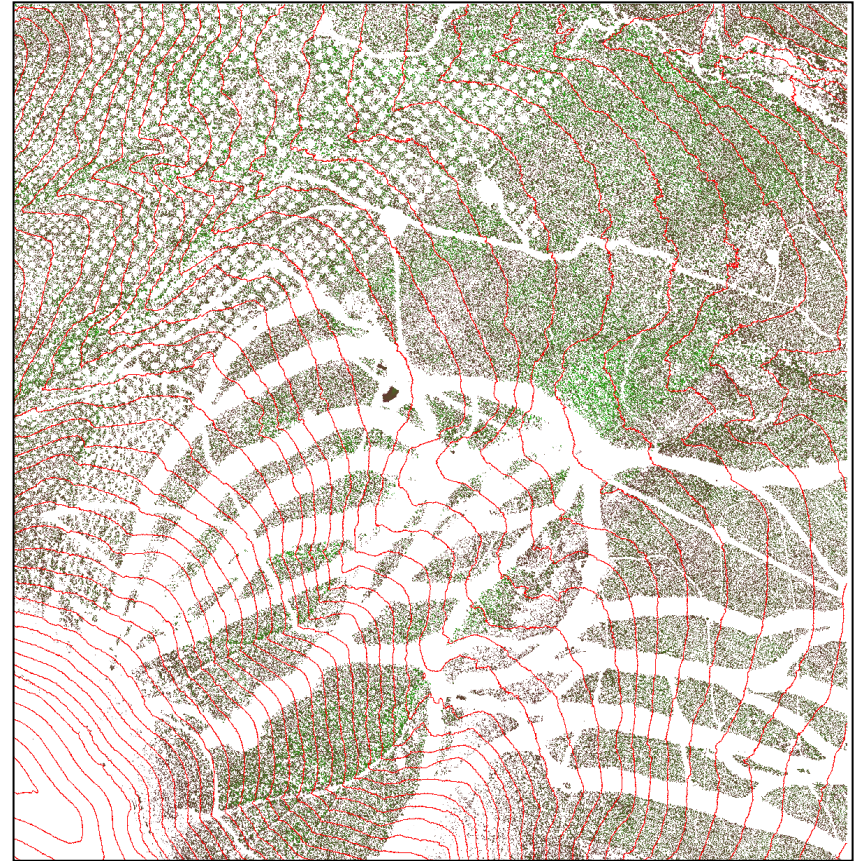
IP3 Workshop, 14 – 17 October 2009, Lake Louise

LiDAR topography and vegetation height

Wolf Creek
(Granger Basin)



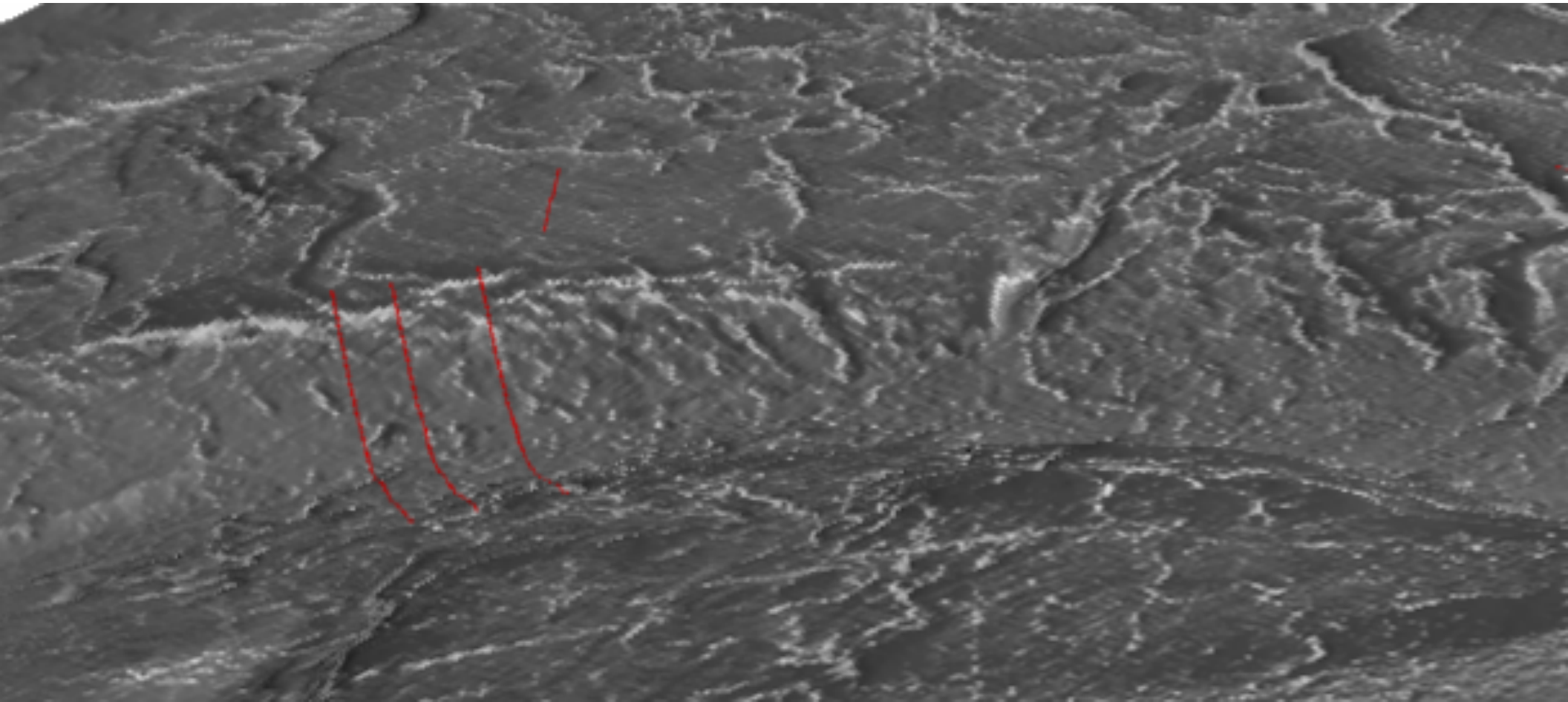
Marmot Creek
(Nakiska ski area and cut blocks)



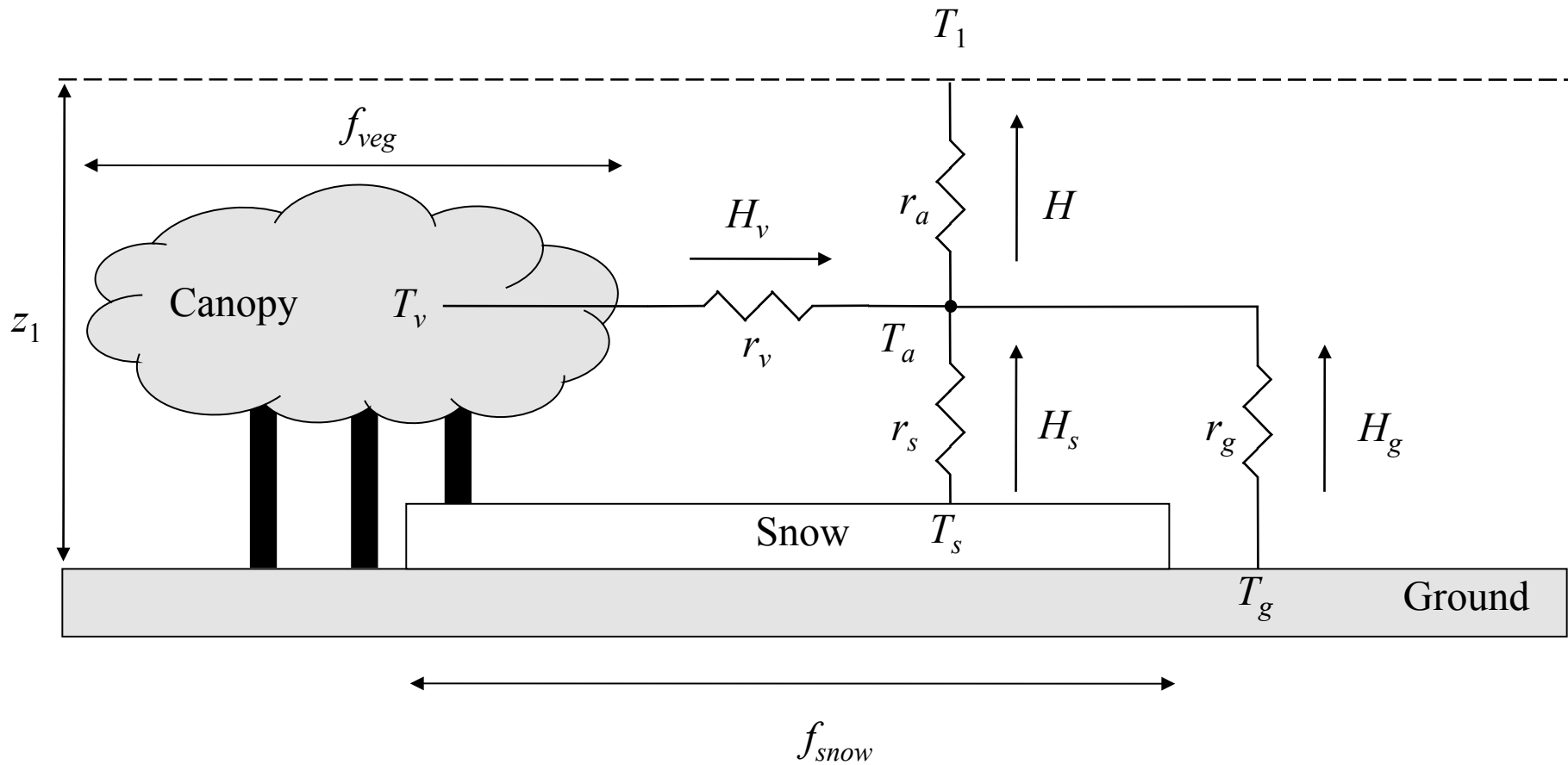
Distributed Blowing Snow Model

New release available from <ftp://arts-hydrology-ip3.usask.ca/essery/DBSM>

- Mason-Sykes or Ryan wind flow model options
- SBSM or PBSM snow redistribution model options
- surveying utility
- examples and (basic) documentation included



Three-source surface energy balance model



Snow and exposed vegetation fractions:

Vegetation fraction

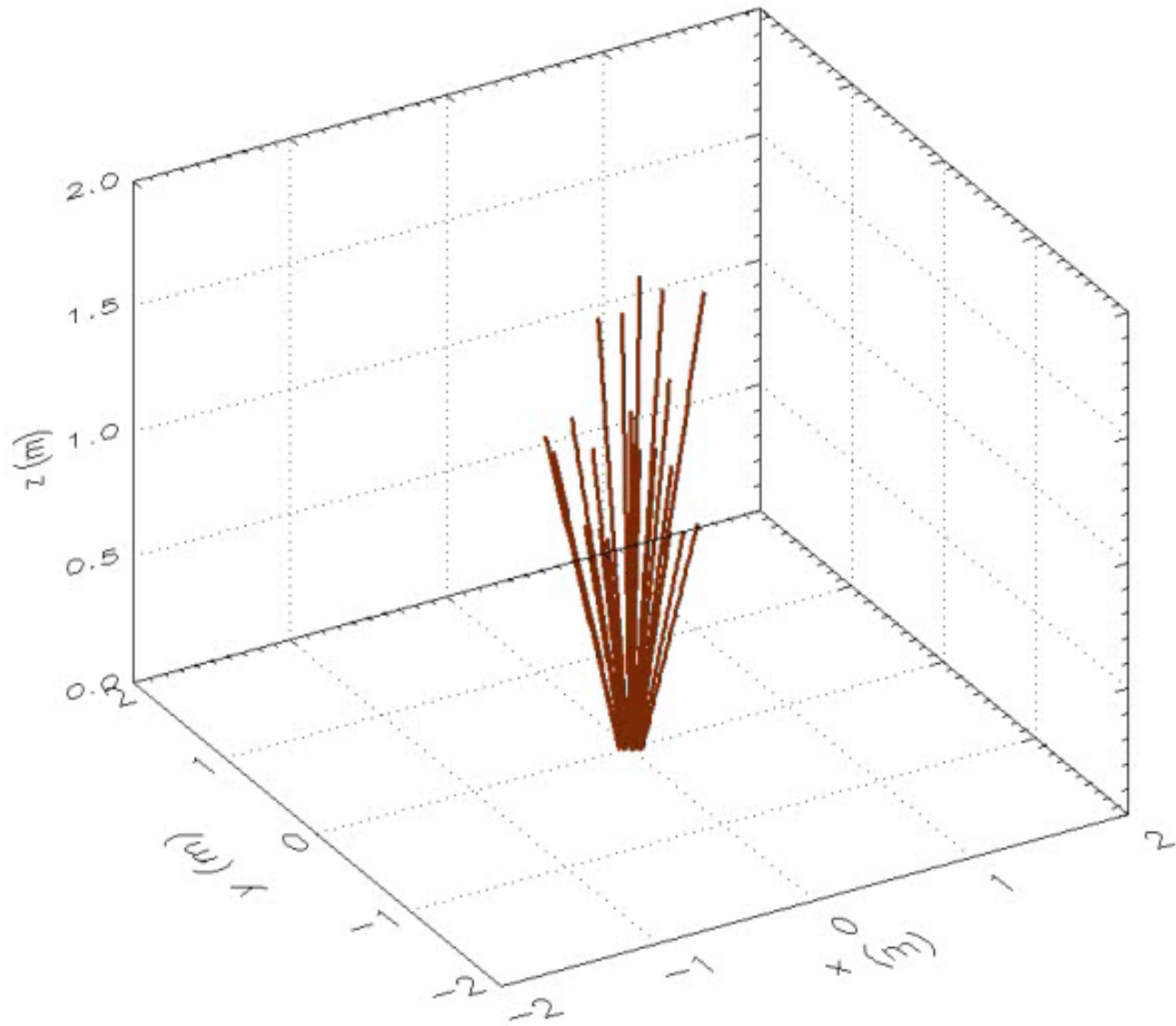
21/04/2008



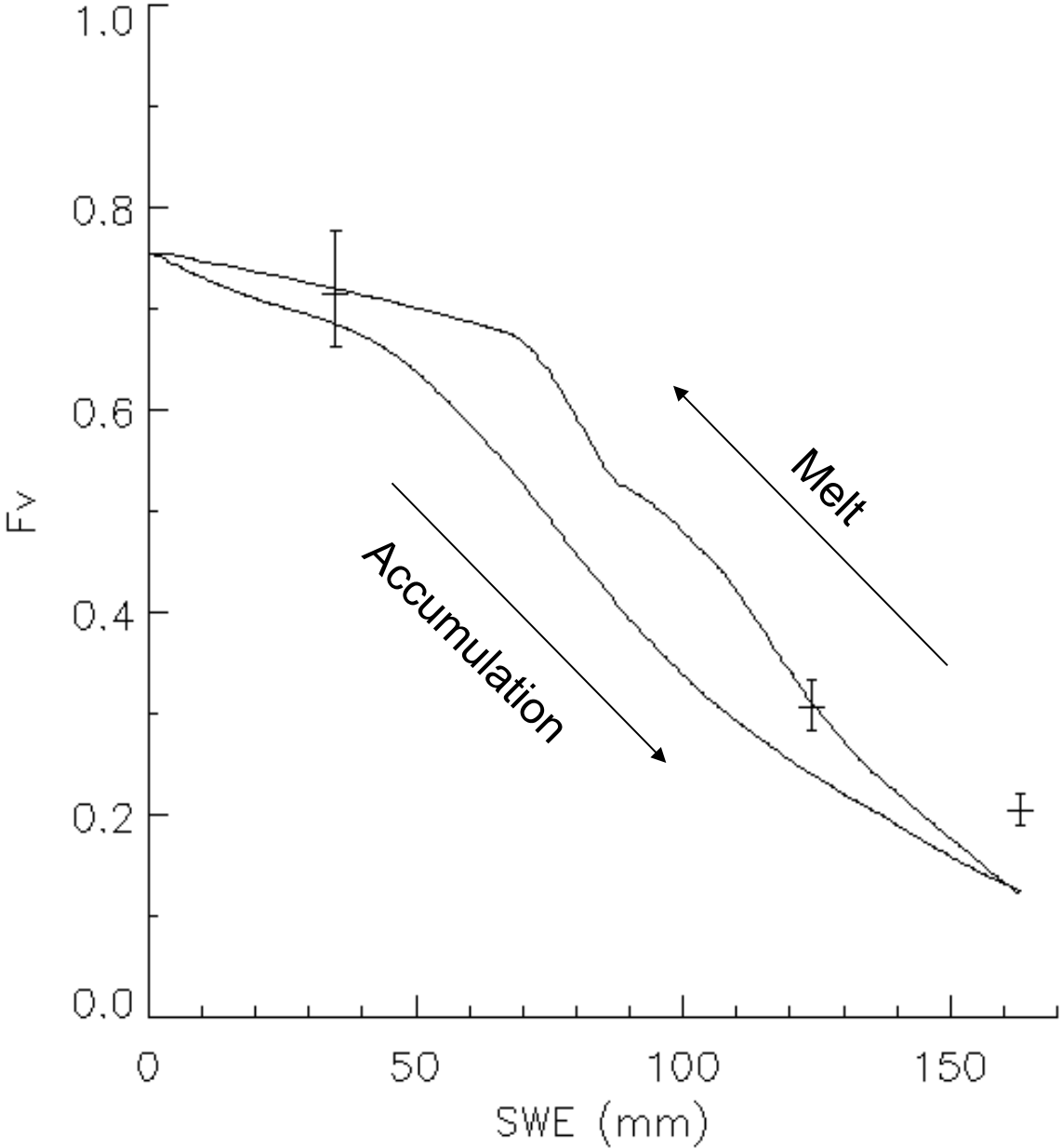
08/05/2008



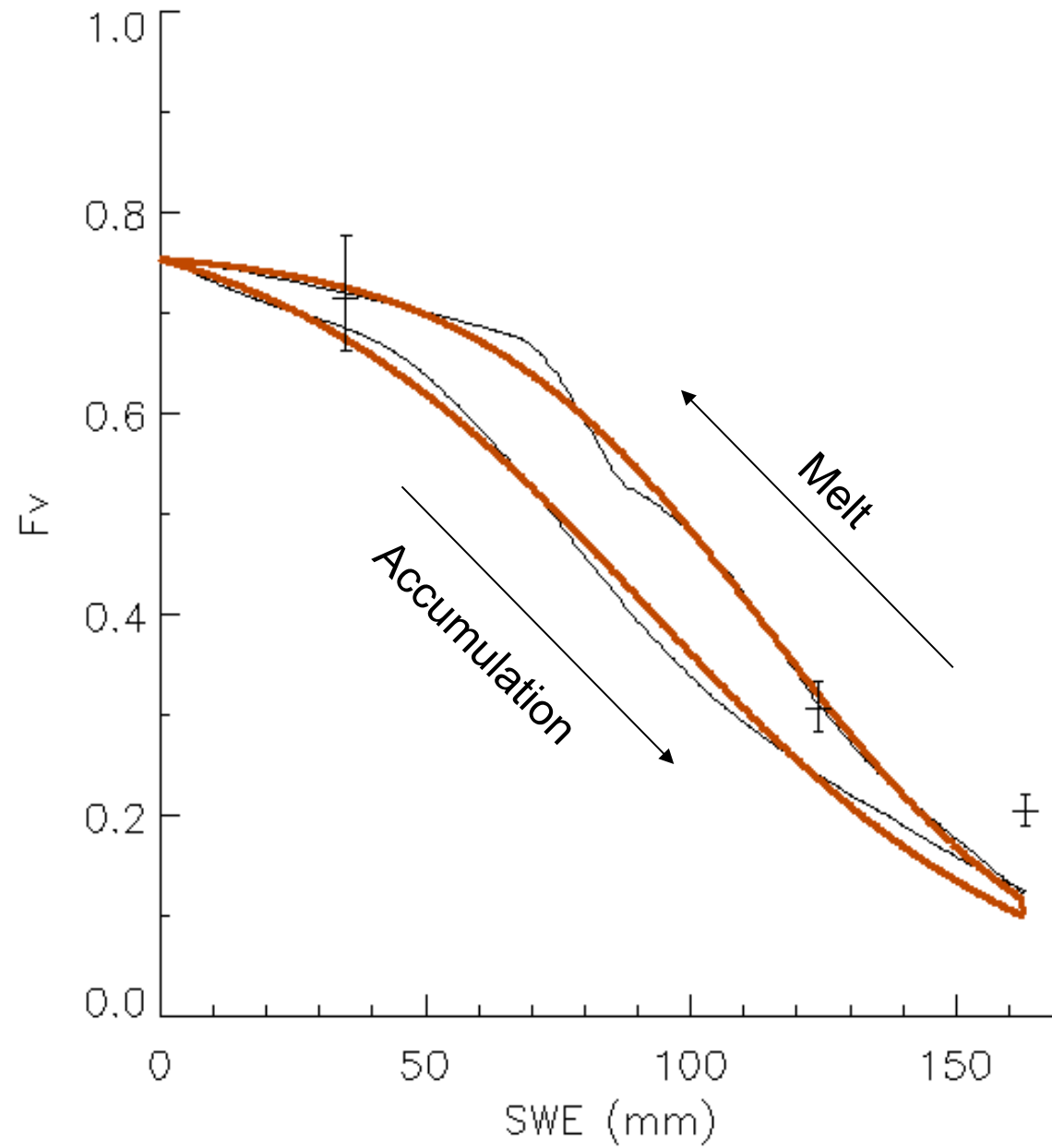
Shrub bending model



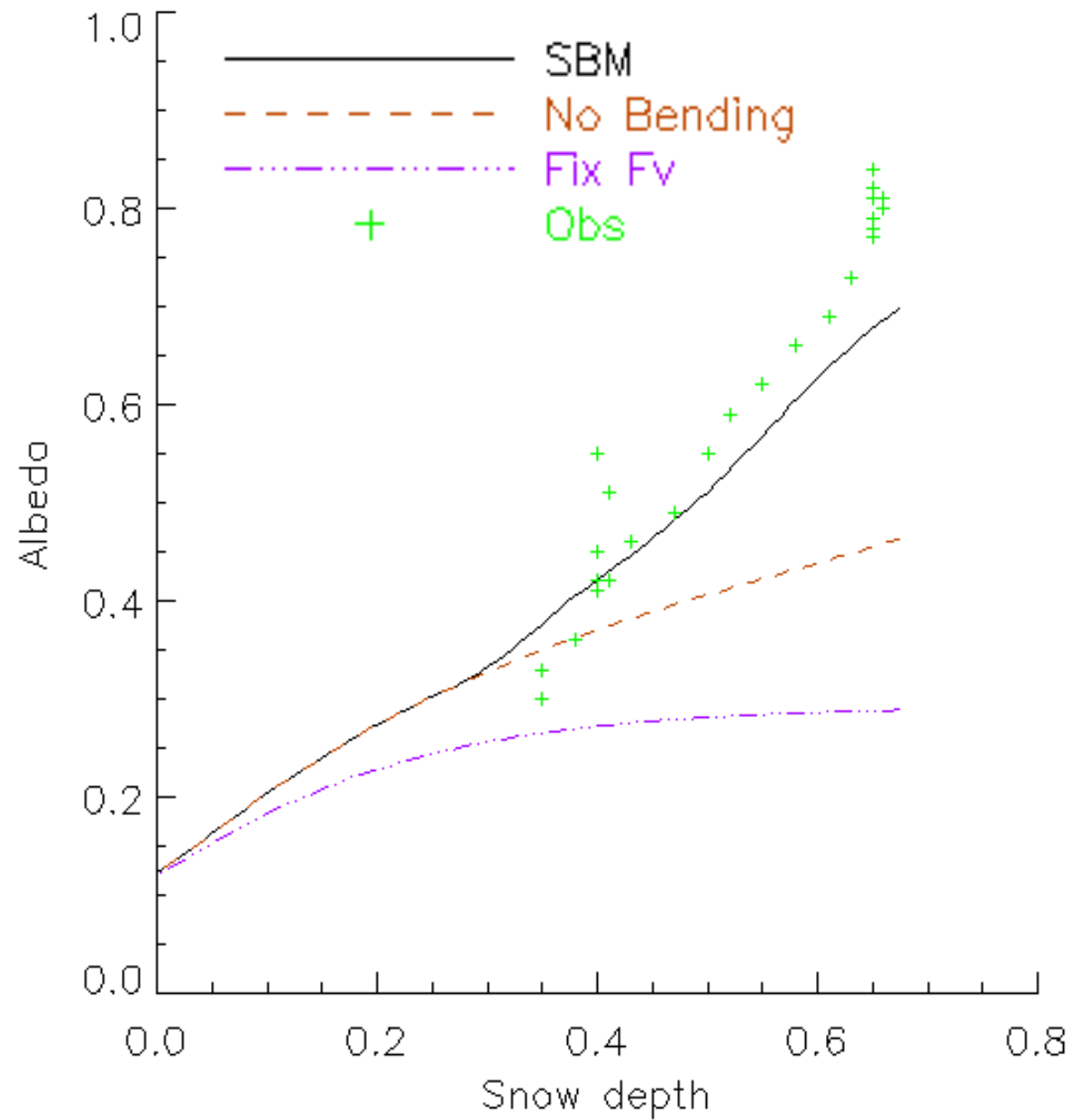
Simulation of exposed vegetation fraction



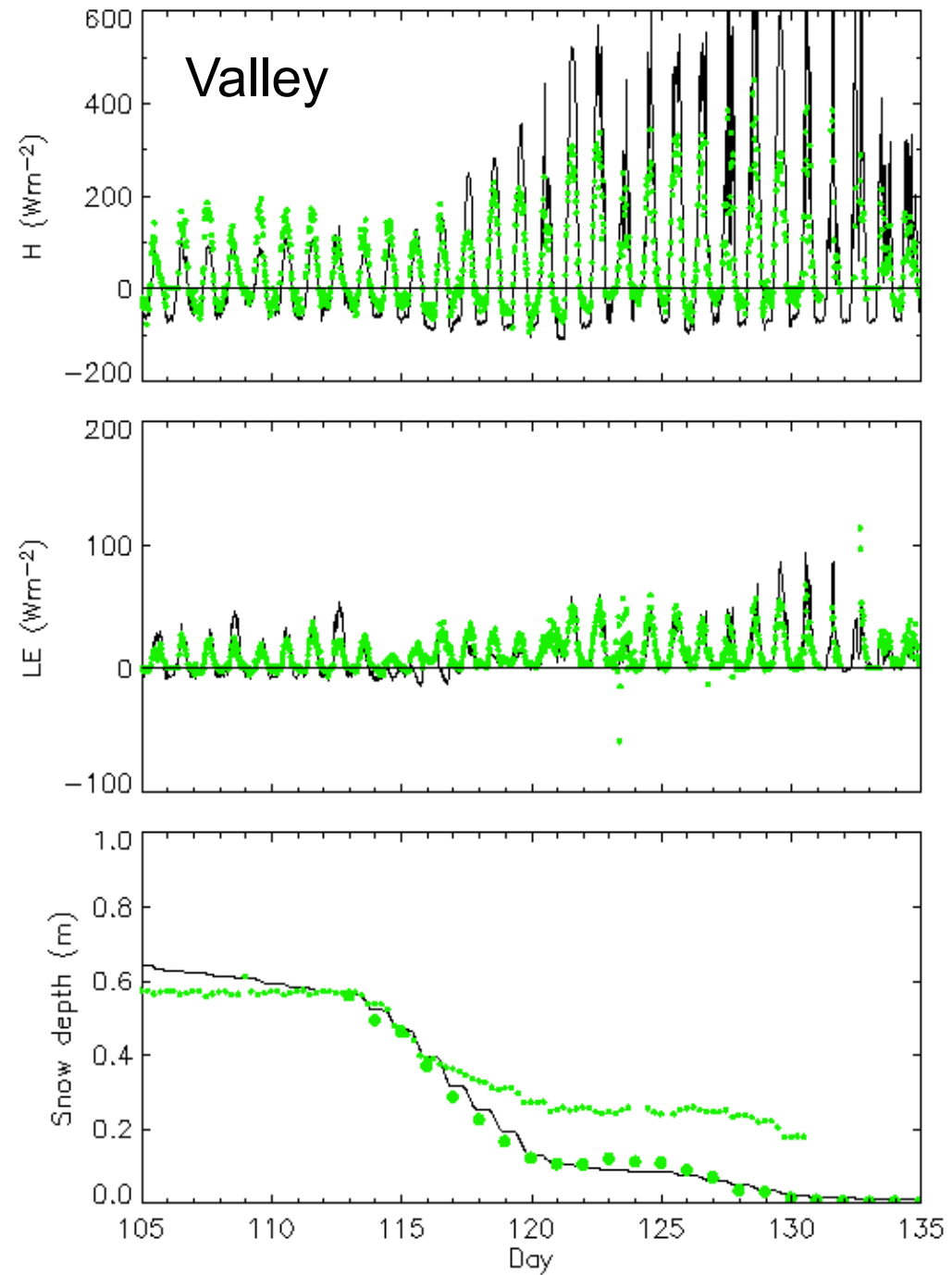
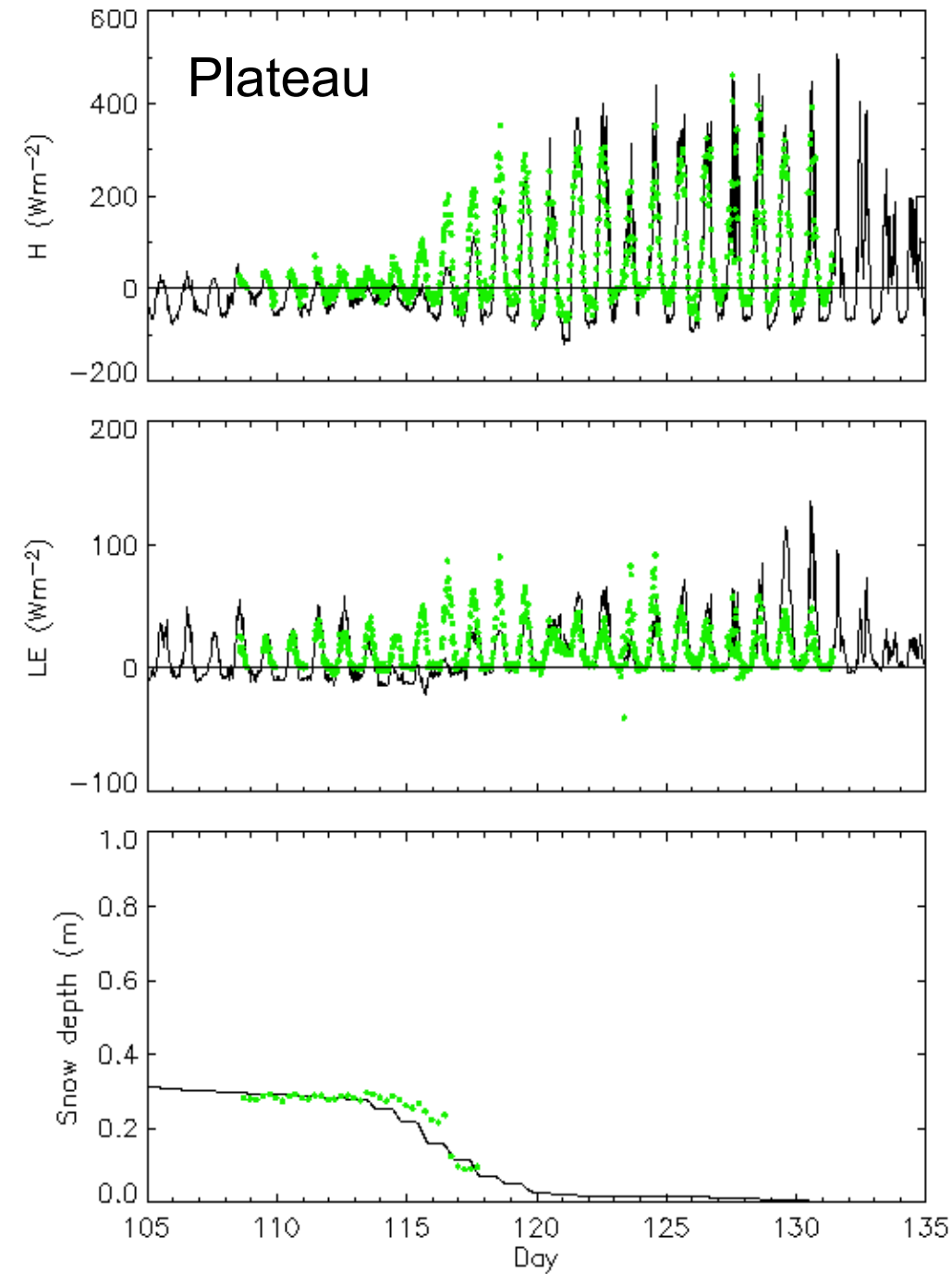
Parameterisation of exposed vegetation fraction



Simulated albedo of heterogeneous surface

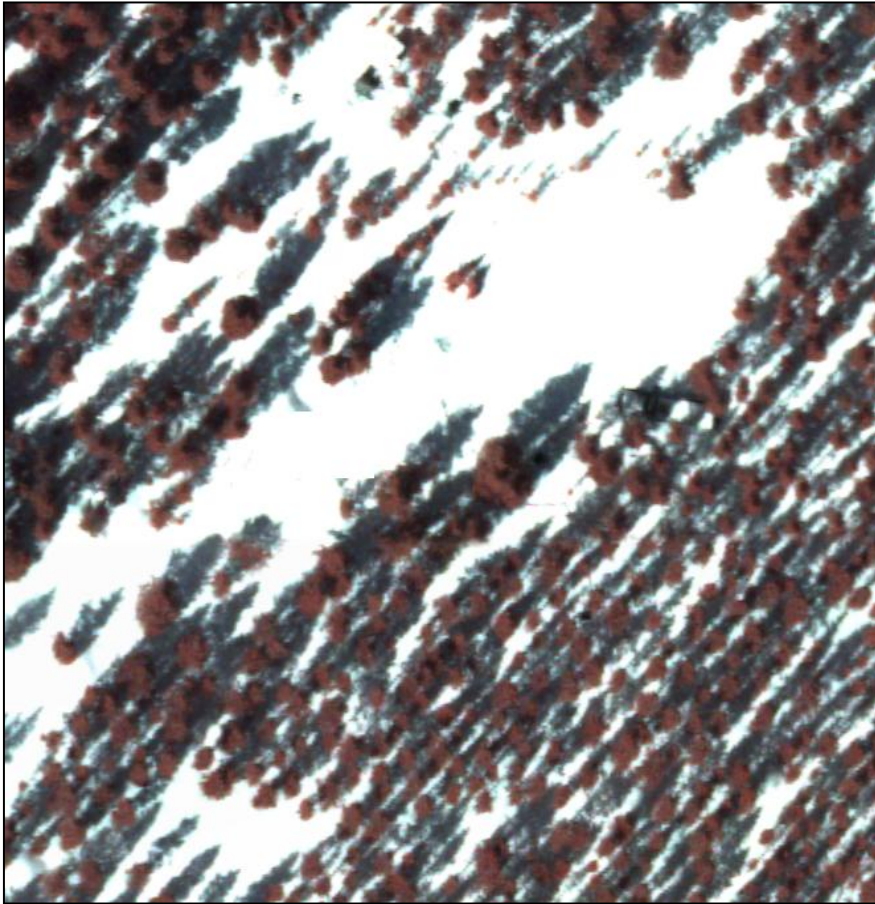


Heat flux and snowmelt simulations



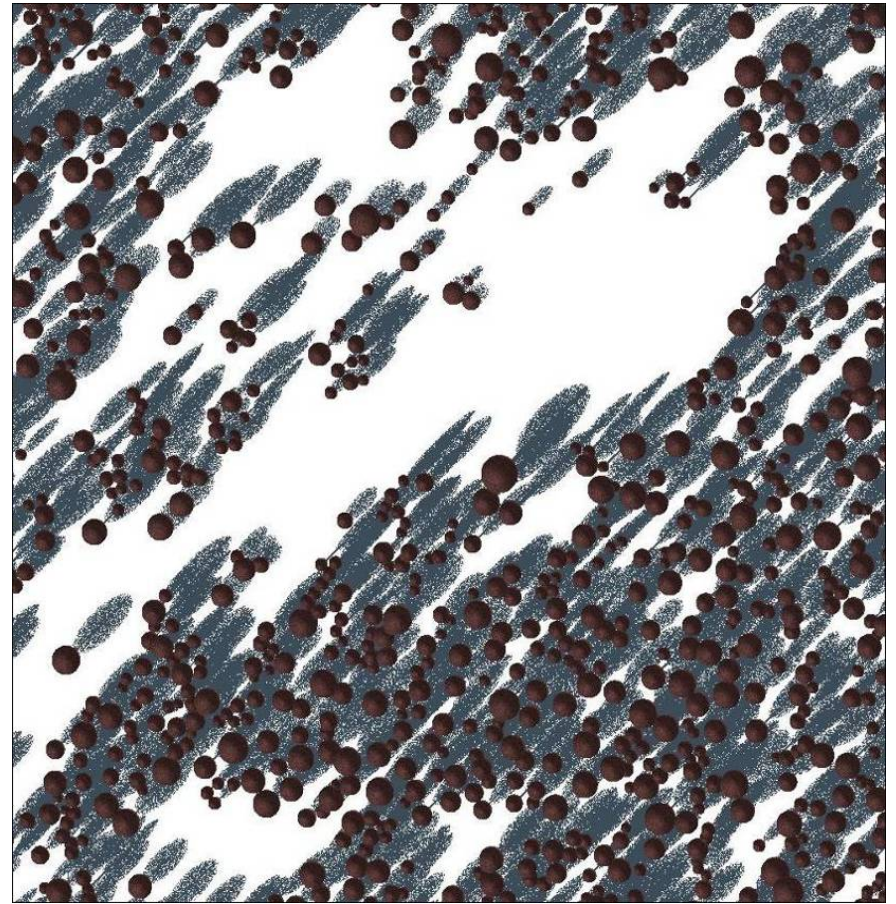
Canopy ray tracing

Aerial photograph



100 m

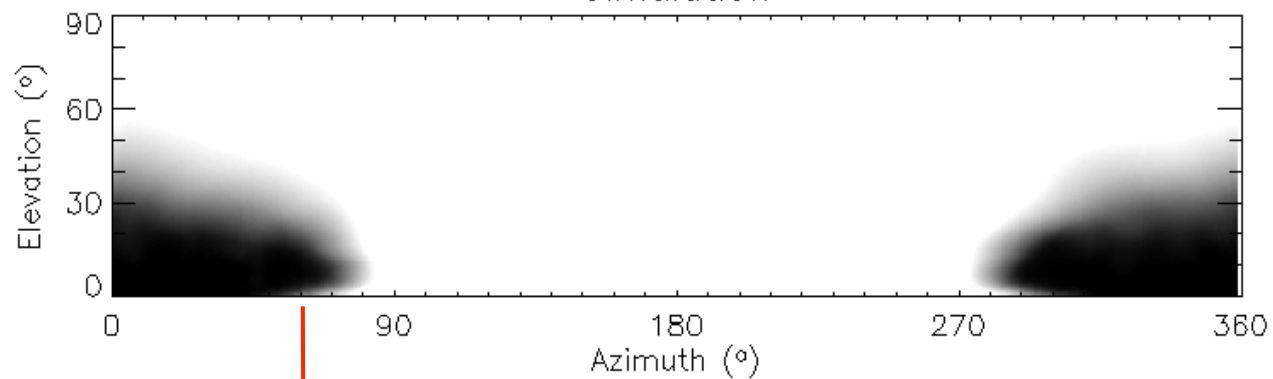
Simulation



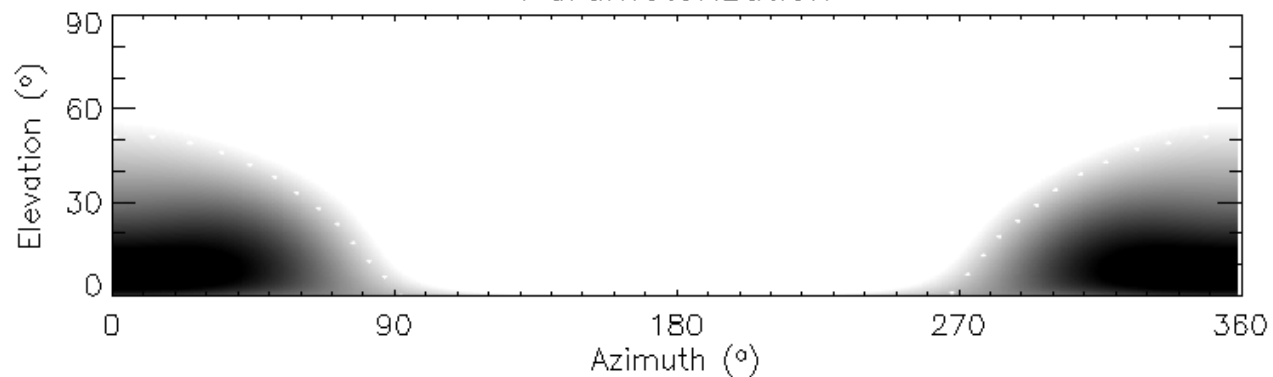
Canopy ray tracing

20 m × 20 m area

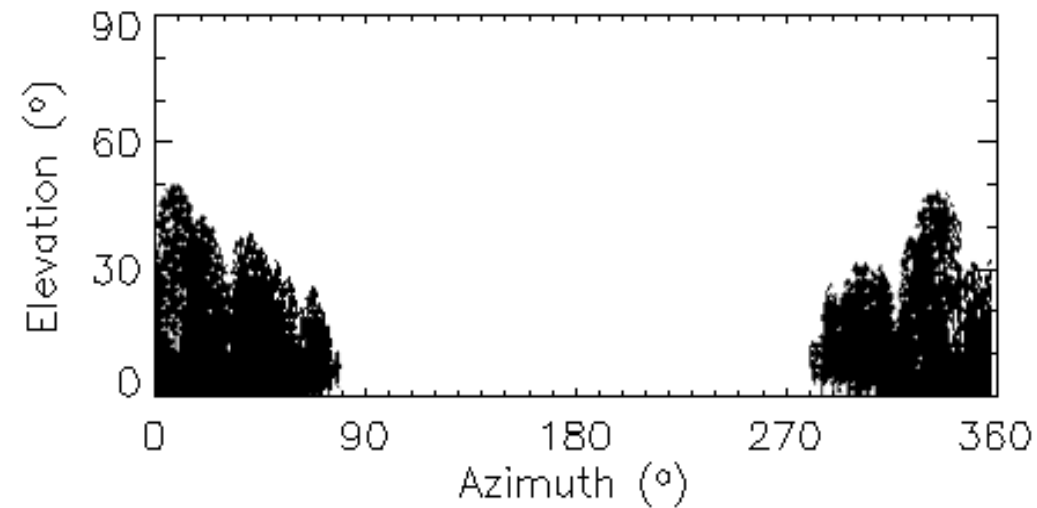
Simulation



Parameterization



Point



Next ...

- combine DBSM, SBM, 3SM and LiDAR mapping in a distributed model for Granger Basin
- use to investigate influences of model resolution and changing vegetation distributions
- investigate reliability of parameter transference between sites (Laura Comeau, following Pablo Dornes)
- apply heterogeneous canopy parameterisation over large areas with complex topography (Chad Ellis, Tim Link)

Thank you!

