



# Snow and Ice Impacts

Richard Essery

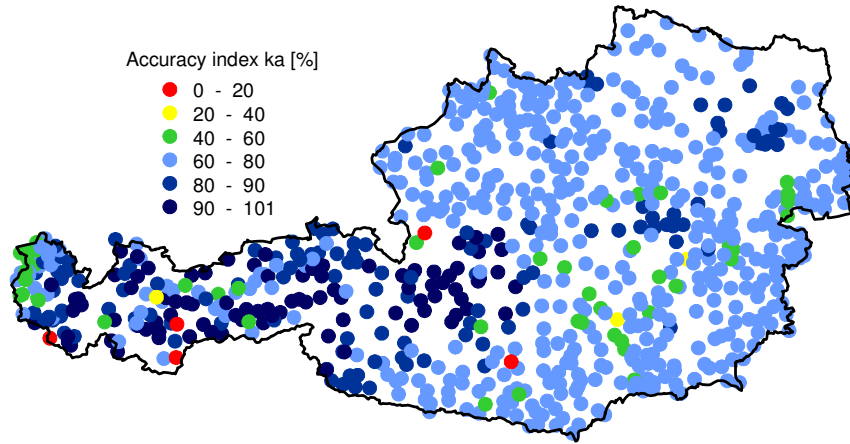
Simon Dadson, Cécile Ménard, Juraj Parajka, Jeff Ridley, Andy Wiltshire



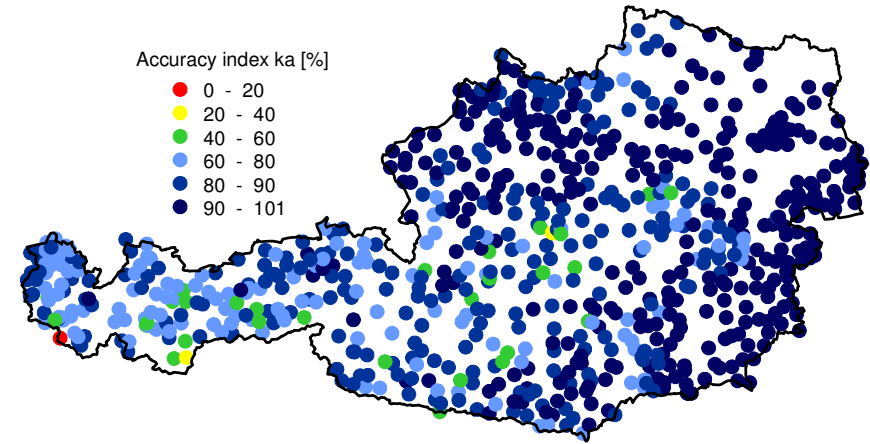
JULES Science Meeting, Met Office, 17 – 18 June 2009

# Accuracy of Austrian Snow Cover Simulations

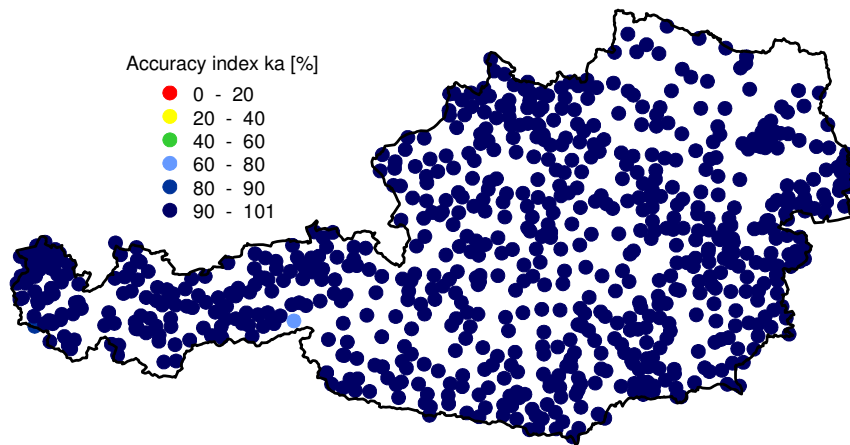
**DEC-FEB**



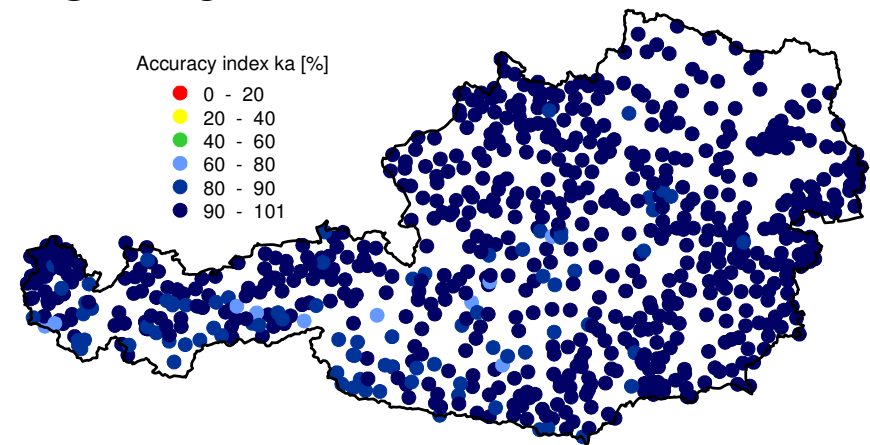
**MAR-MAY**



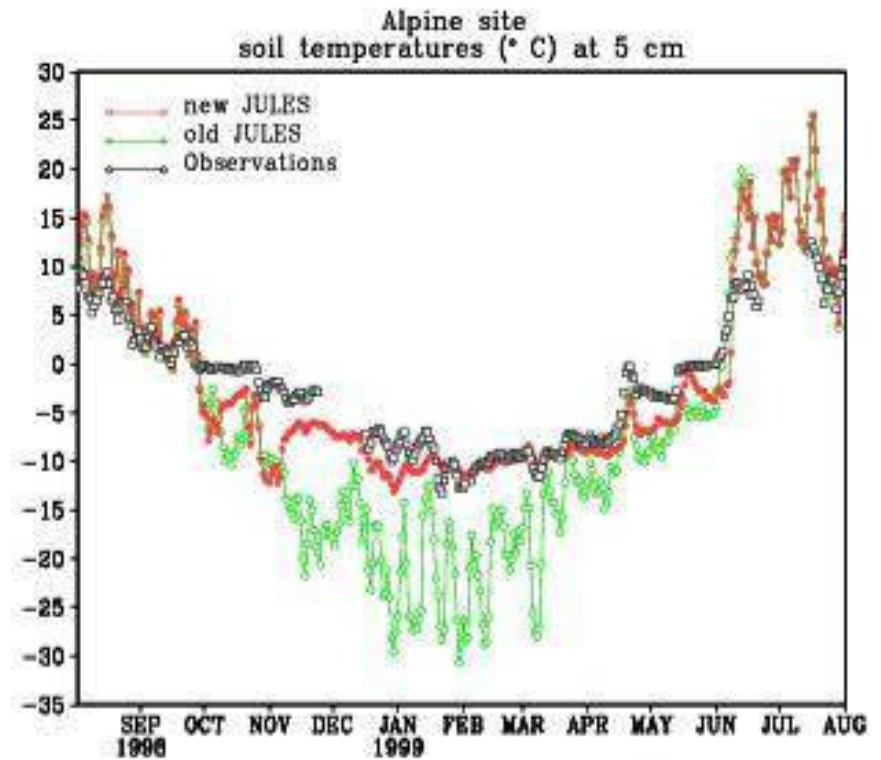
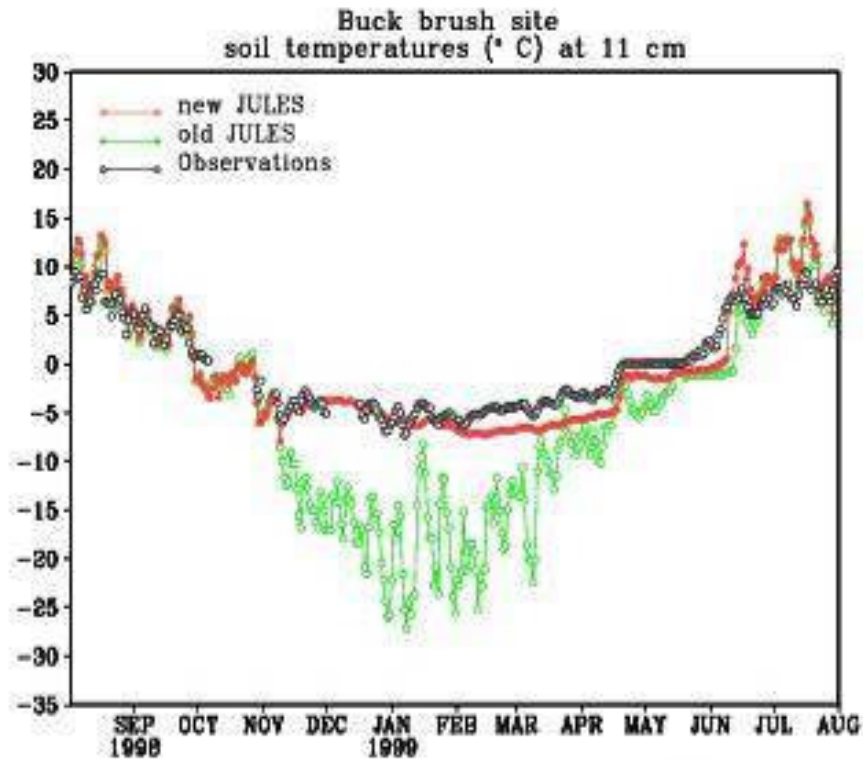
**JUN-AUG**



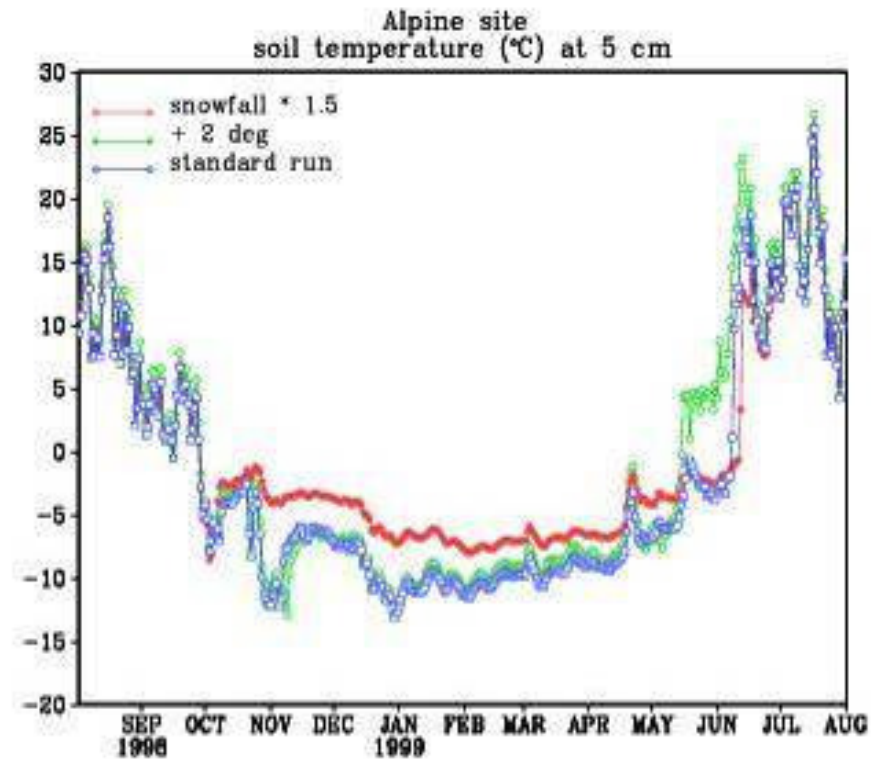
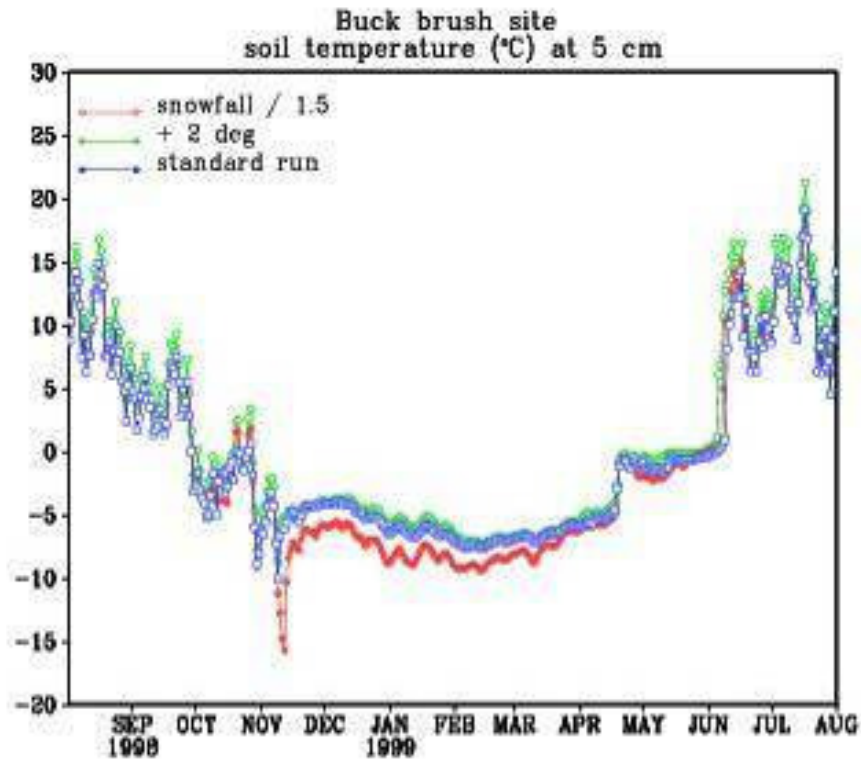
**SEP-NOV**



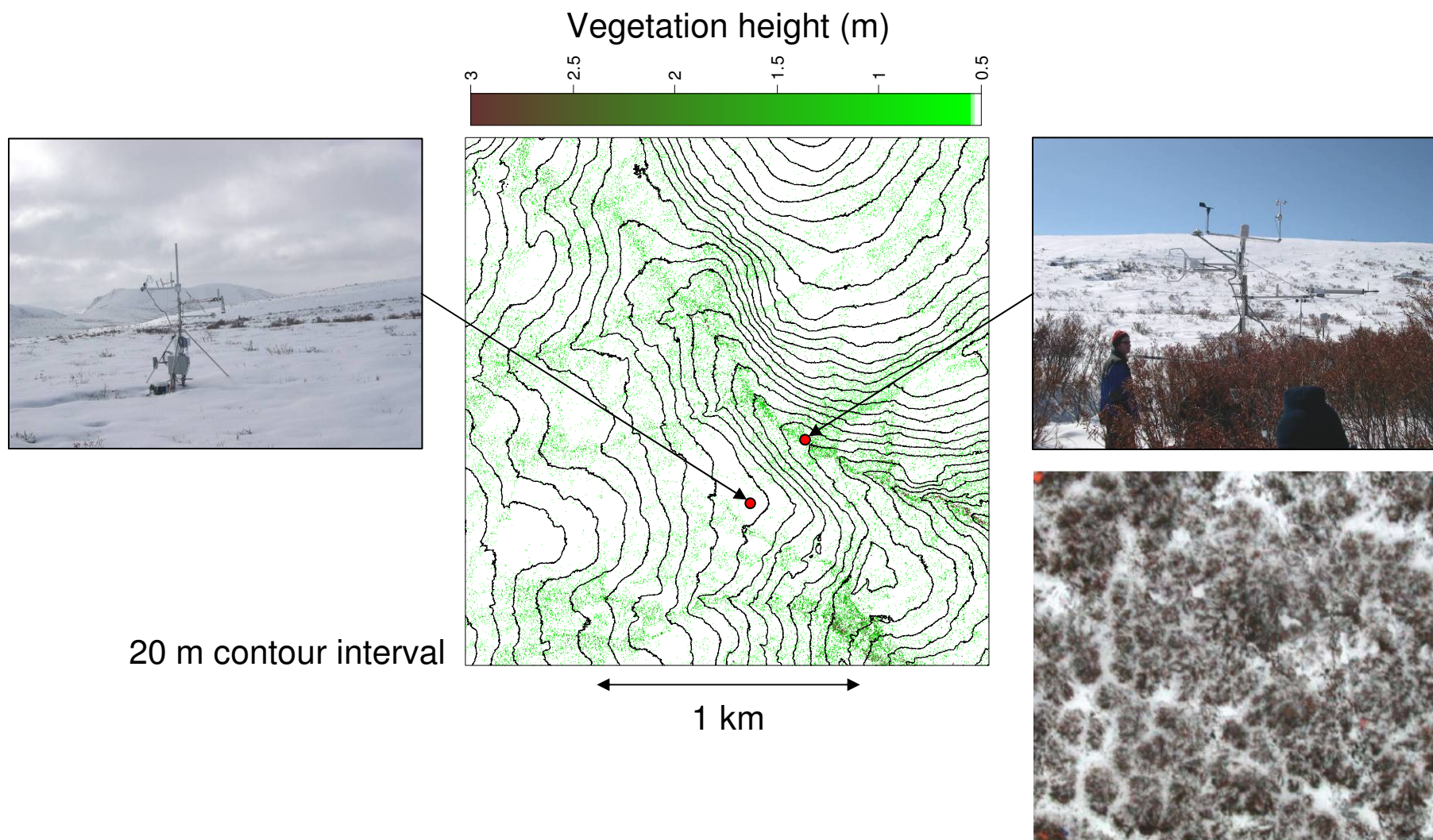
# Impact of Snow Module on Soil Temperature



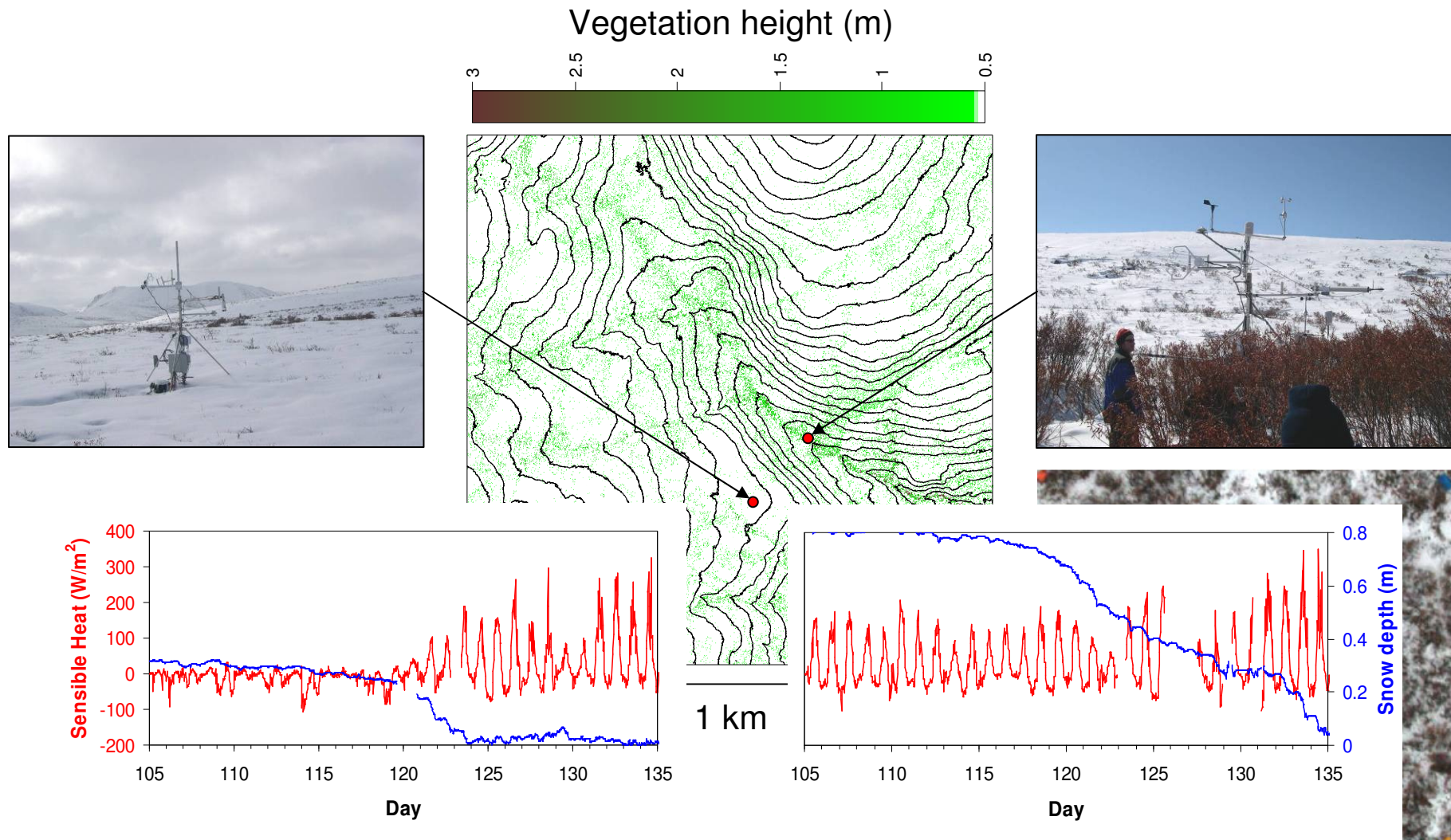
# Impact of Snow and Air Temperature on Soil Temperature



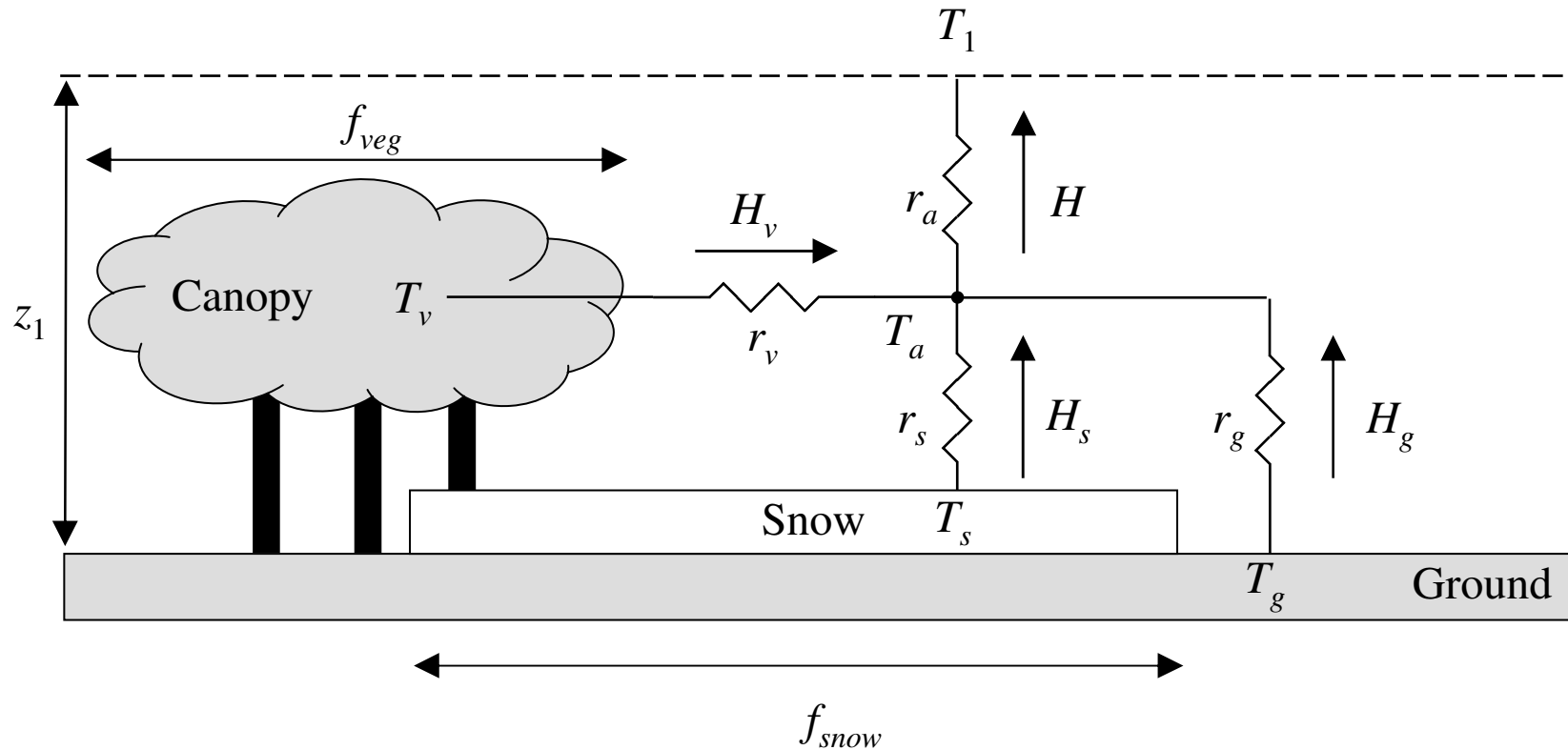
# Impact of Tundra Shrub Expansion



# Impact of Tundra Shrub Expansion



# Three-Source Surface Energy Balance



Snow and exposed vegetation fractions:

$$f_{snow}(S_d, z_0) \quad f_{veg}(S_d, h)$$

# Impact of Snow on Shrubs

19 April

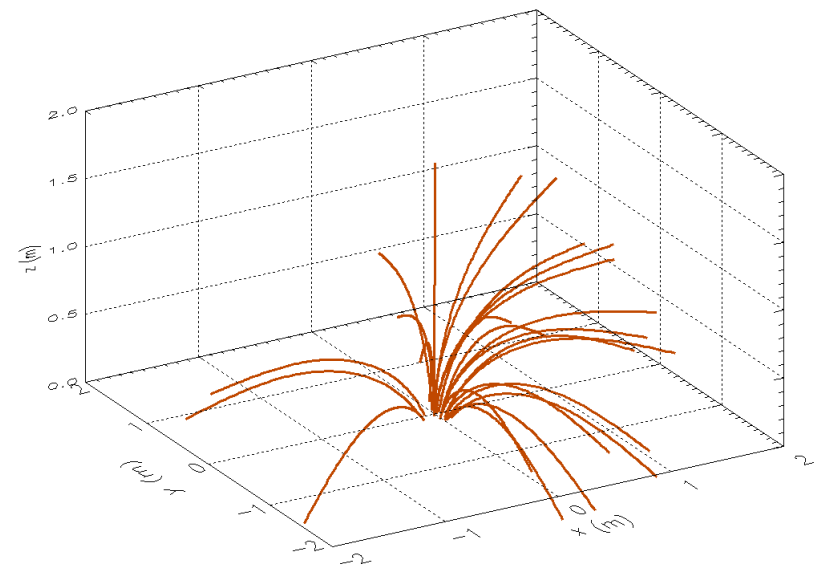
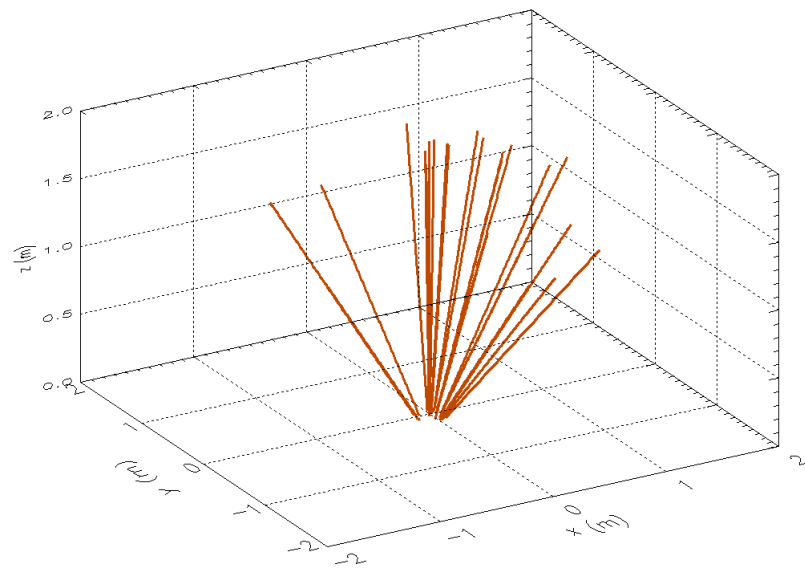


12 May



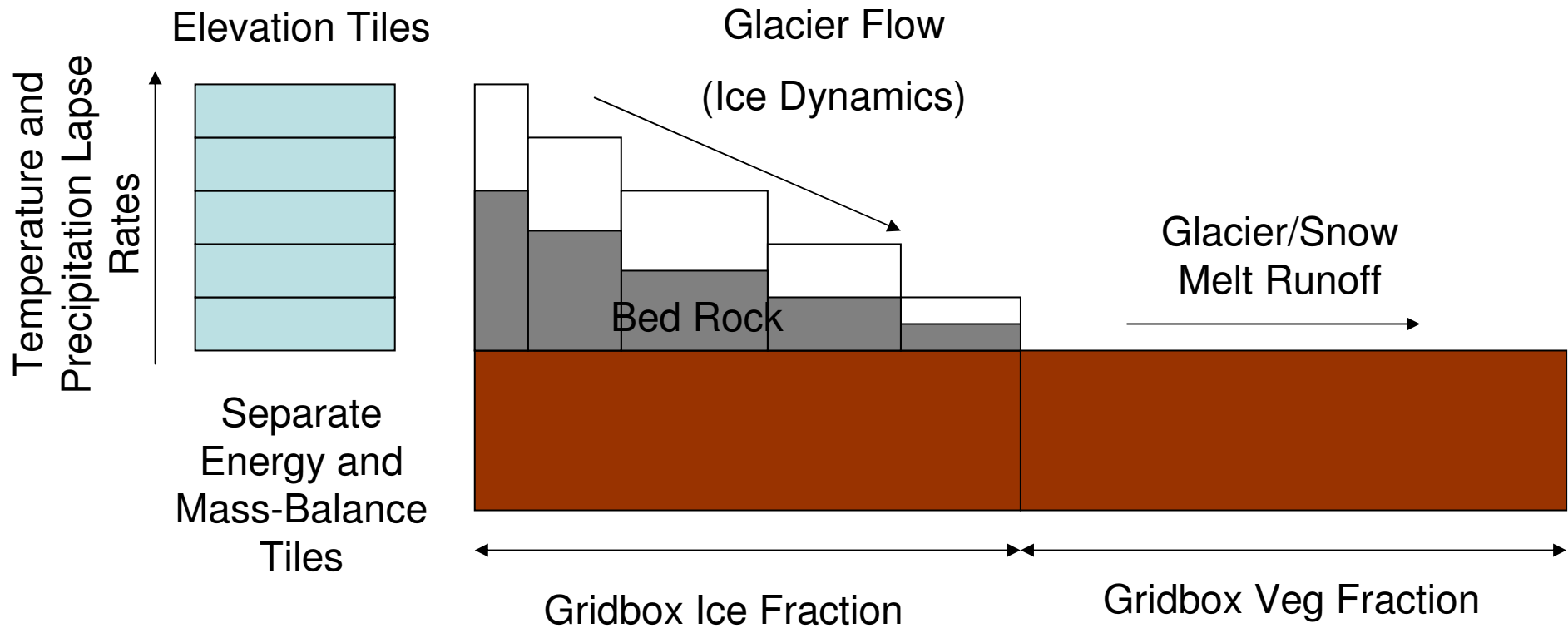


# Shrub Bending Model



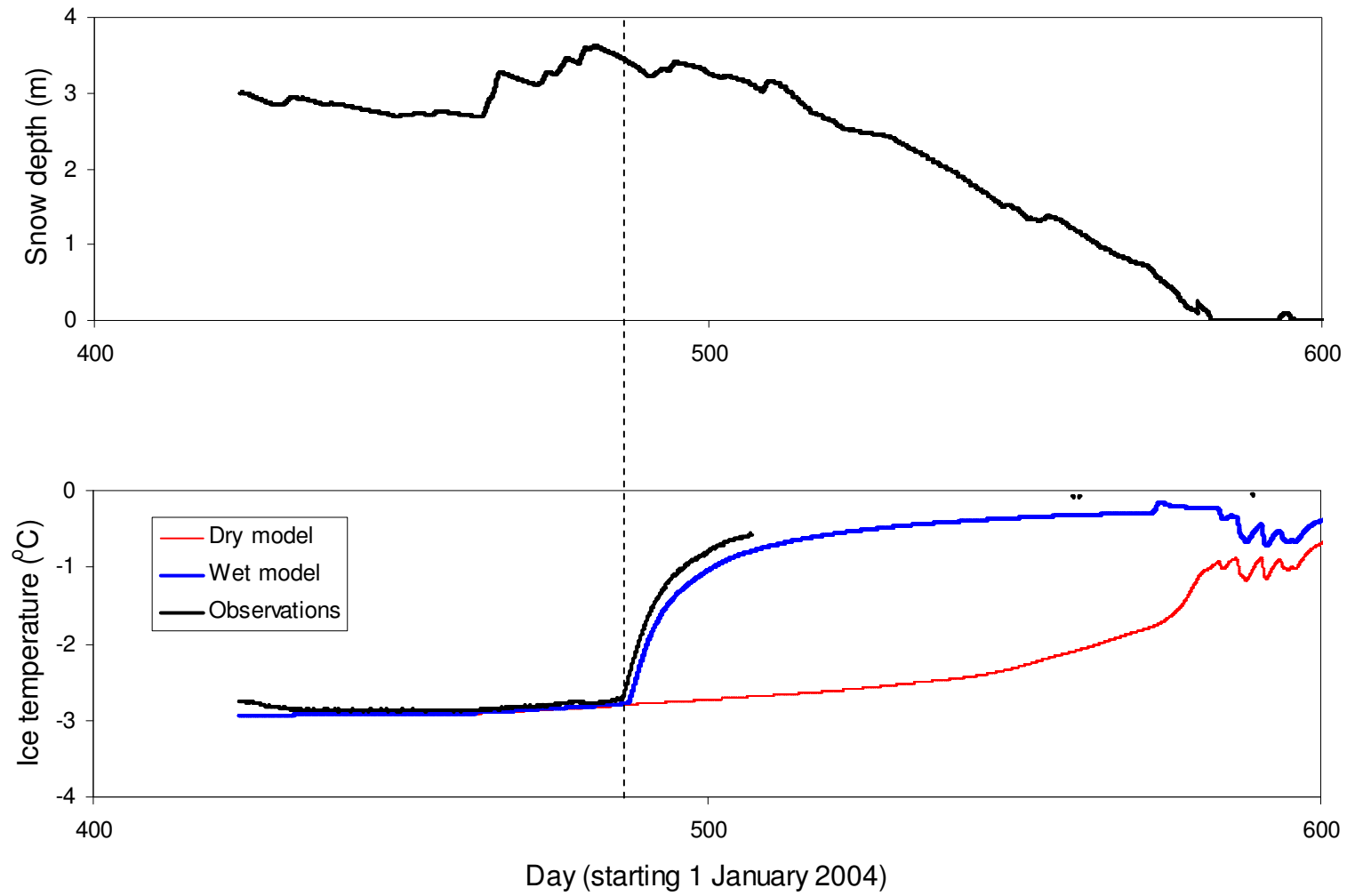
# JULES Subgrid Glacier Model

No mass fluxes between gridboxes – gridbox assumed large compared to glacier area

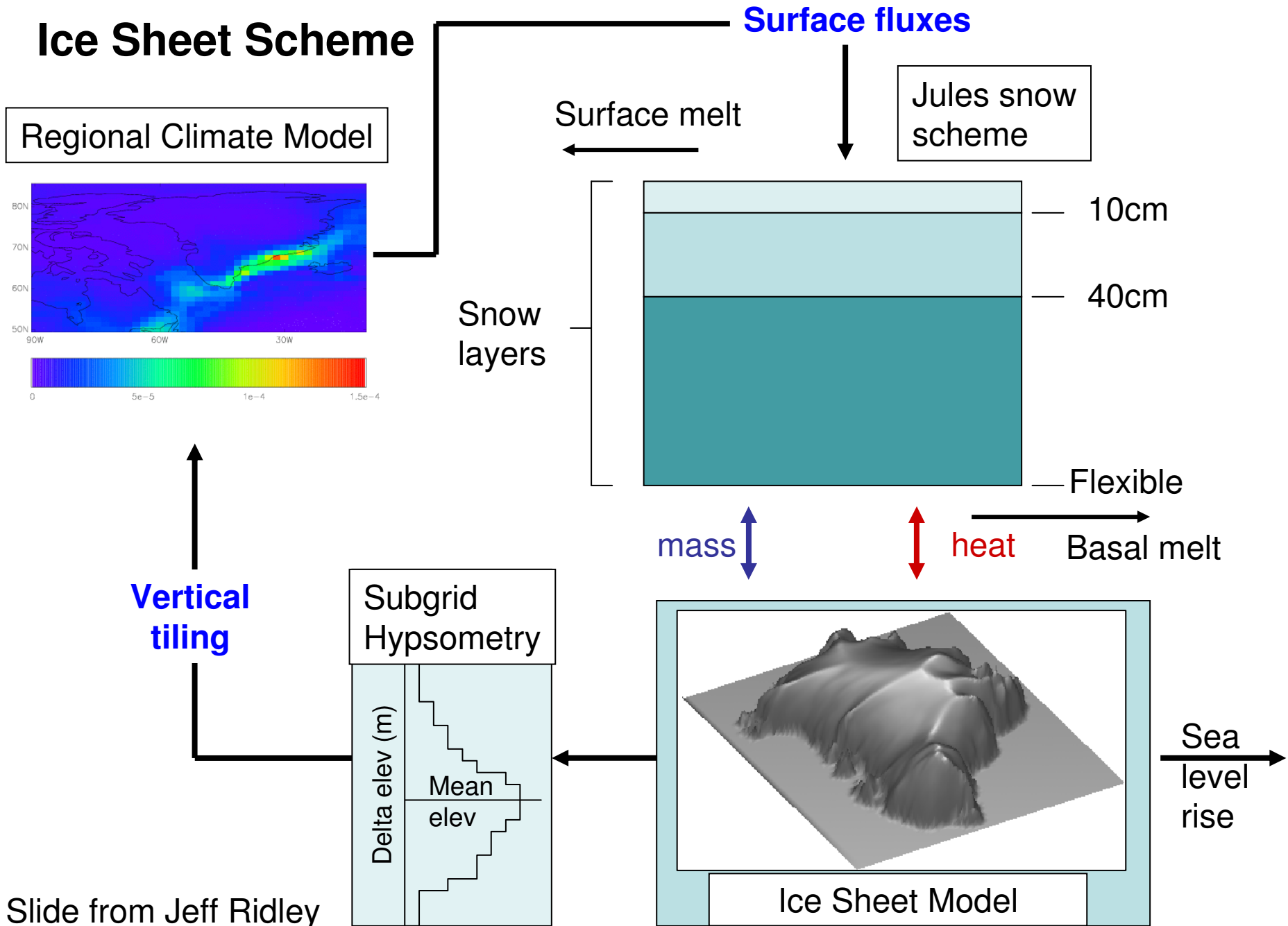


Slide from Andy Wiltshire

# Impact of Snow on Glacier Ice Temperature



# Ice Sheet Scheme



Slide from Jeff Ridley