



Snow and Ice Impacts

Richard Essery

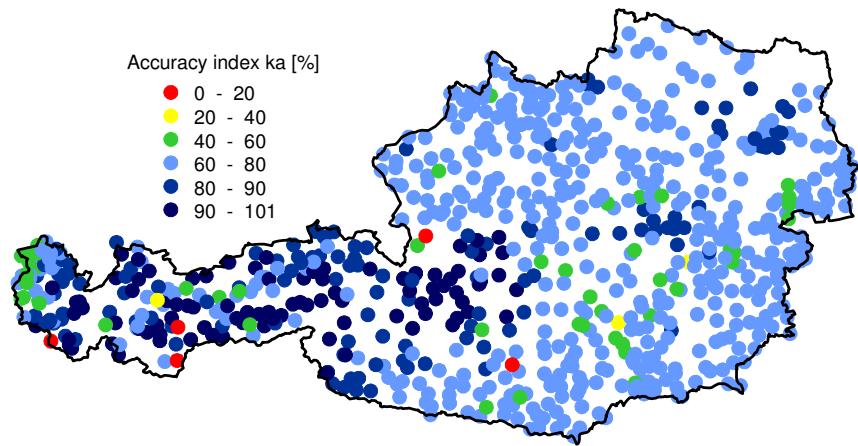
Simon Dadson, Cécile Ménard, Juraj Parajka, Jeff Ridley, Andy Wiltshire



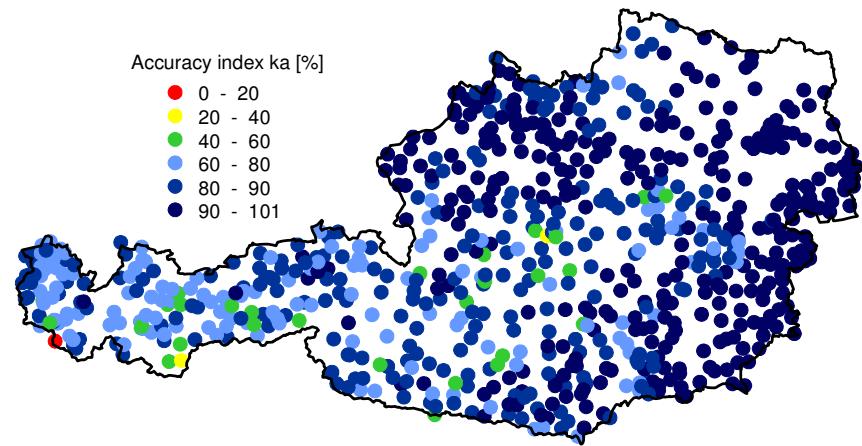
JULES Science Meeting, Met Office, 17 – 18 June 2009

Accuracy of Austrian Snow Cover Simulations

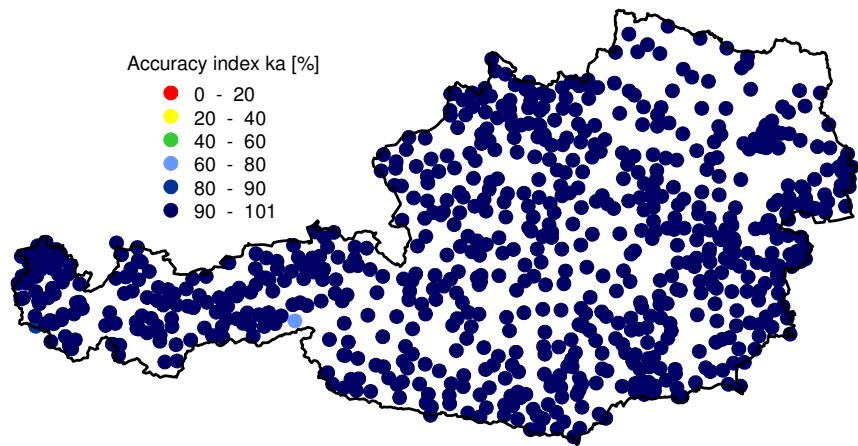
DEC-FEB



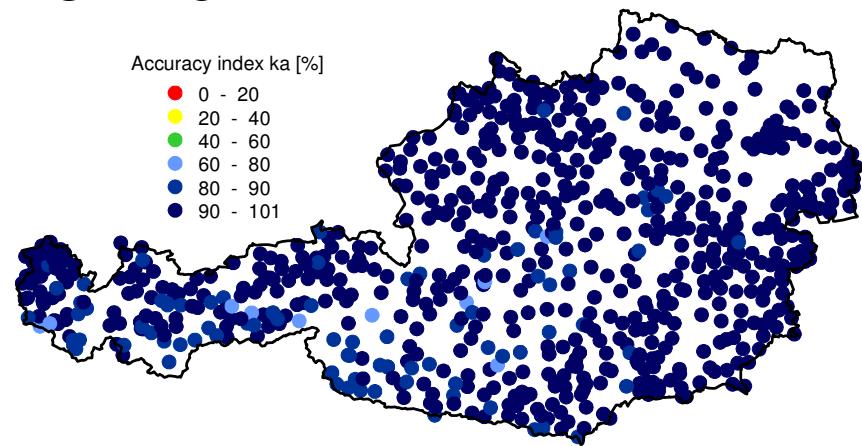
MAR-MAY



JUN-AUG

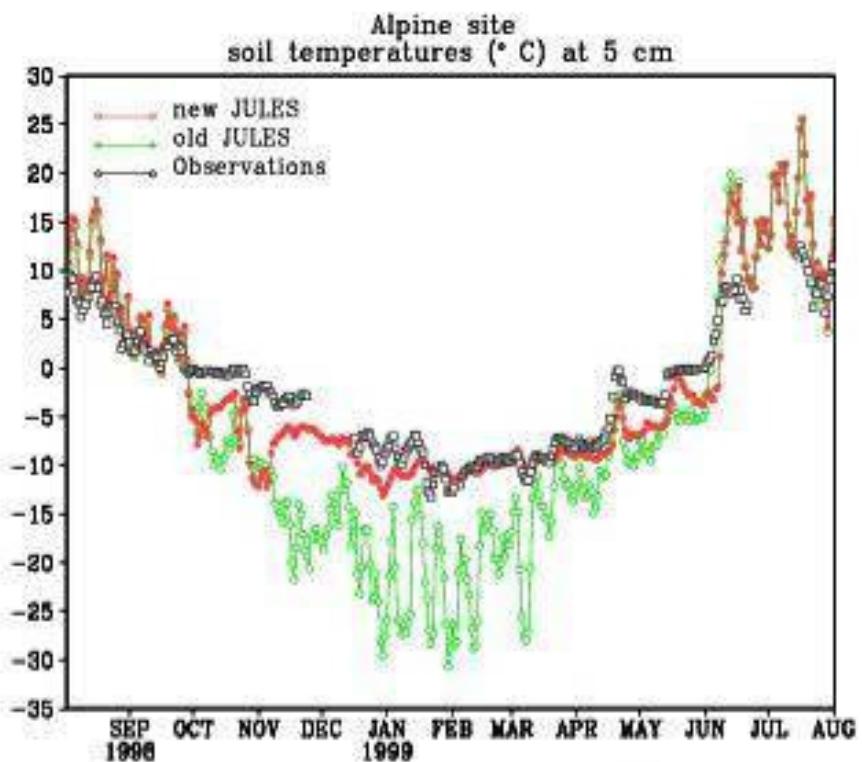
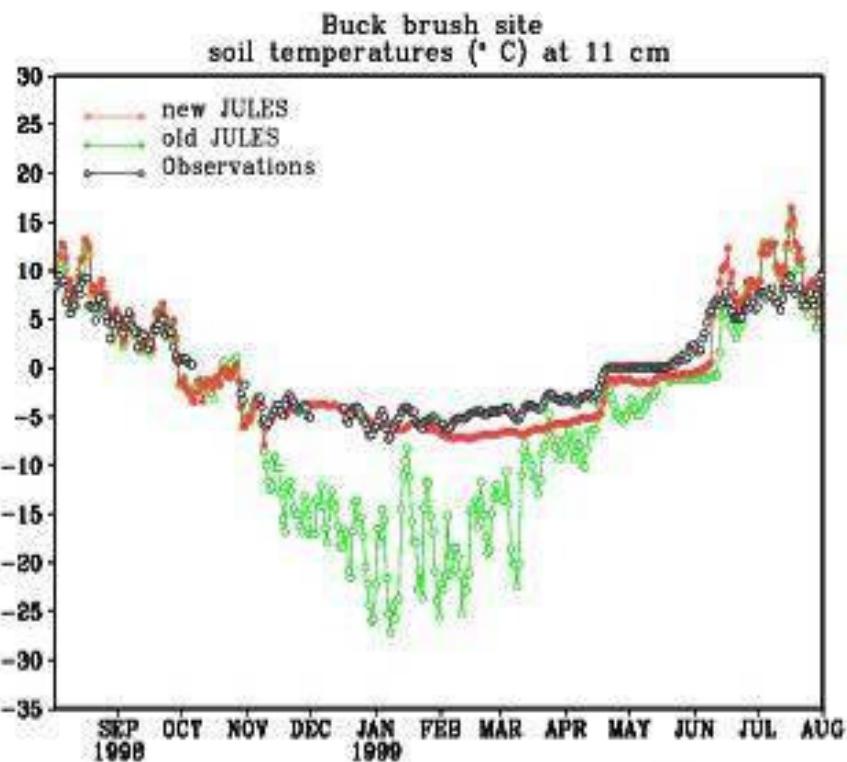


SEP-NOV



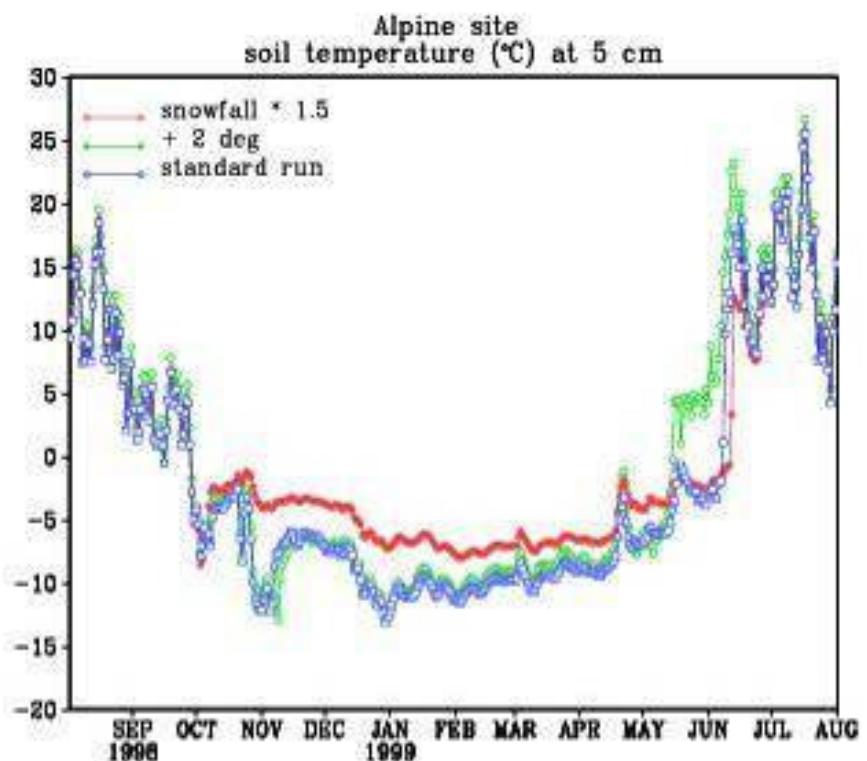
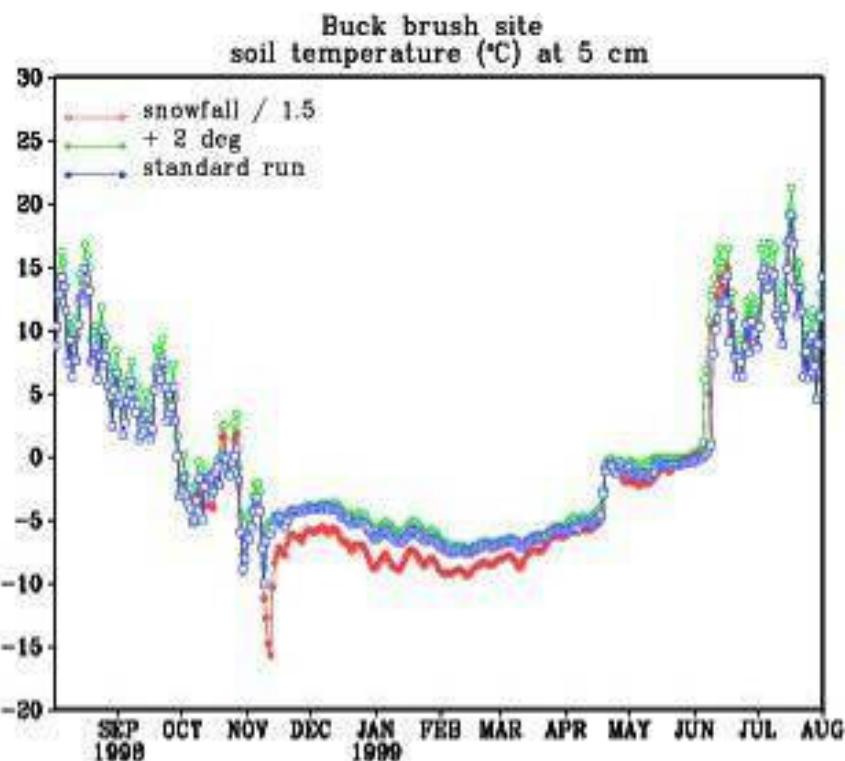
Slide from Simon Dadson

Impact of Snow Module on Soil Temperature

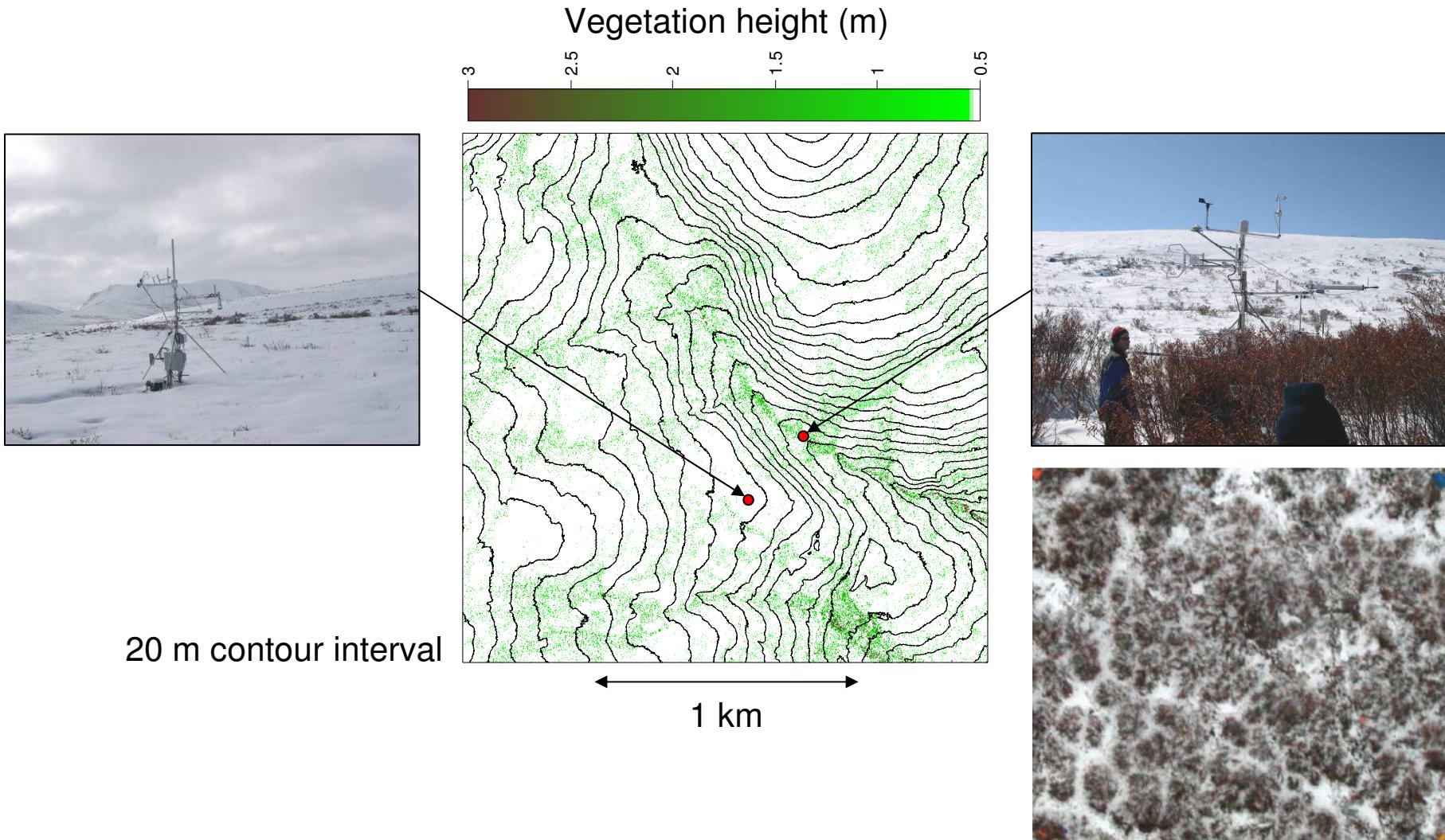


Slide from Cécile Ménard

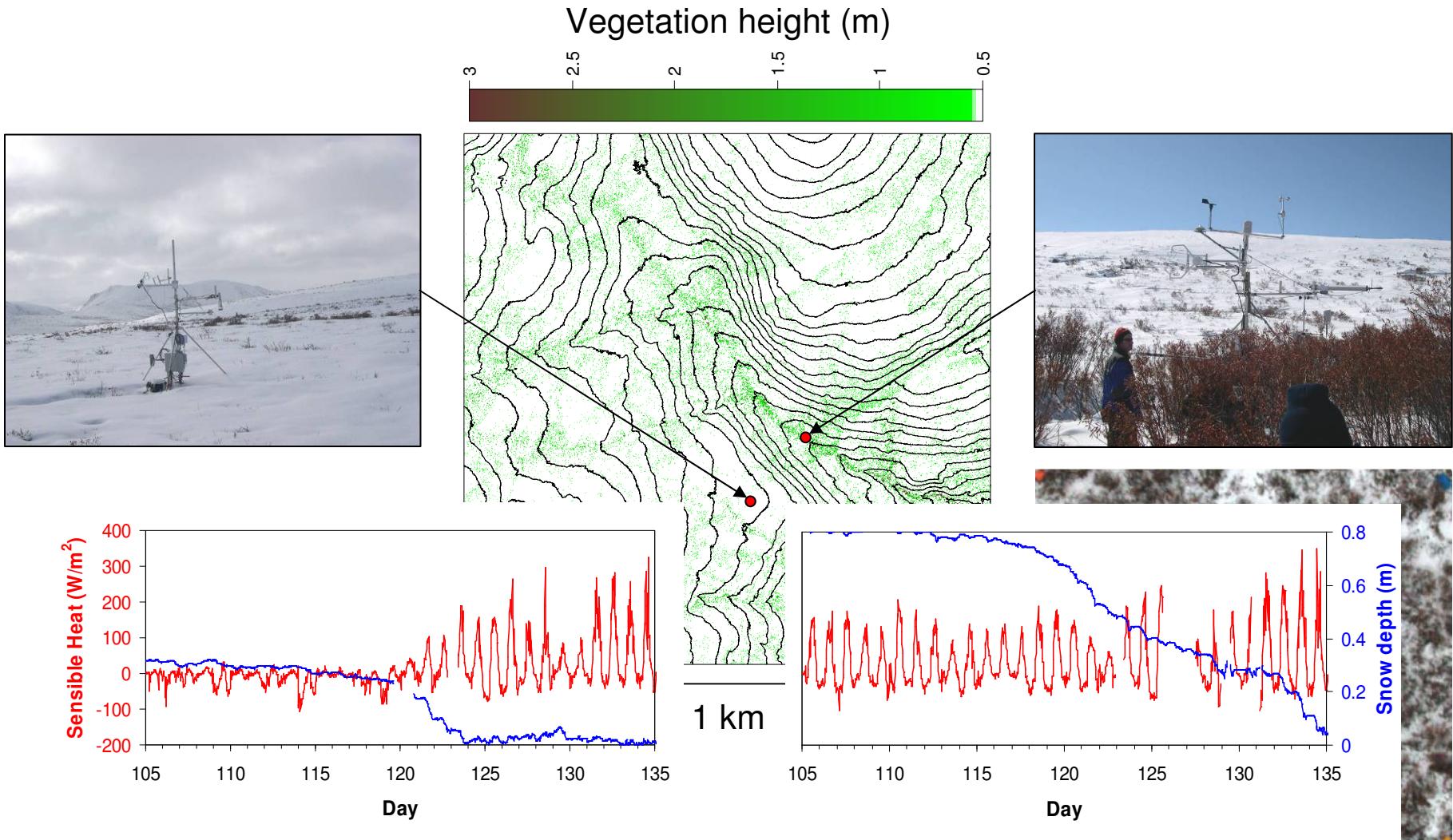
Impact of Snow and Air Temperature on Soil Temperature



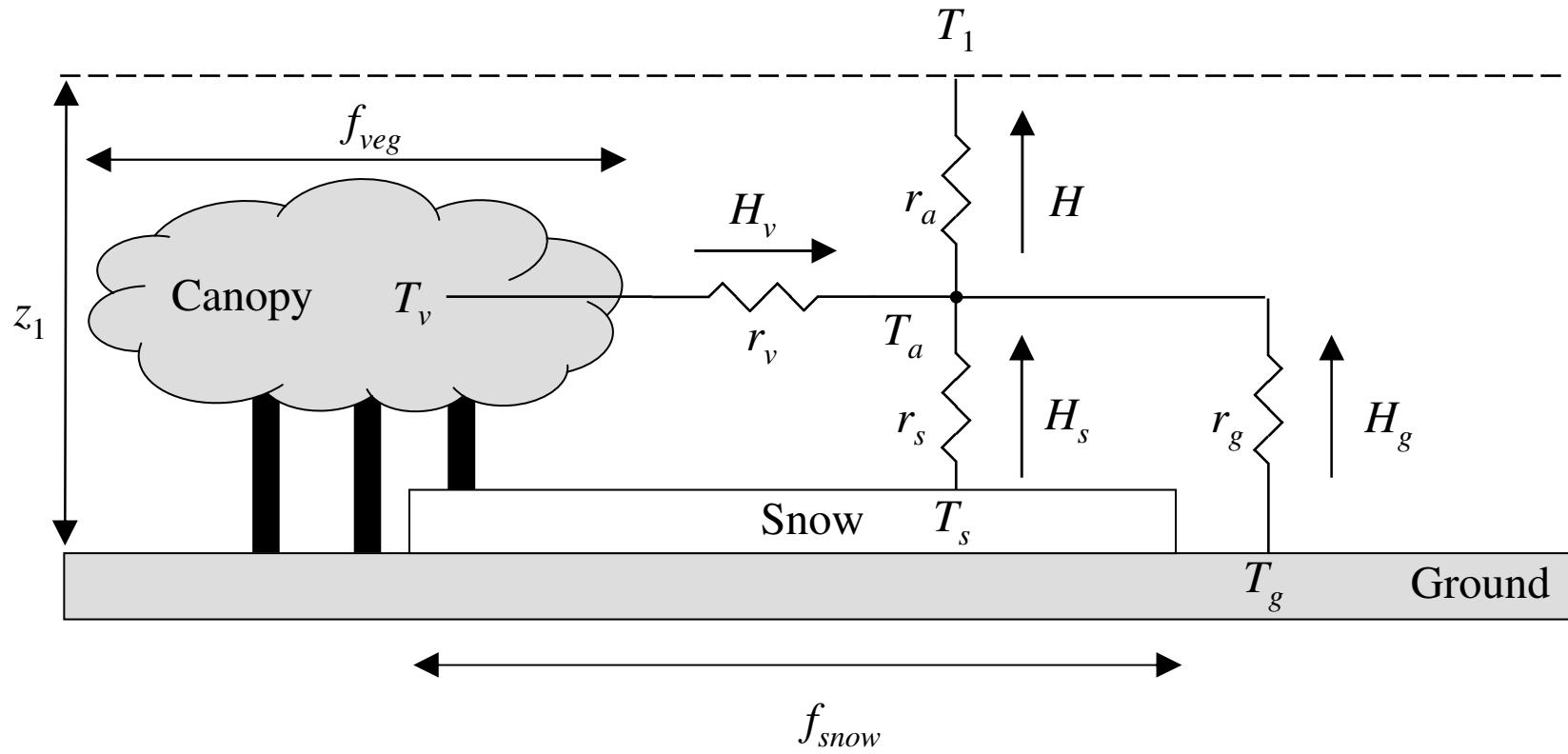
Impact of Tundra Shrub Expansion



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

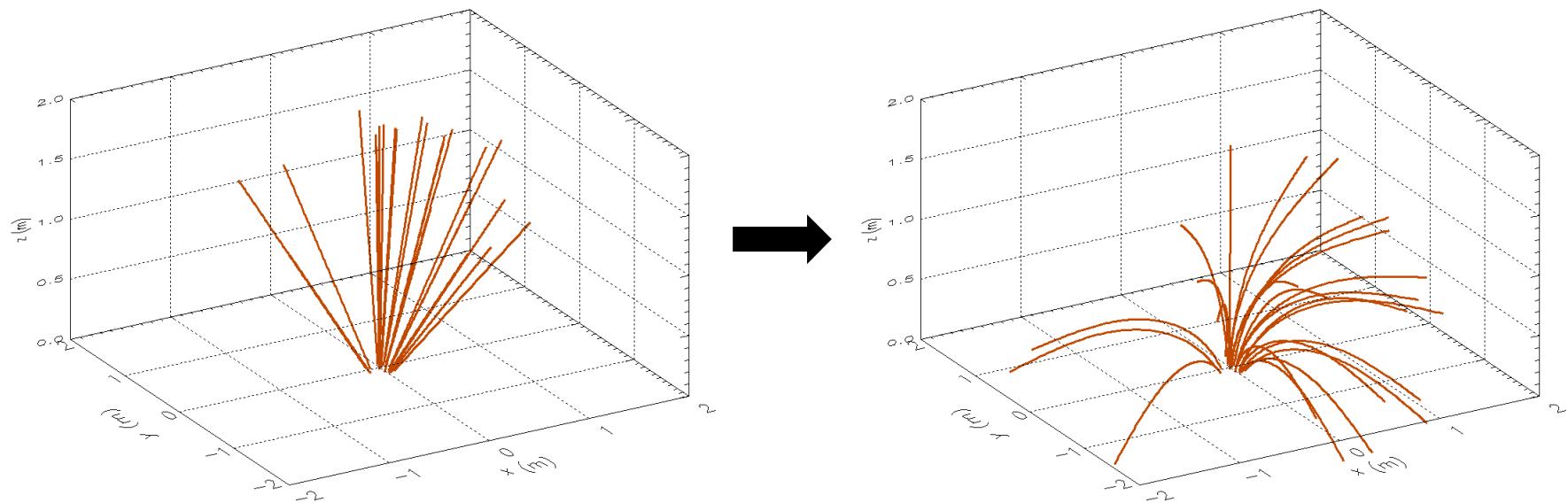
19 April



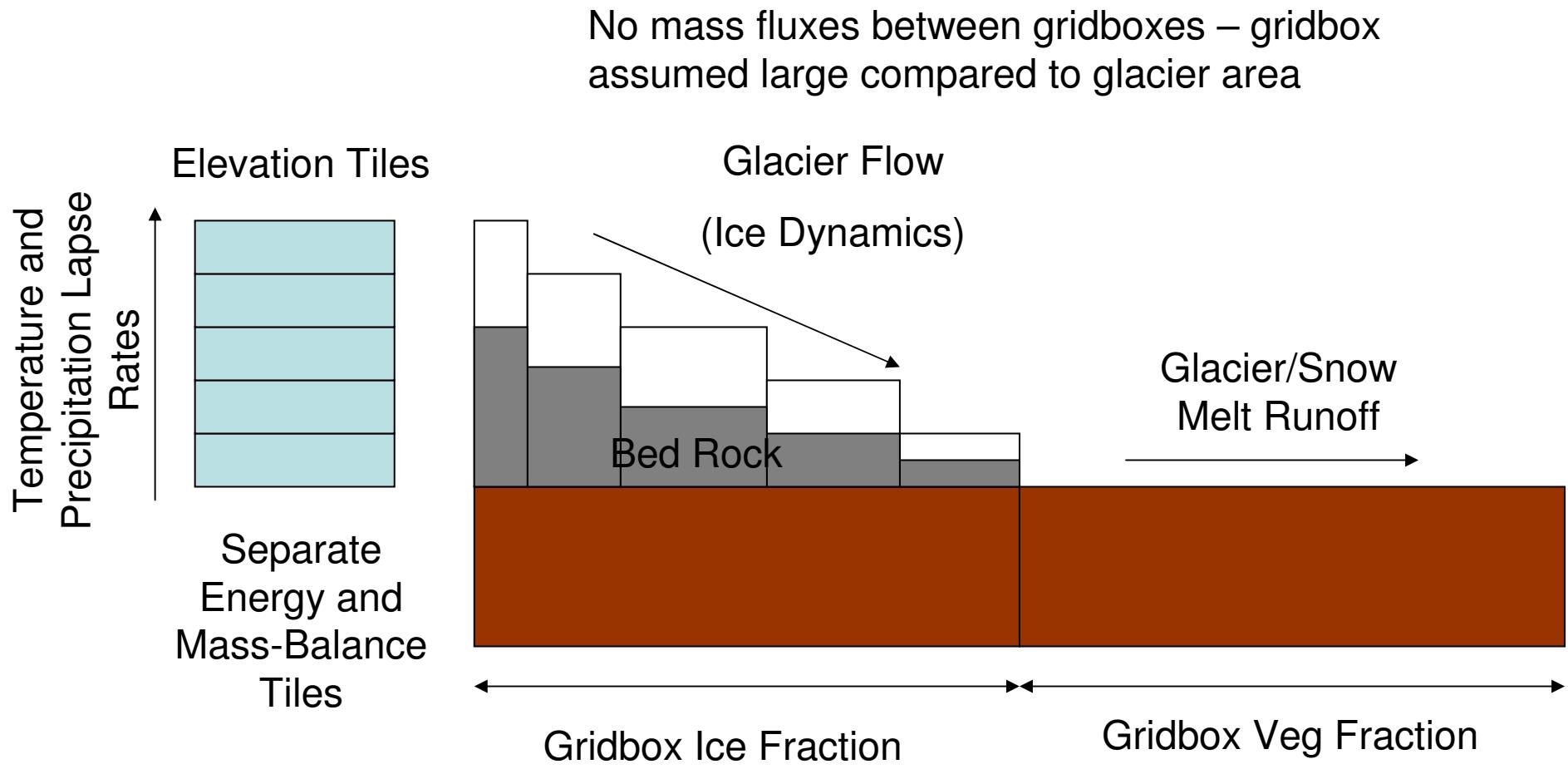
12 May



Shrub Bending Model

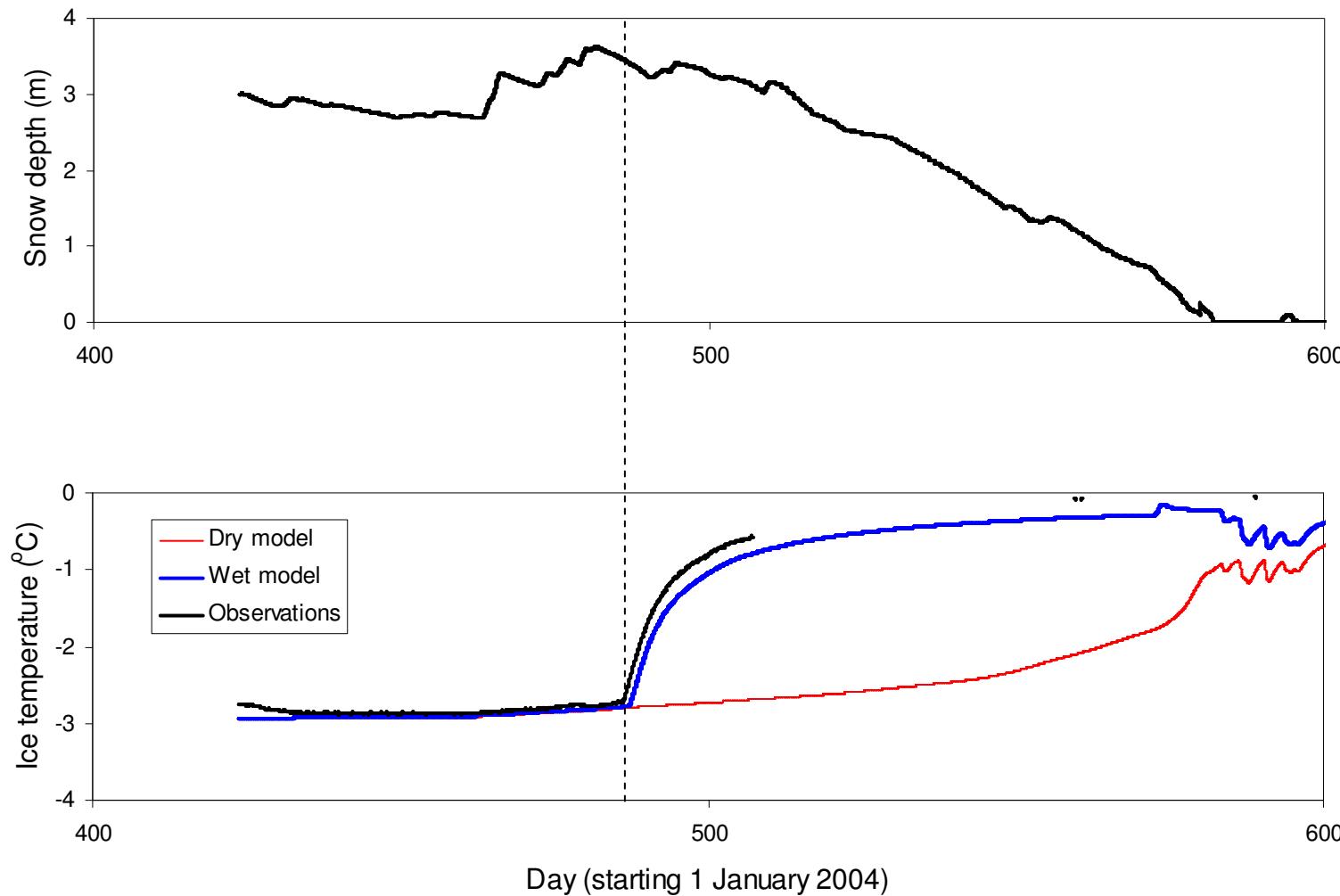


JULES Subgrid Glacier Model



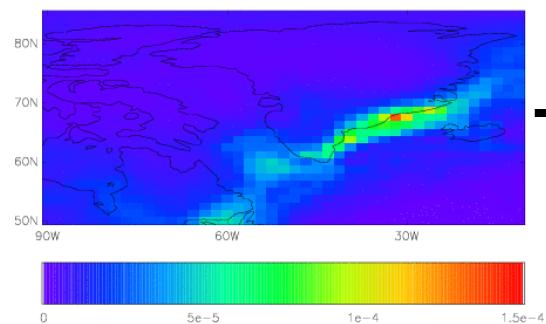
Slide from Andy Wiltshire

Impact of Snow on Glacier Ice Temperature



Ice Sheet Scheme

Regional Climate Model



Surface fluxes

Surface melt

Jules snow
scheme

Snow
layers

10cm

40cm

Flexible

Vertical
tiling

Subgrid
Hypsometry

Delta elev (m)

Mean
elev

mass

heat

Basal melt

Sea
level
rise

Ice Sheet Model

Slide from Jeff Ridley