

Effect of the new snow module on snow runoff soil temperatures

Cecile Menard, Richard
Essery, Doug Clark



Outline

1. Before we start...
2. Snow
3. Runoff
4. Soil
5. Conclusion

1. Before we start....

| | | |
|-----------|-------------------------|--|
| can_model | integer 1, 2, 3 or 4 | <p>Choice of canopy model for vegetation:</p> <p>1: No canopy. 2: Radiative canopy with no heat capacity. 3: Radiative canopy with heat capacity. 4: As 3 but with a representation of snow beneath the canopy.</p> <ul style="list-style-type: none"> • NB can_model=1 does <i>not</i> mean that there is no vegetation canopy. It means that the surface is represented as a single entity, rather than having distinct surface and canopy levels for the purposes of radiative processes. |
|-----------|-------------------------|--|

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#####

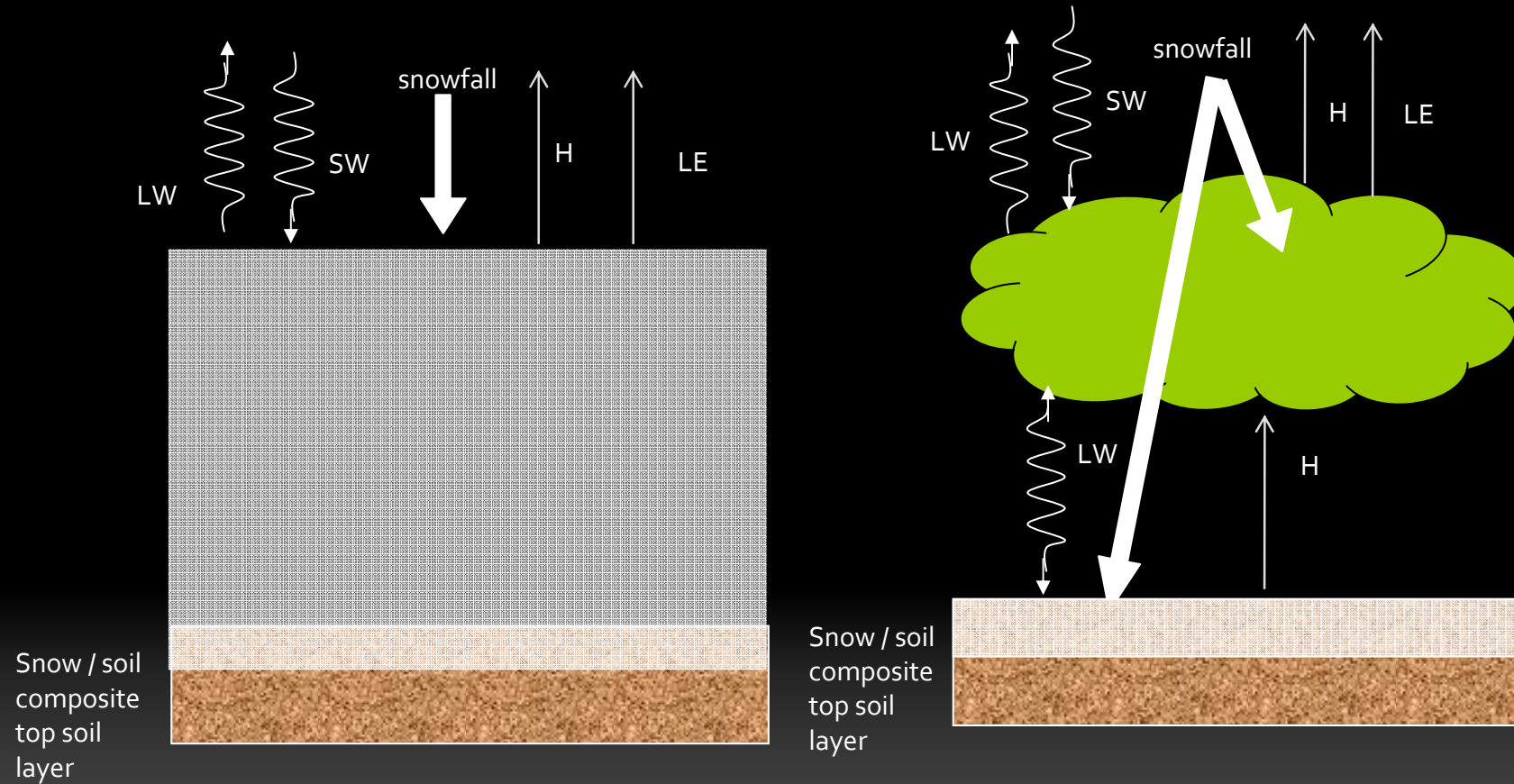
## Model options.
>INIT_OPTS

7,2      !  npft,nvng
9        !  ntiles

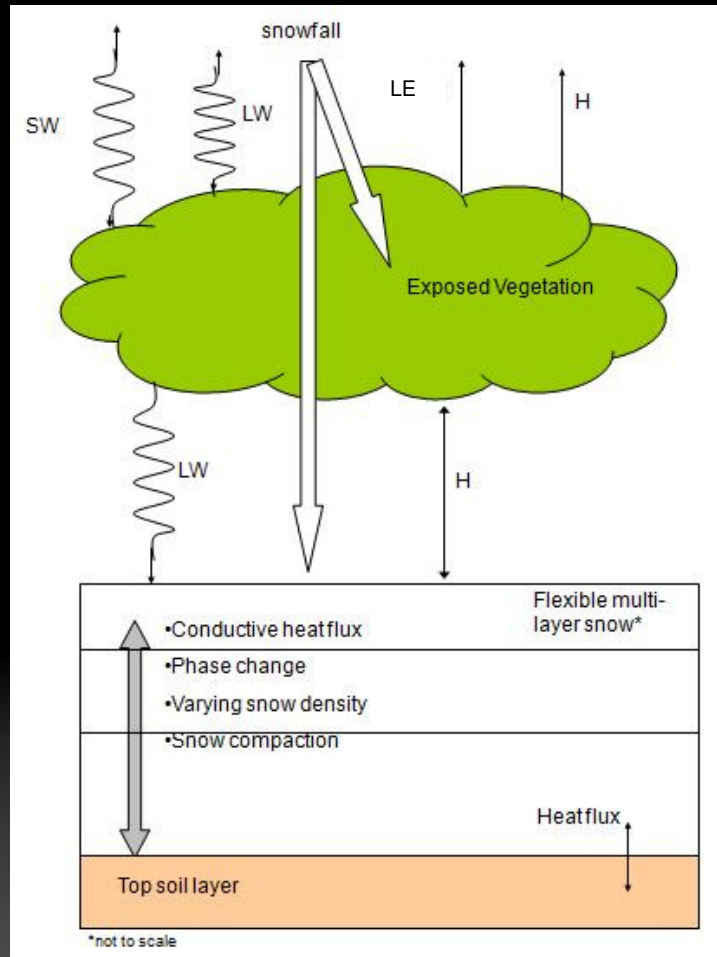
'EgNF', 'MF', 'WL', 'WG', 'CS', 'OS', 'G'   !  pftName
'water', 'soil'      !  nvngName

29,14    !  nxIn,nyIn
4        !  sm_levels
4        !  can_model
3,10     !  can_rad_mod,ilayers
E,T     !  l cosz,l spec albedo
    
```

1. Before we start....

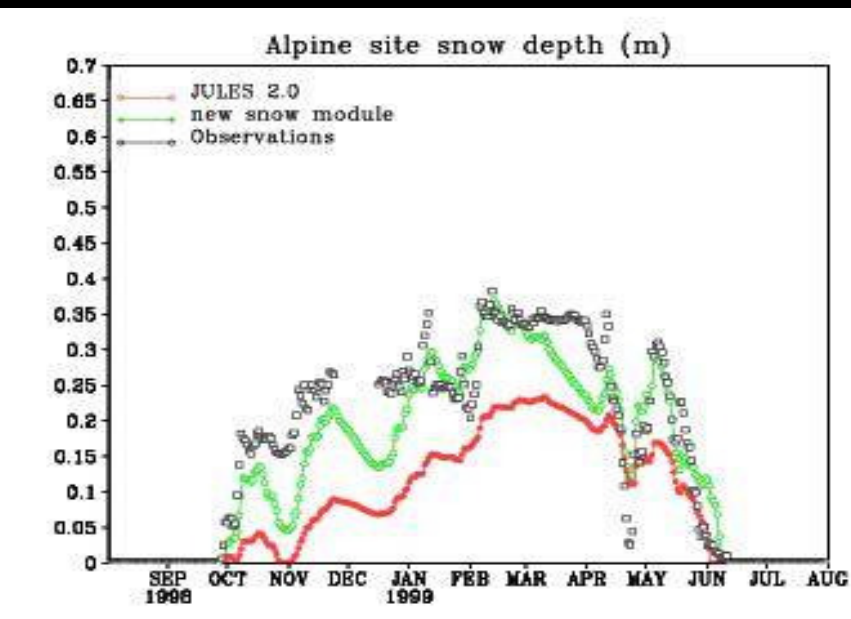
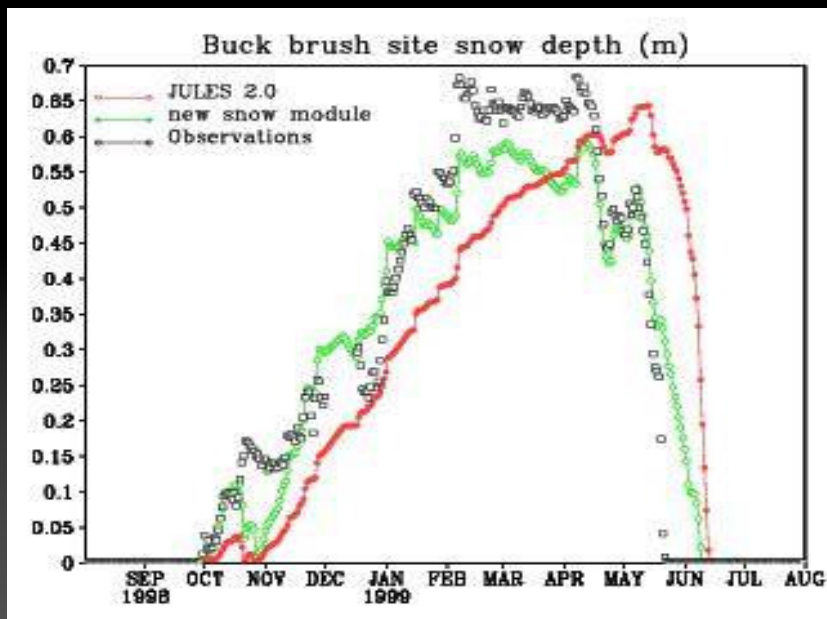
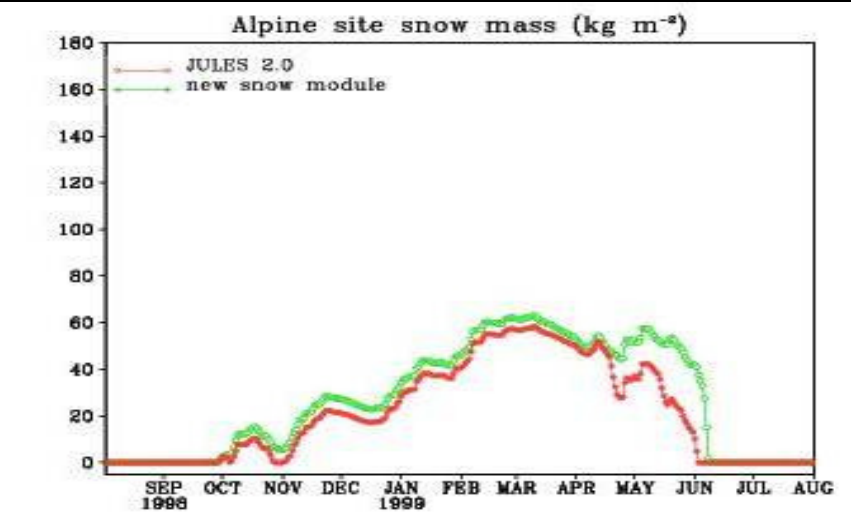
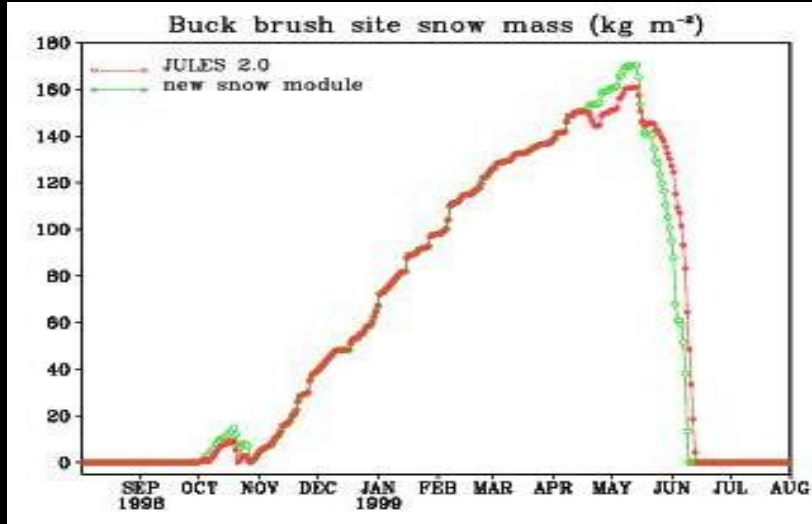


What is in the new snow module?

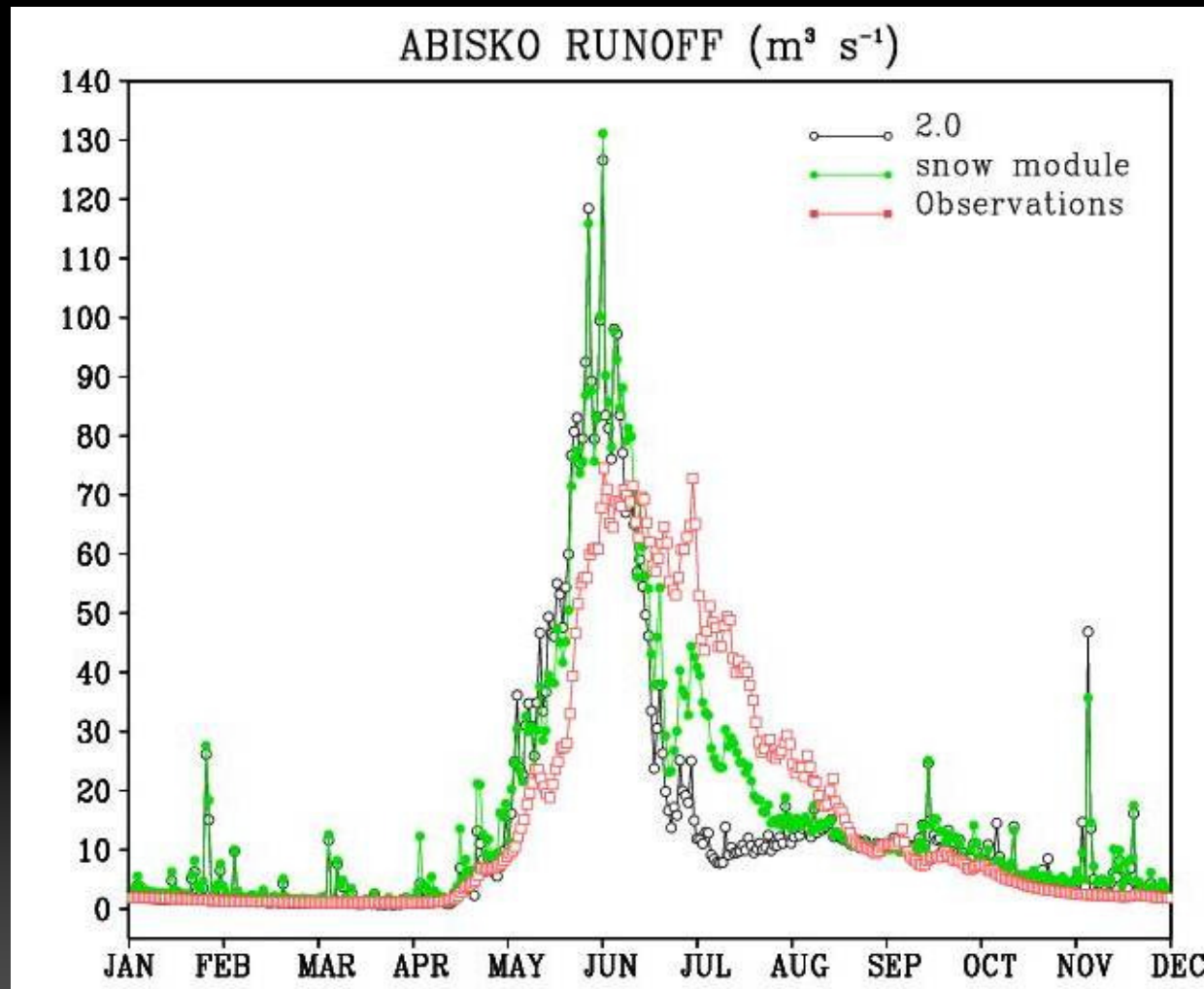


- Multiple snow layers
- Varying snow density
- Separate temperature
- Liquid water storage

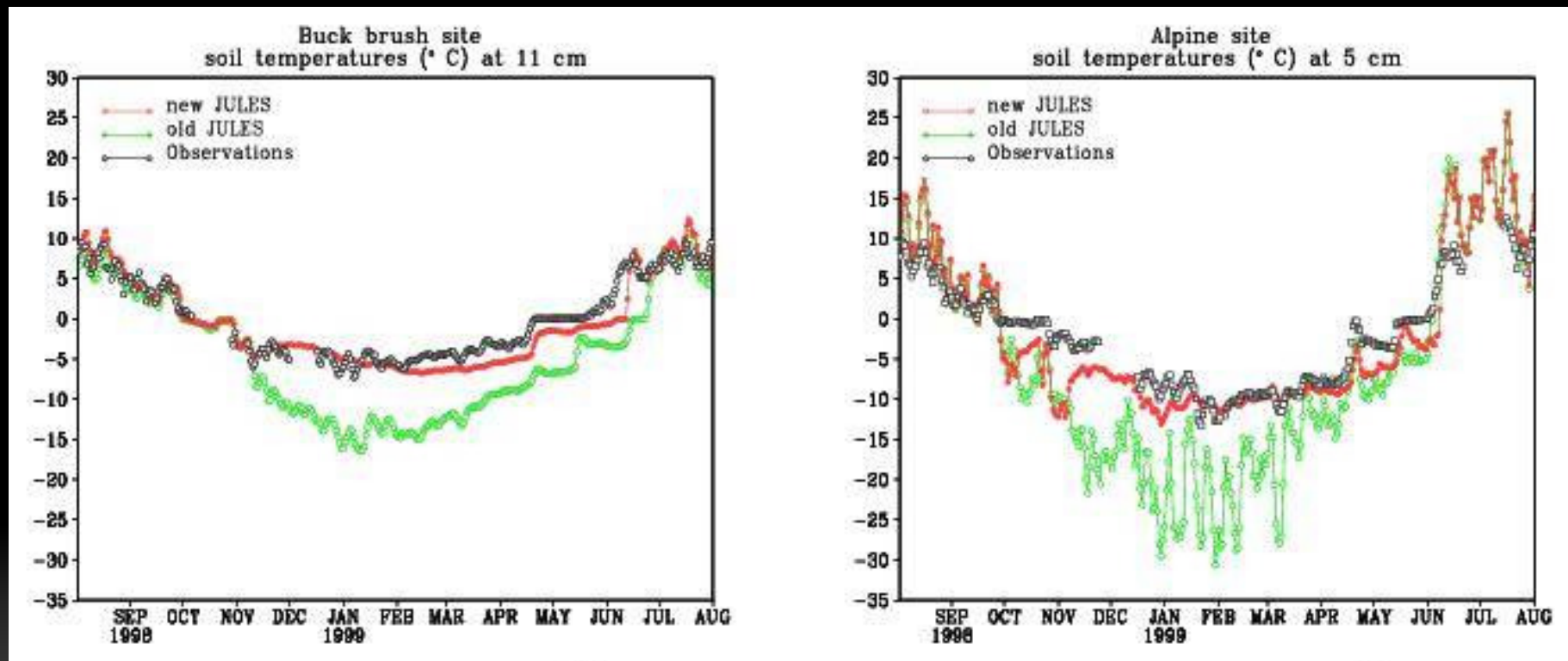
Evaluation data: Vegetated (tall shrubs) & bare soil sites in Wolf Creek, Yukon Territory, Canada



Evaluation data: Daily climatological runoff, **Abisko catchment, Sweden**



Soil temperatures at a vegetated (tall shrubs) site & a bare soil site in Wolf Creek, Yukon Territory, Canada



Conclusion:

Effect of the new snow module on:

- Snow → Good !
- Soil temperatures → Very good !
- Runoff → Not too bad

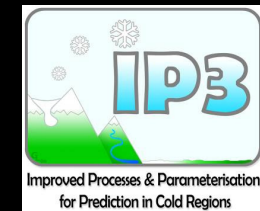
Reference (canopy model 4):

- Essery *et al*, 2003, Sublimation of snow from coniferous forests in a climate model, *Journal of Climate*, **16**, 1855:1864



Acknowledgements

The Wolf Creek data were provided by the IP3 network



The Abisko data were provided by Laura Bowling as part of the PILPS2e experiments

