Comparison of Boreal Winter simulated by CABLE and MOSES in ACCESS

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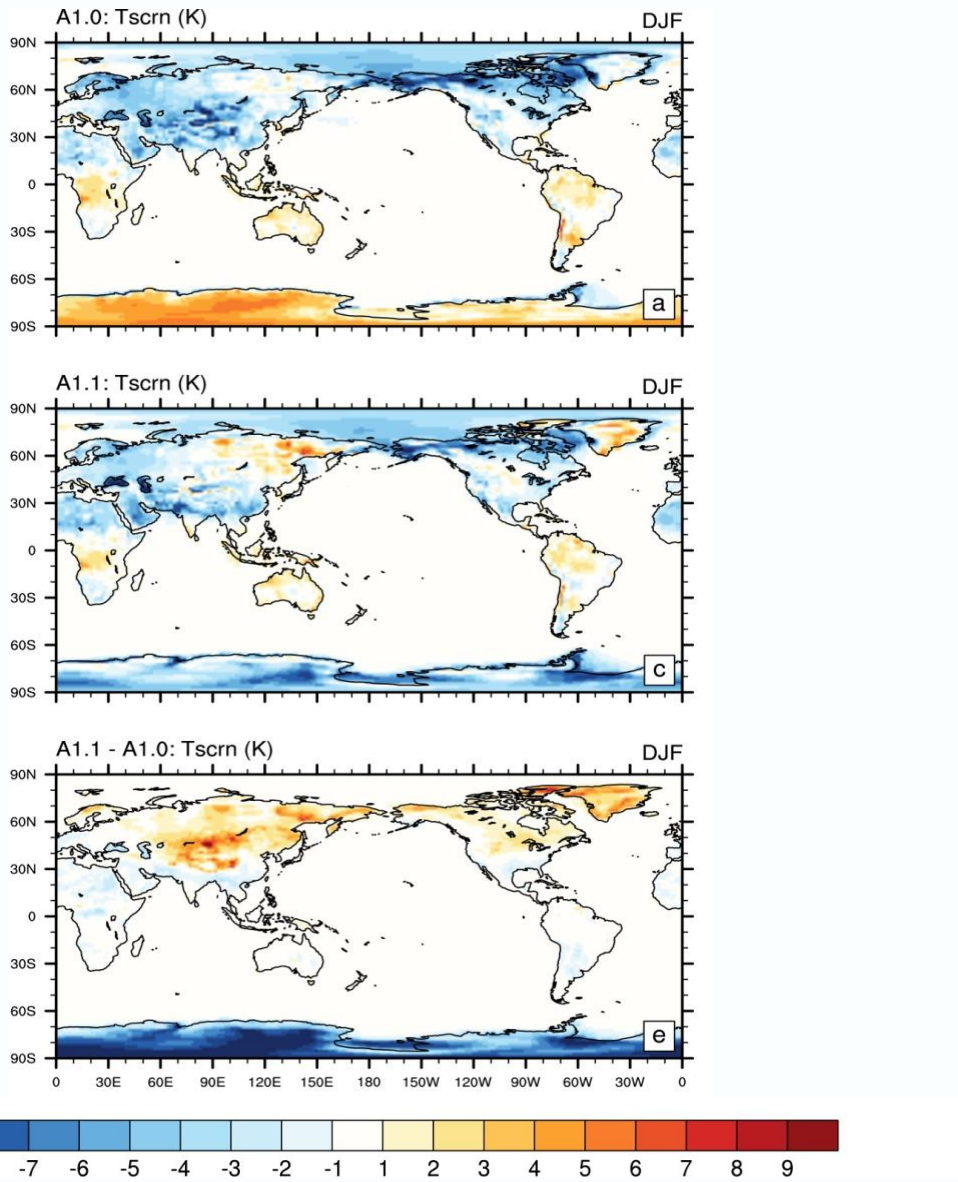
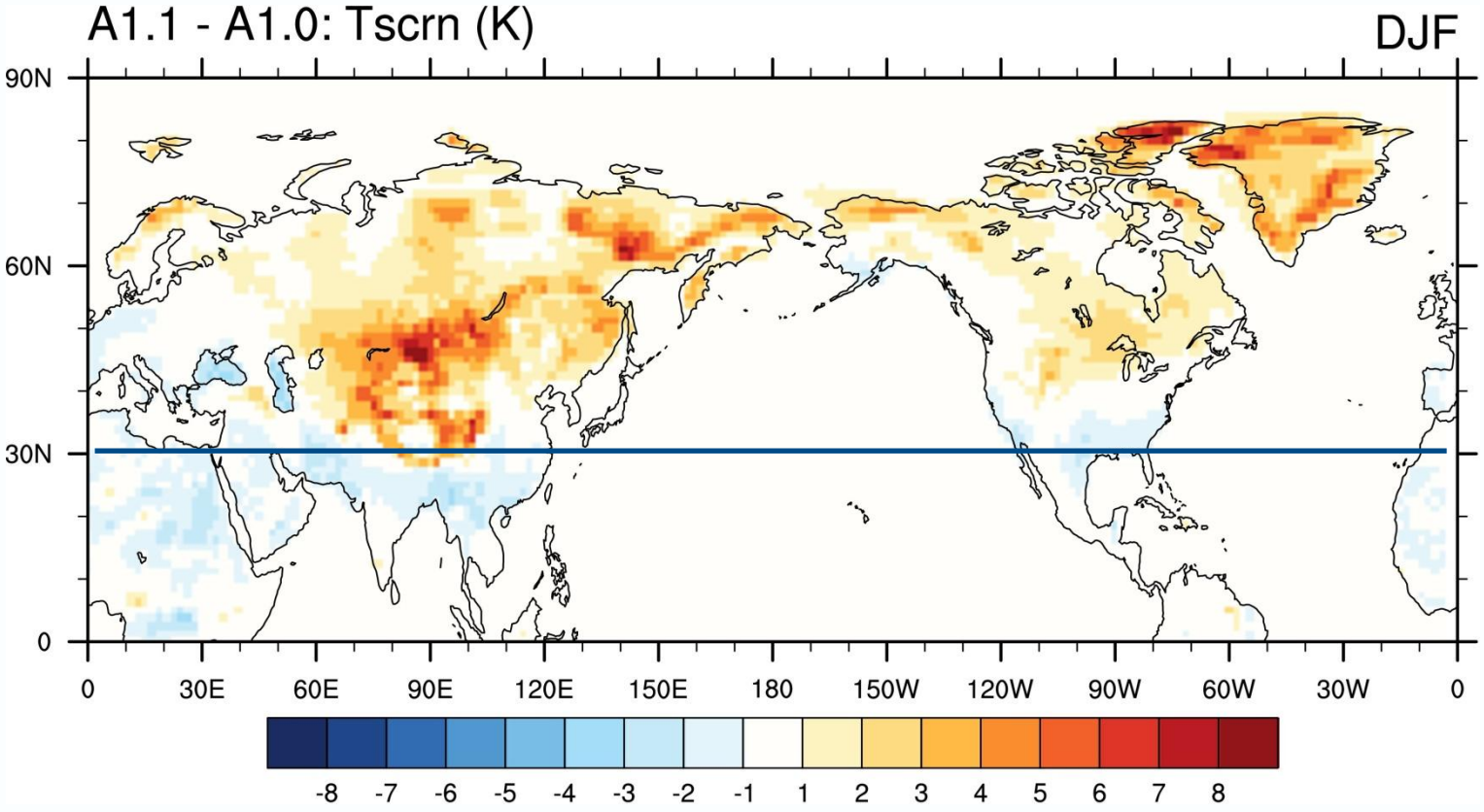
Tscrn: DJF Bias

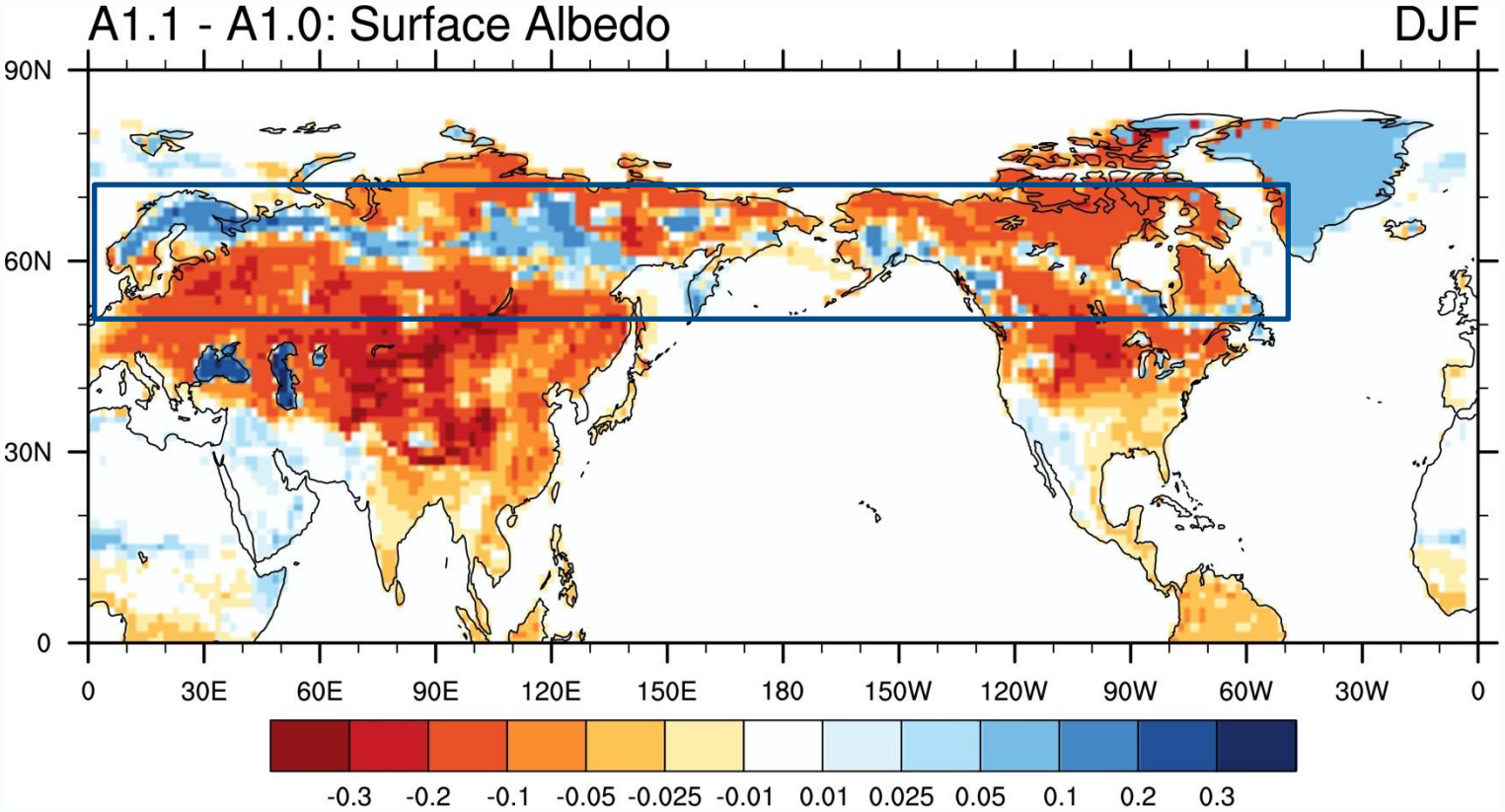


Screen Temperature (K)

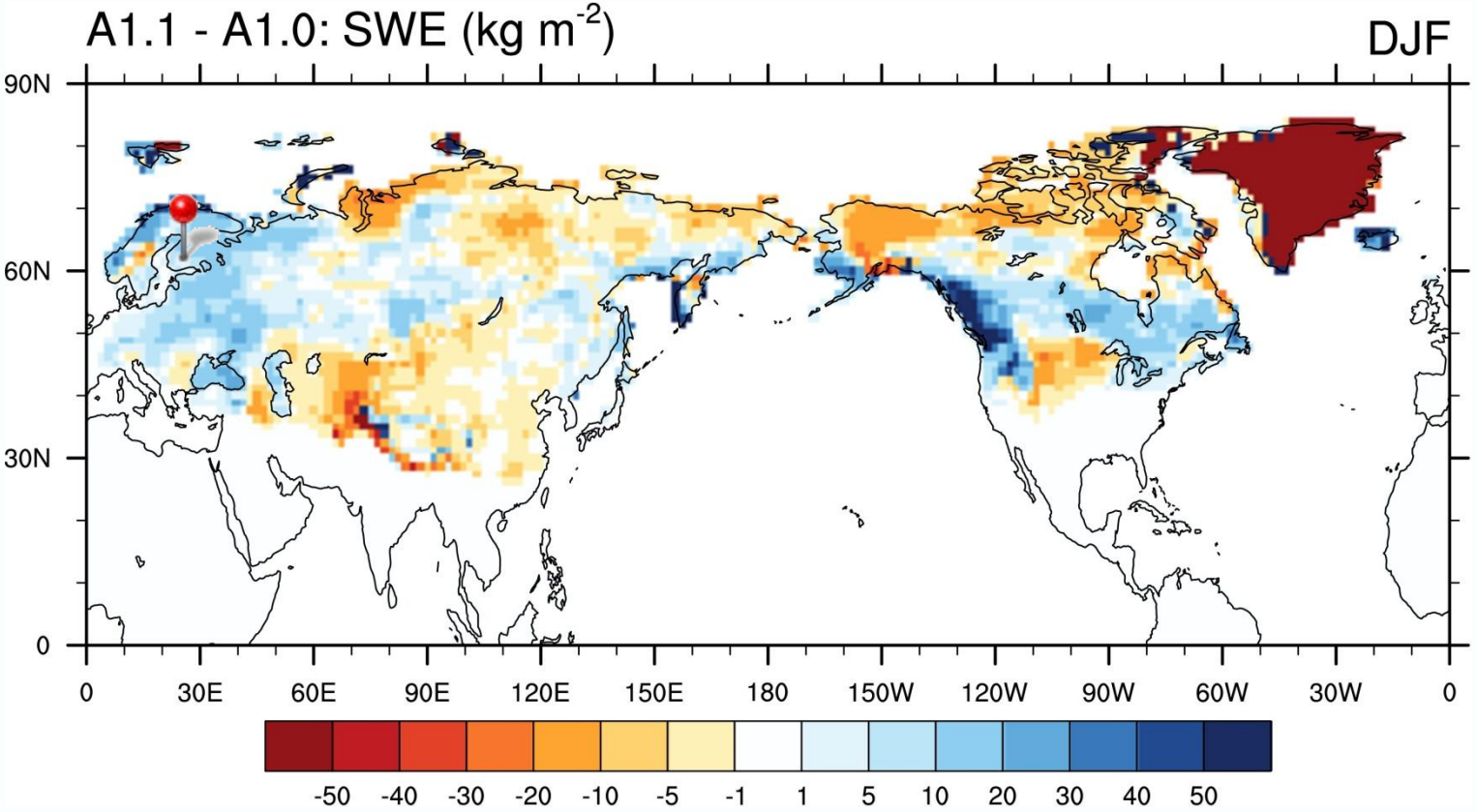
Above 30°N exc. Greenland	*DJF*		
	A1.0	***A1.1***	***Diff***
Screen Temperature (°C)	-13.30	-12.19	1.11
- Maximum	-9.59	-9.27	0.32
- Minimum	-16.73	-14.99	1.74



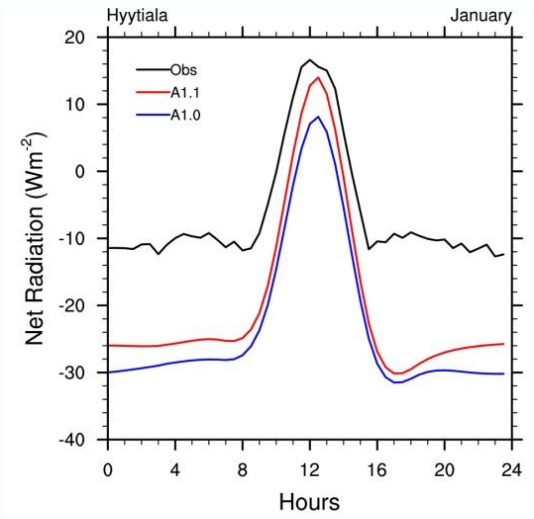
Surface Albedo

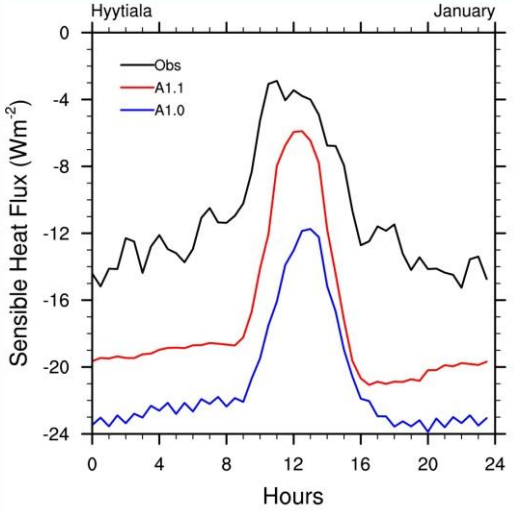


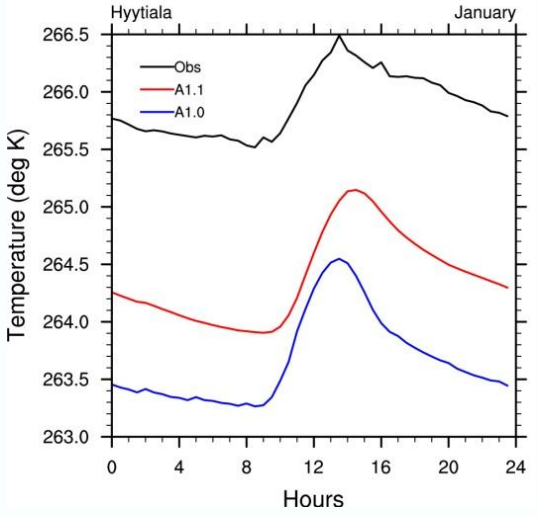
Snow Water Equivalent (kg m^{-2})

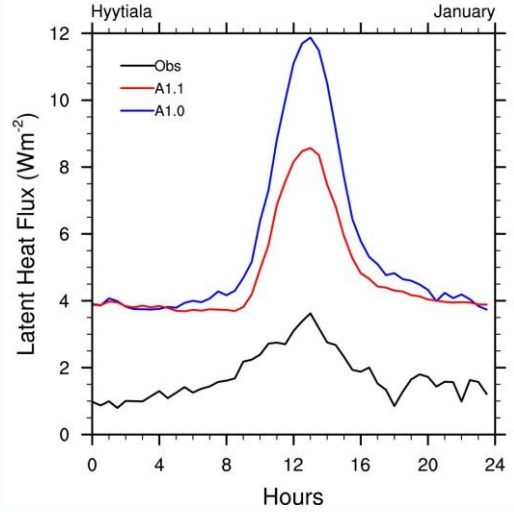


Online: Hyytiala – January Diurnal Cycle









Offline: Hyytiala [61° 51’ N]

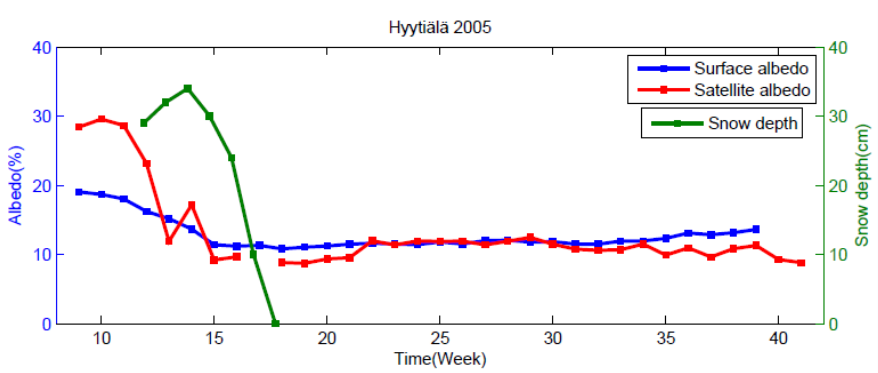
JULES albedo:

$$\alpha_s = f(\textit{snow depth}, \textit{temperature})$$

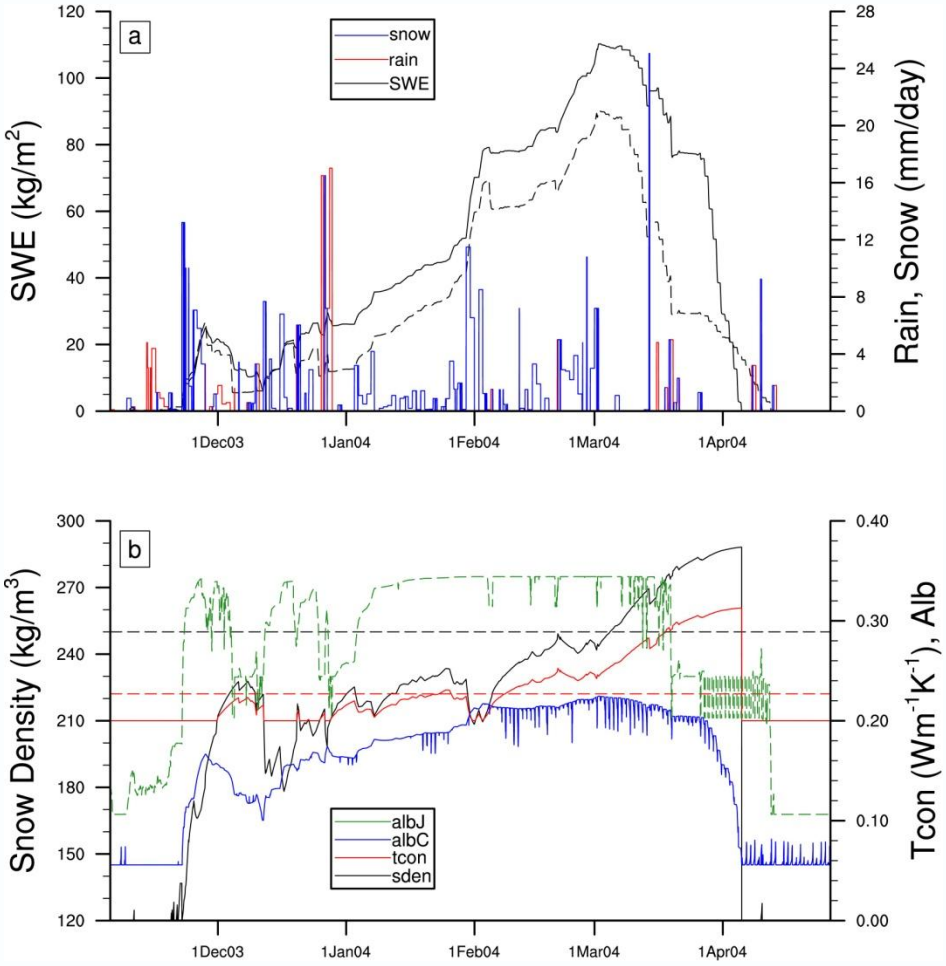
$$\alpha_s = \begin{cases} \alpha_{cds} & T_* < T_m - 2 \\ \alpha_{cds} + 0.3(\alpha_o - \alpha_{cds})(T_* - T_m + 2) & T_m - 2 < T_* < T_m \end{cases}$$

CABLE albedo:

$$\alpha_s = f(\textit{snow depth}, \textit{snow density}, \textit{zenith angle}, \textit{soot}, \textit{snow temperature})$$



Weekly average values of albedo and snow depth (Hannuniemi, 2007).



JULES (dash), CABLE (solid)

Conclusions

CABLE's (A1.1) mean, maximum and minimum temperatures were warmer than in MOSES (A1.0), with the largest difference of 1.74°C in the minimum temperature.

Parameterization of the of cold climate processes which include liquid precipitation freezing within the snowpack, age dependant diurnally resolved snow albedo, prognostic snow density and variable snow thermal conductivity, are important distinctions between CABLE (A1.1) and MOSES (A1.0).

In winter in the Northern hemisphere a lower albedo of the snow covered surface and time dependent thermal snow properties allow more heat to enter the snow and ground below causing a warmer surface temperature and results in an earlier snowmelt in CABLE (A1.1).

Questions

CONTACT

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Refs:

1. Hadley Centre Tech Note 30, Essery, Best, Cox, 2001.
2. Hannuniemi, EUMETSAT Conference 2007.