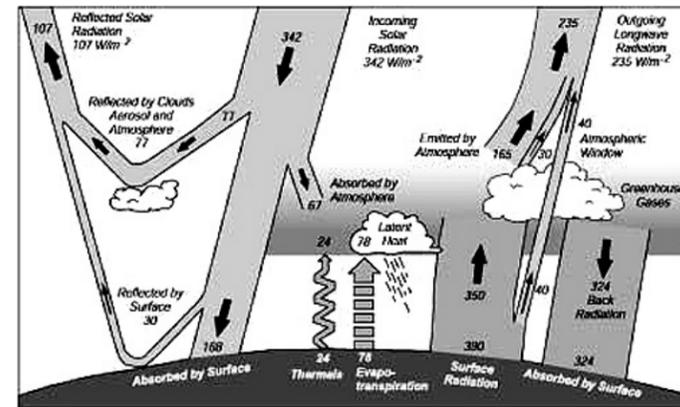
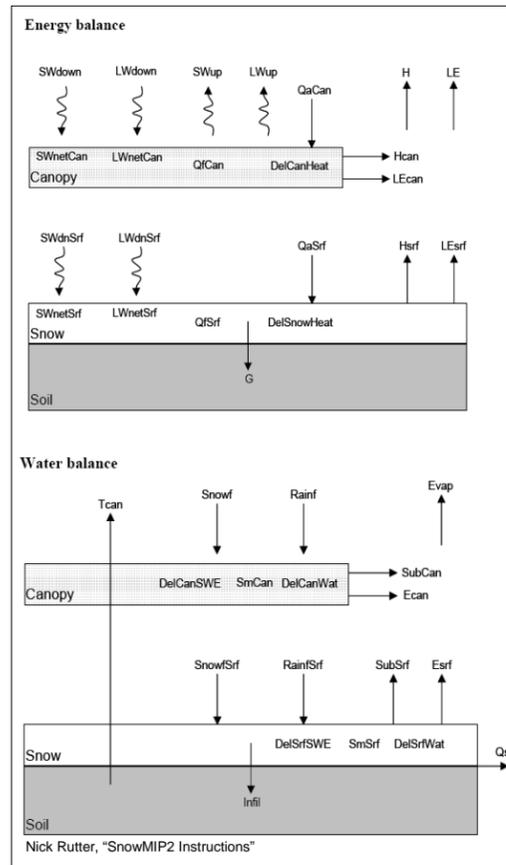


Comparison of Two Snow Models Over Various Accumulation Regimes

Daniel Hopkins with Dr. Susan Frankenstein, ERDC-CRREL



<http://rst.gsfc.nasa.gov/Sect14/Fig5-6s.jpg>

The Models

SNTHERM.89

General description of model

This report describes a one-dimensional mass and energy balance model, SNTHERM.89, for predicting temperature profiles within strata of snow and frozen soil. The model is intended for seasonal snow covers and addresses conditions found throughout the winter, from initial ground freezing in the fall to snow ablation in the spring.

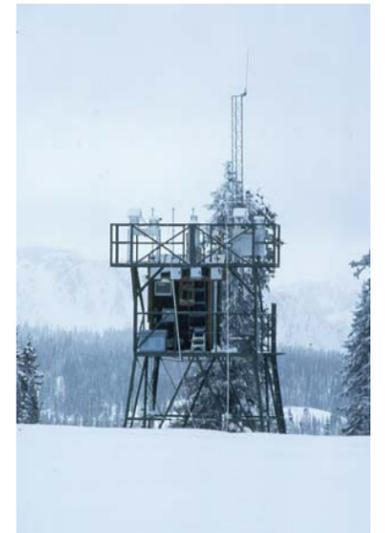
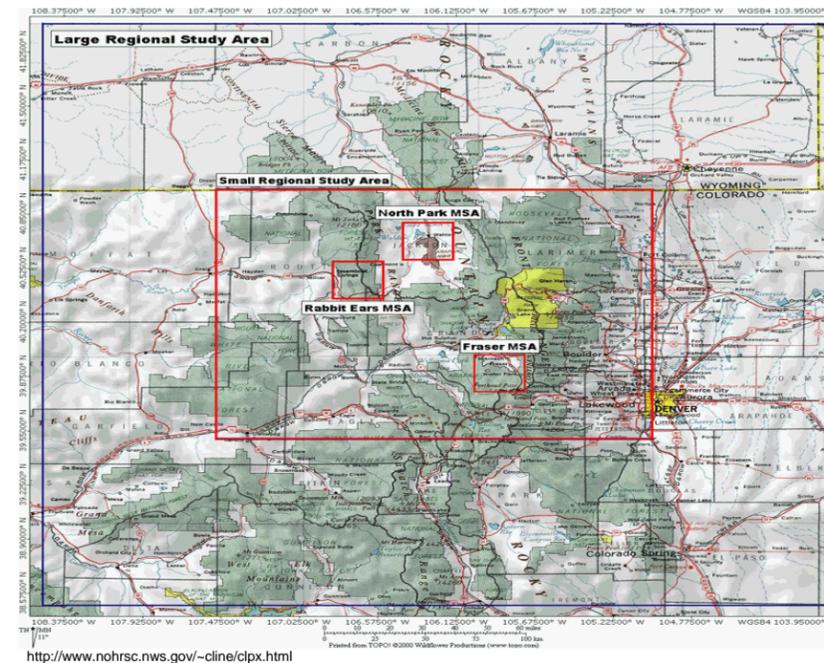
Fast All-season Soil STrength

Abstract

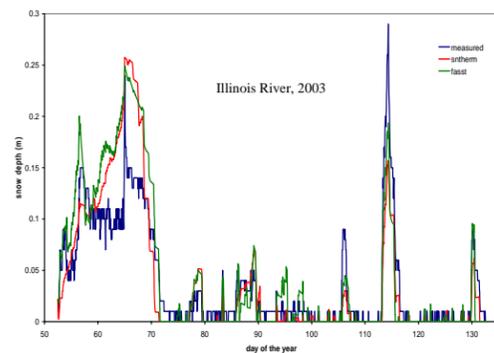
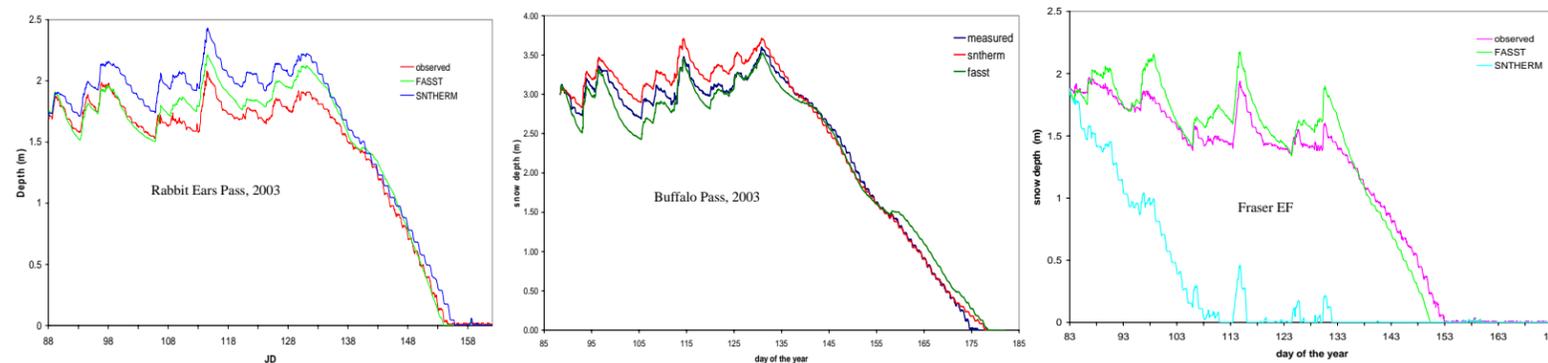
The ability to predict the state of the ground is essential to manned and unmanned vehicle mobility and personnel movement, as well as determining sensor performance for both military and civilian activities. As part of the Army's Battlespace Terrain Reasoning and Awareness research program, the 1-D dynamic state of the ground model FASST (Fast All-season Soil STrength) was developed. It calculates the ground's moisture content, ice content, temperature, and freeze/thaw profiles, as well as soil strength and surface ice and snow accumulation/depletion.

NASA Cold Land Processes Experiment (CLPX)

Taking place on a 400 km X 400 km plot in Northern Colorado and Southern Wyoming, the goal of NASA's Cold Land Processes Experiment is to gain a better understanding of water and energy fluxes in the terrestrial cryosphere (cold regions of the planet's surface).



Buffalo Pass



Site Name	Maximum Snow Depth (m)	Average Discrepancy from Actual Snow Depth (m)	
		FASST	SNTHERM
Rabbit Ears	2.07	0.09	0.19
Buffalo Pass	3.60	0.11	0.11
Fraser EF	1.97	0.13	1.01
Illinois R.	0.29	0.02	0.02

Conclusions

These graphs show the model calculated snow depth compared to the measured snow depths at the CLPX sites. Both models perform admirably but the greater accuracy, flexibility, reliability, modernity and ease-of-use of FASST make it a better choice. SNTHERM often encounters difficulties and collapses resulting in data like those pictured at Fraser Experimental Forest above.



Rabbit Ears Pass



FASST accounts for vegetation factors such as the canopy interception of Snow in this image from Buffalo Pass11