LiDAR-Derived Canopy Structure For Environmental Assessment & Modeling

Danny Marks

Northwest Watershed Research Center
USDA-Agricultural Research Service
Boise, Idaho
USA

NORTHWEST WATERSHED RESEARCH CENTER
USDA
800 Park Blvd., Suite 105
Boise, Idaho 83712
(208) 422-0700
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NASA Cold Lands Processes Experiment (CLPX) Lidar Data
Local Snow Observation Site (LSOS)

Orthophoto, Lidar-Derived Ground Level DEM,
Canopy Heights, Snow Cover Effects

- +/-5 cm vertical precision; 1.1 km area, 1 m grid (1,210,000 grid cells)
- illumination: zenith = 45, azimuth = -45

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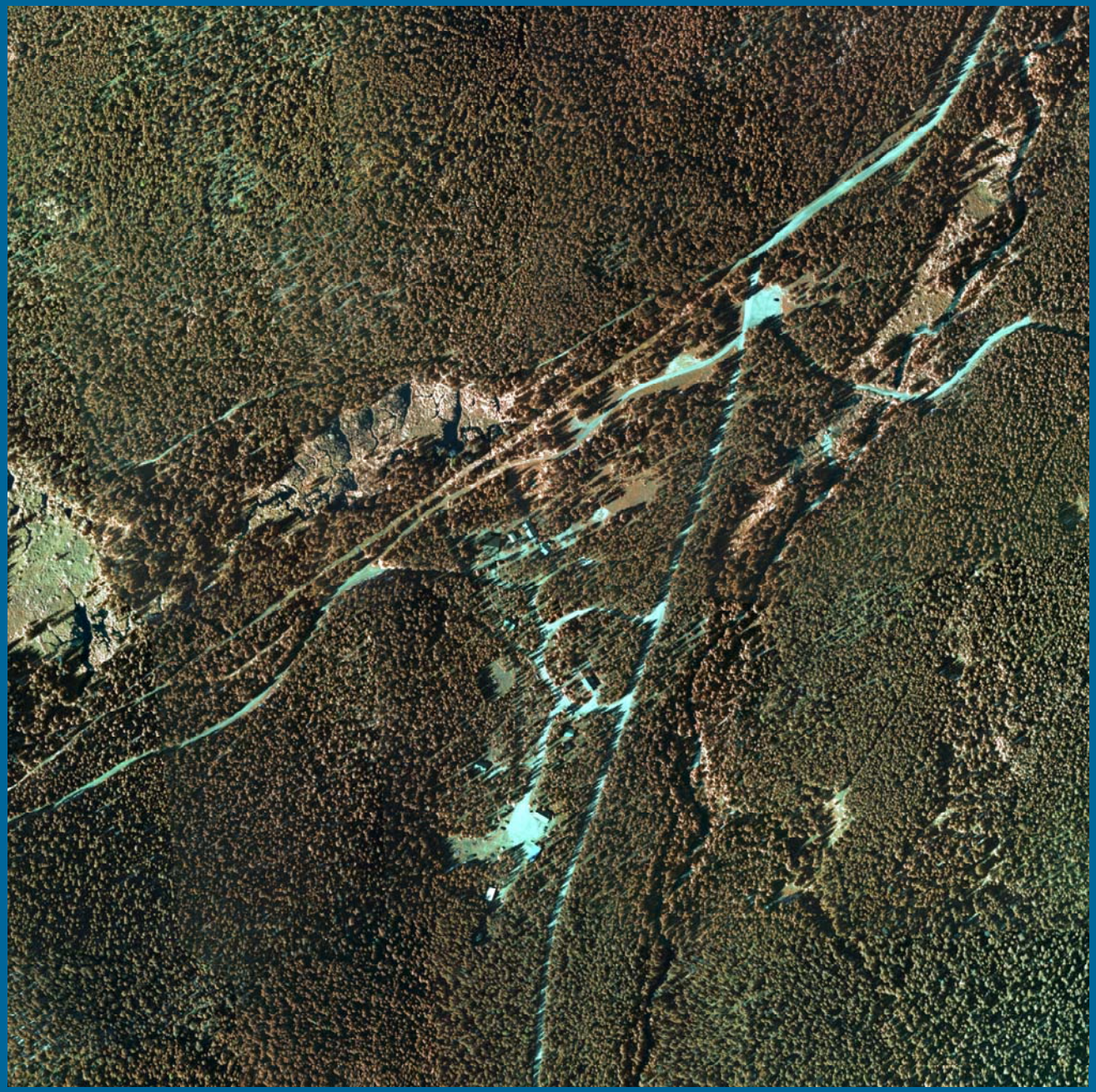

Color OrthoPhoto (15 cm resolution)

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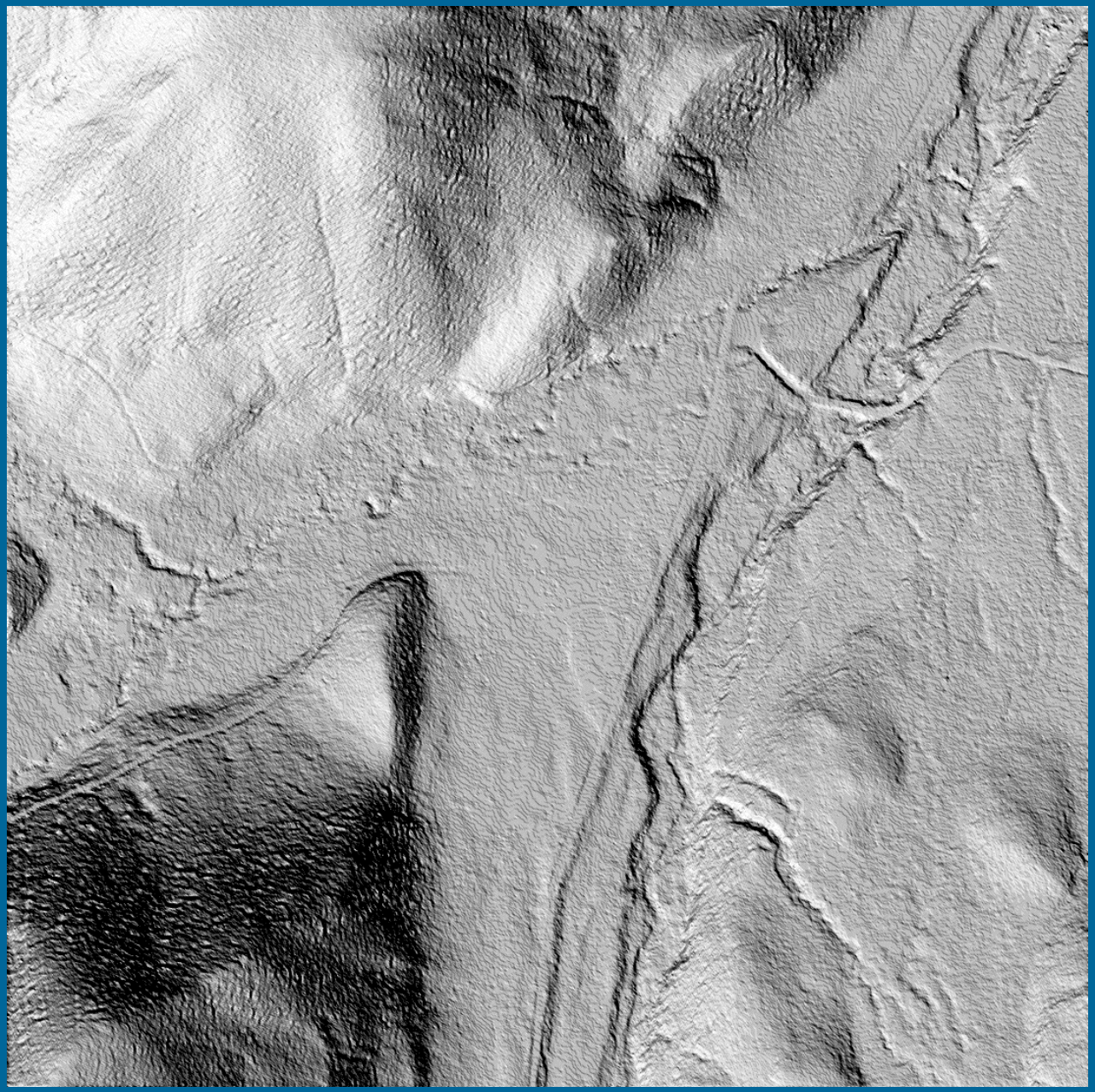

Bare Ground DEM (1 m resolution) 172 m relief

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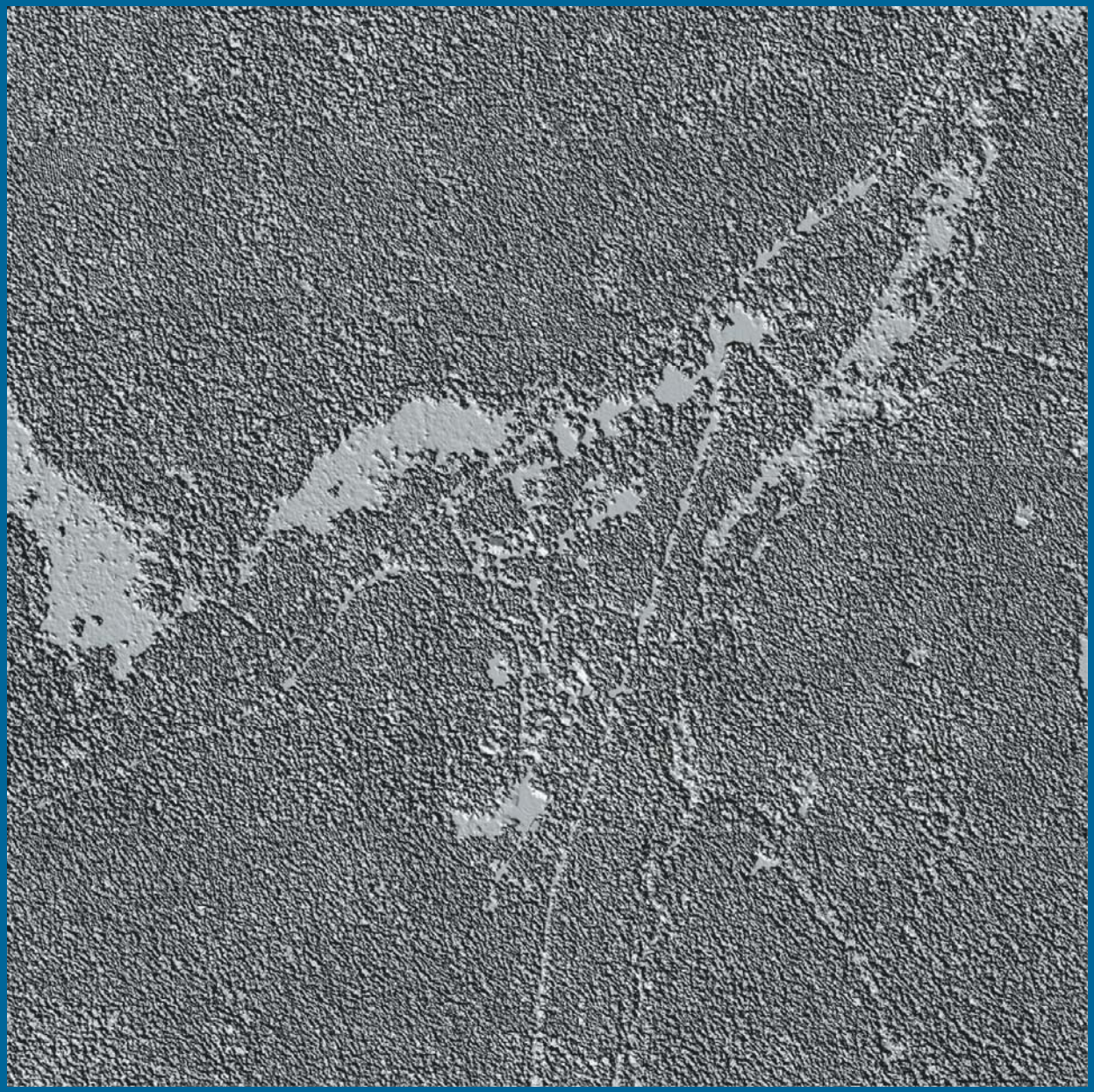

Digital Canopy Model (DCM) (1 m resolution)
16.5 m max veg height

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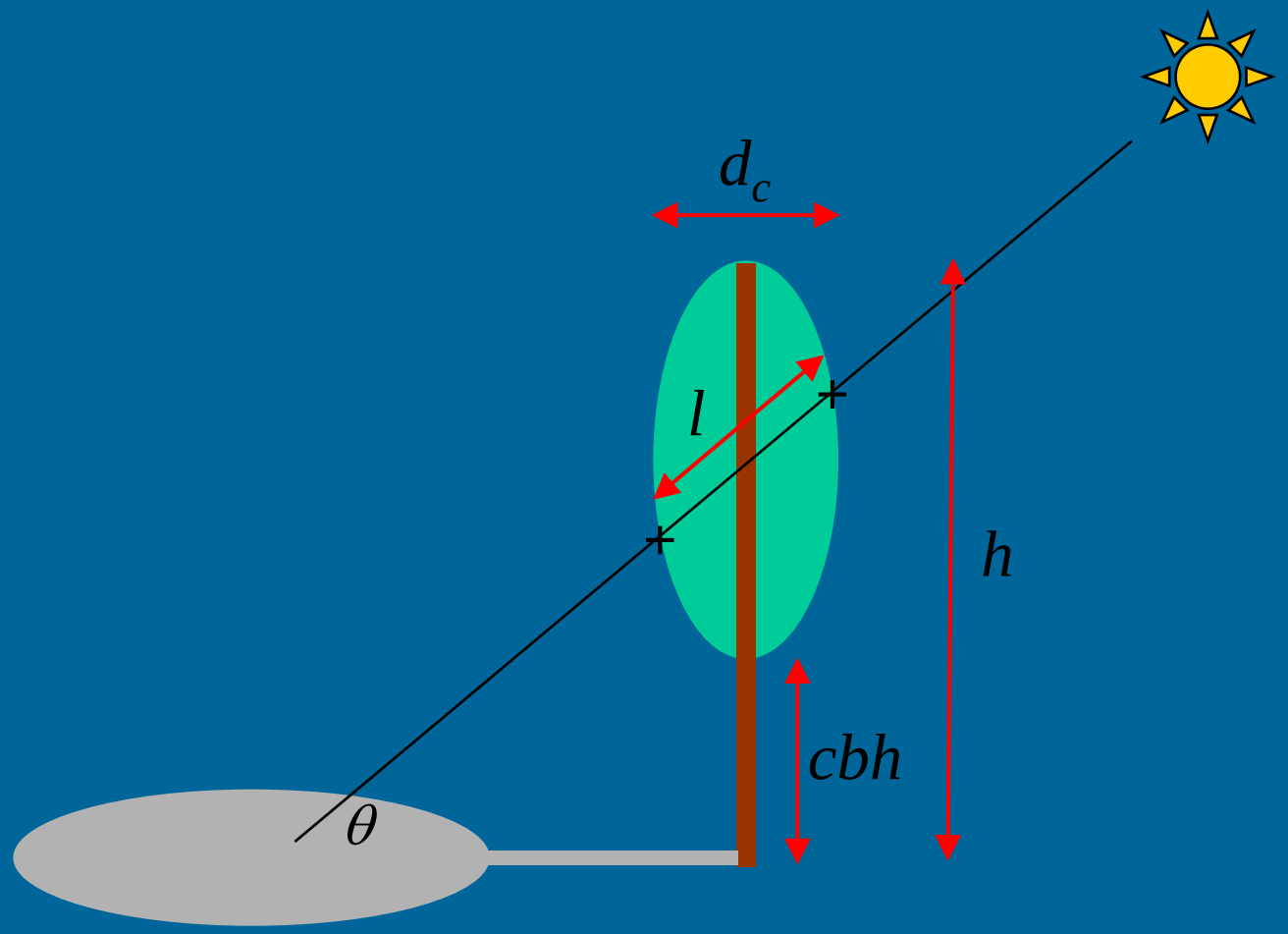
Geometric shading model



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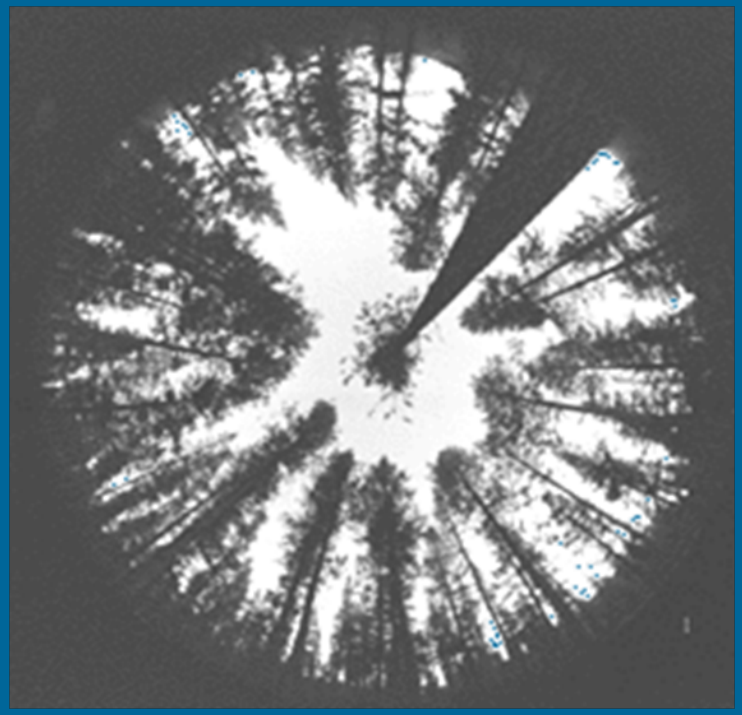
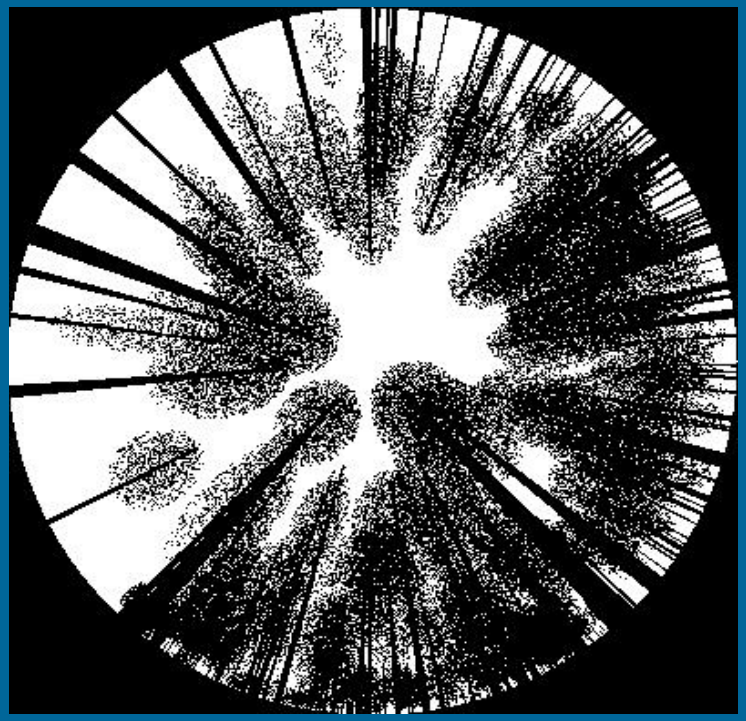
Sky view

From hemispherical photographs



From shading model



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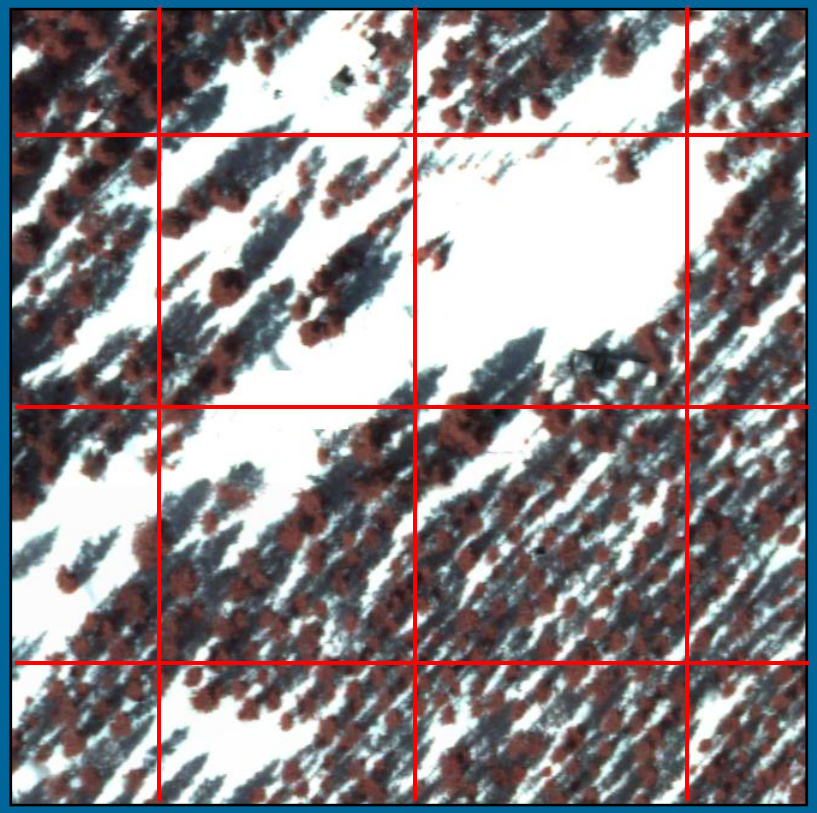
Canopy Structure Mapping and Shade Simulation from LiDAR

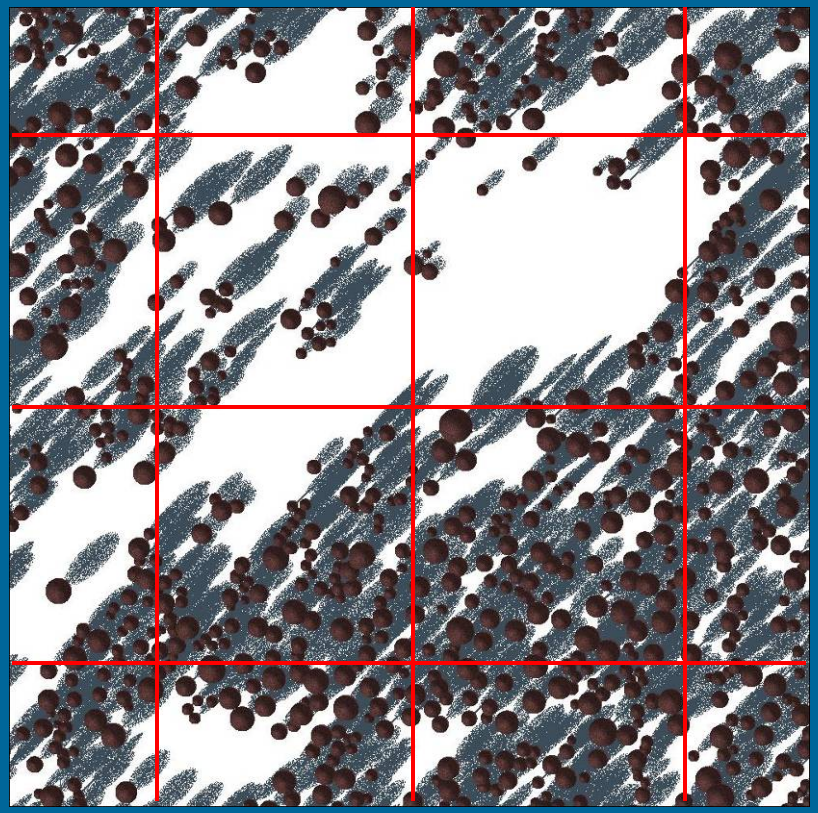
Orthophotograph



N

30 m

Simulation



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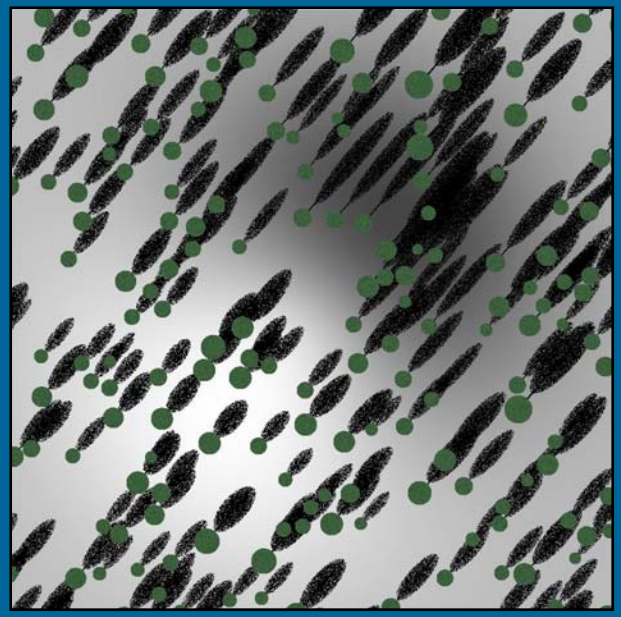
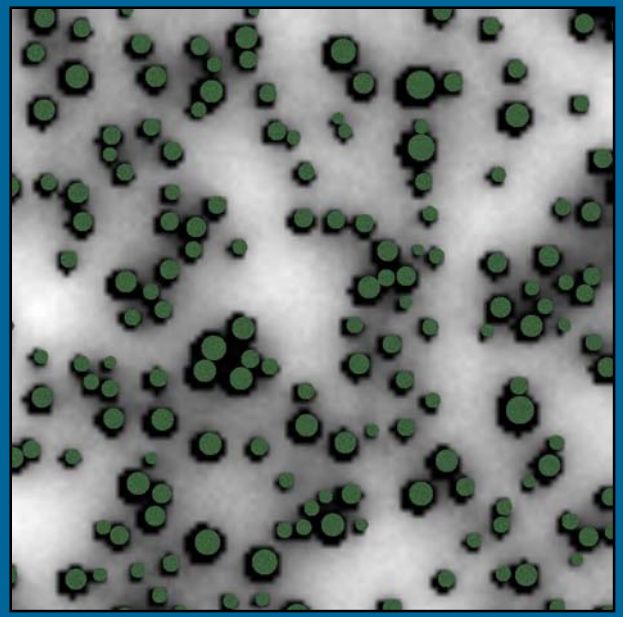
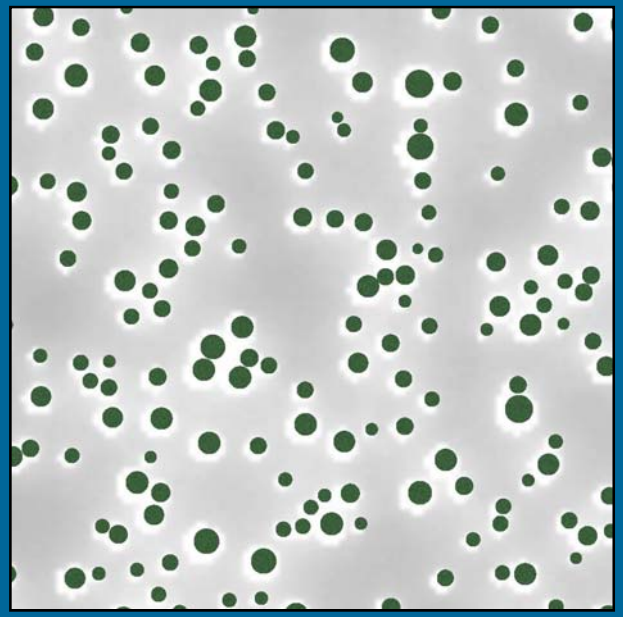
Direct-beam solar radiation



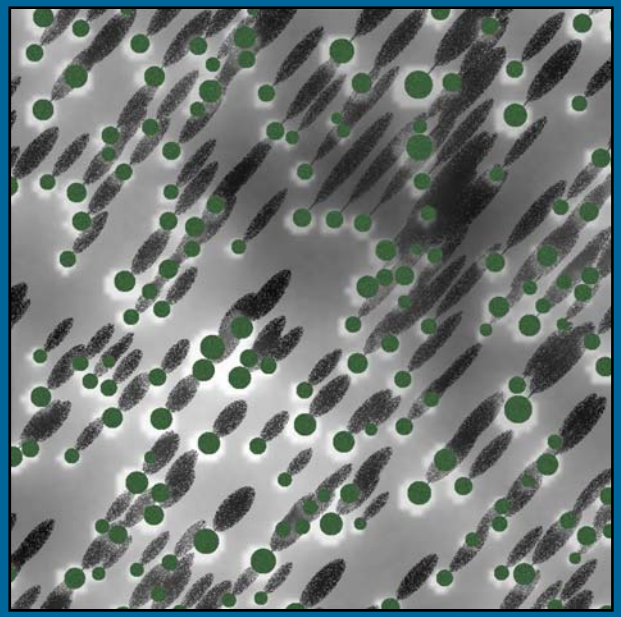
Diffuse solar radiation



Longwave radiation



Net radiation



Modelling terrain and canopy effects on solar & thermal radiation

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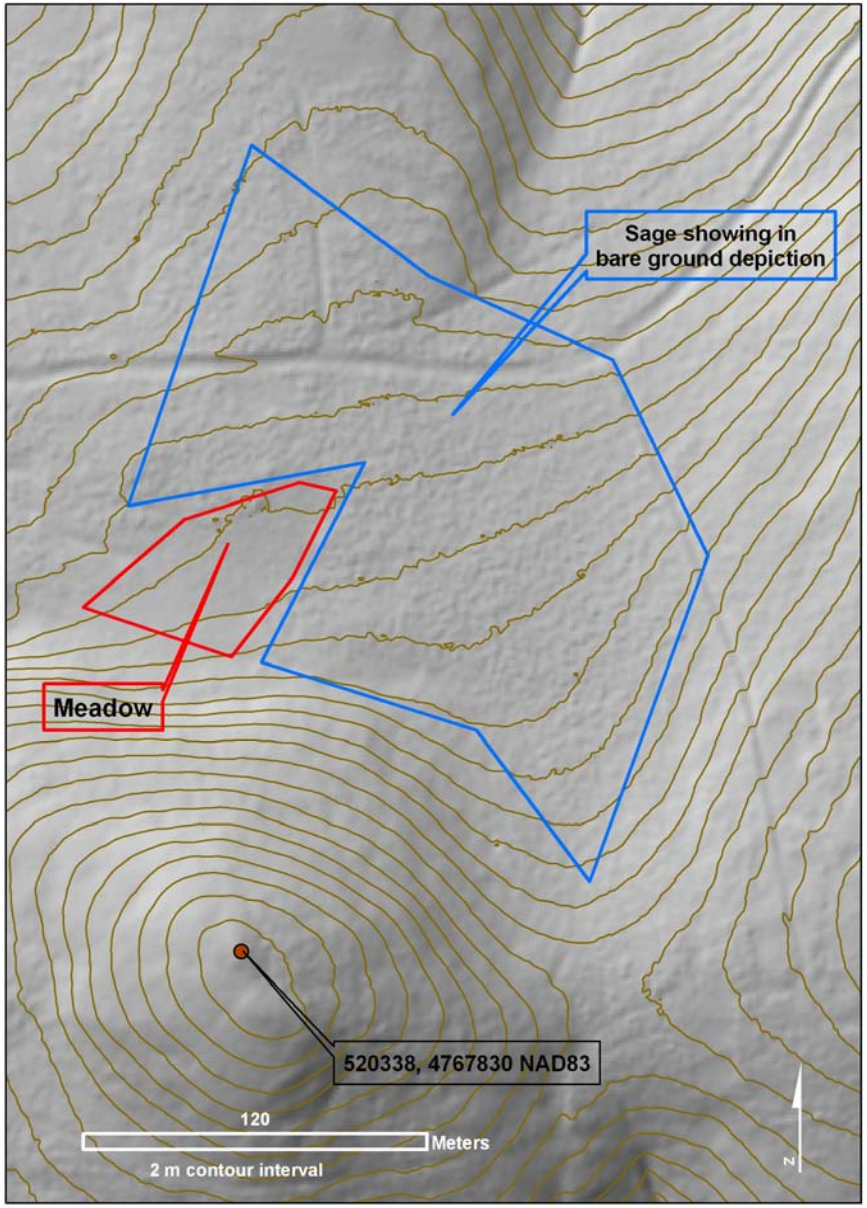

RCEW LiDAR:

Problem with Shrubs

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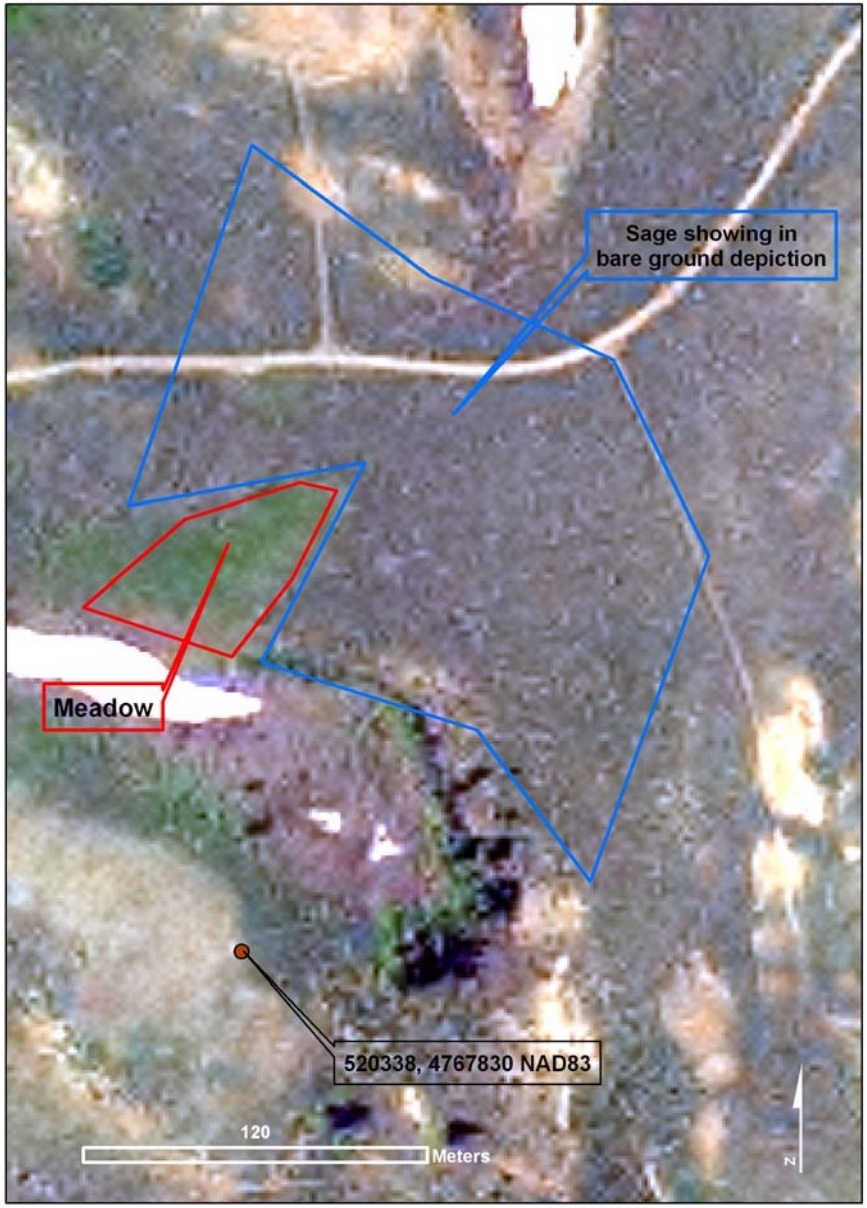

Aerial Photo:

Properly characterizes trees, grass & bare ground;

Misses the sage…

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RCEW LiDAR:

Problem with Shrubs

Ceanothus…

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Aerial Photo:

Properly characterizes trees, grass, buildings and structures & bare ground;

Misses sage & ceanothus patches…

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