

UCLA

Posters

Title

Temporal and spatial scales of temperature change in an alpine fell field ecosystem

Permalink

<https://escholarship.org/uc/item/1m365021>

Authors

Phil Rundel
Eric Graham
Michael Stealey
et al.

Publication Date

2005

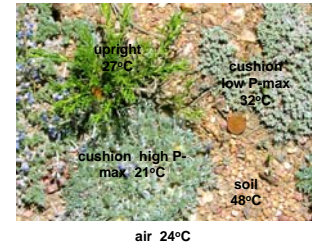
Temporal and spatial scales of temperature pattern in an alpine fellfield ecosystem

Phil Rundel, Eric Graham, Michael Stealey, Yeung Lam, Gerald Kim, Victor Chen, Willie Chen, and William Kaiser
 Terrestrial Ecology (TEOS) and NIMS Groups

Introduction:

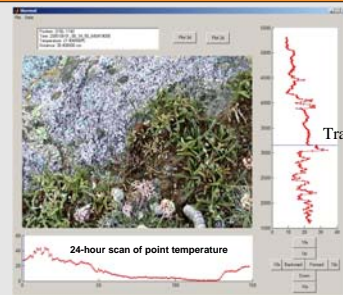
Alpine fellfield ecosystems

Alpine fellfield ecosystems exhibit an irregular rock and soil surface as well as a scattered cover of prostrate mats and upright herbaceous plants. Cool air temperatures and solar heating of soil and rock surfaces produce sharp and dynamic spatial gradients in temperature. These have profound impacts on plant ecophysiology. Spot measurements of plant and soil surface temperatures are not sufficient to understand this system.



Instrumentation Application:

- Thermal scanner instrumentation mounted on a NIMS-RD installation can provide precise measurements of spatial and temporal patterns of surface temperatures across a fellfield habitat, as well as a photographic log of transect position.
- Successful application of this system requires a user interface to relate thermal maps to the positions of rock, soil, and plant species
- Complex problem of interpreting fine-scale patterns of spatial and temporal change in relation to plant position and growth-form will require statistical analyses.

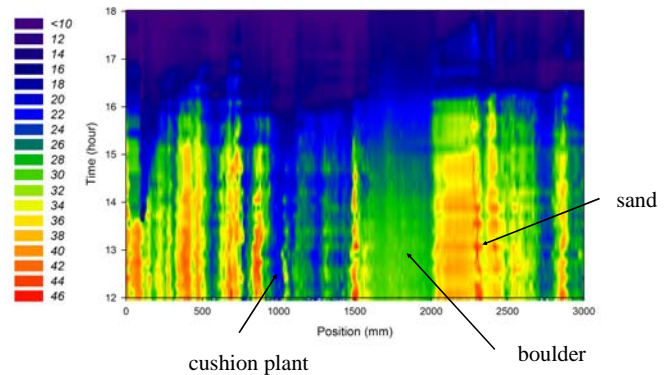


•User interface

Field Measurements: Thermal mapper scans over two distinct fellfield communities

Granitic substrate with coarse rocks and 80% plant cover

Surface temperature gradients of 20°C occur over distances of a few mm. Granite sands heat to 45°C, while air temperature is <15°C.



Dolomite substrate with rock pavement and 20% plant cover

High albedo of dolomite surface and small rock size produces a fine-scale pattern of surface temperature gradients.

