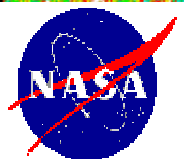


The Use of ATLAS data to Quantify Surface Radiative Budget Alteration Through Urbanization for San Juan Puerto



Jeffrey C. Luvall
Marshall Space

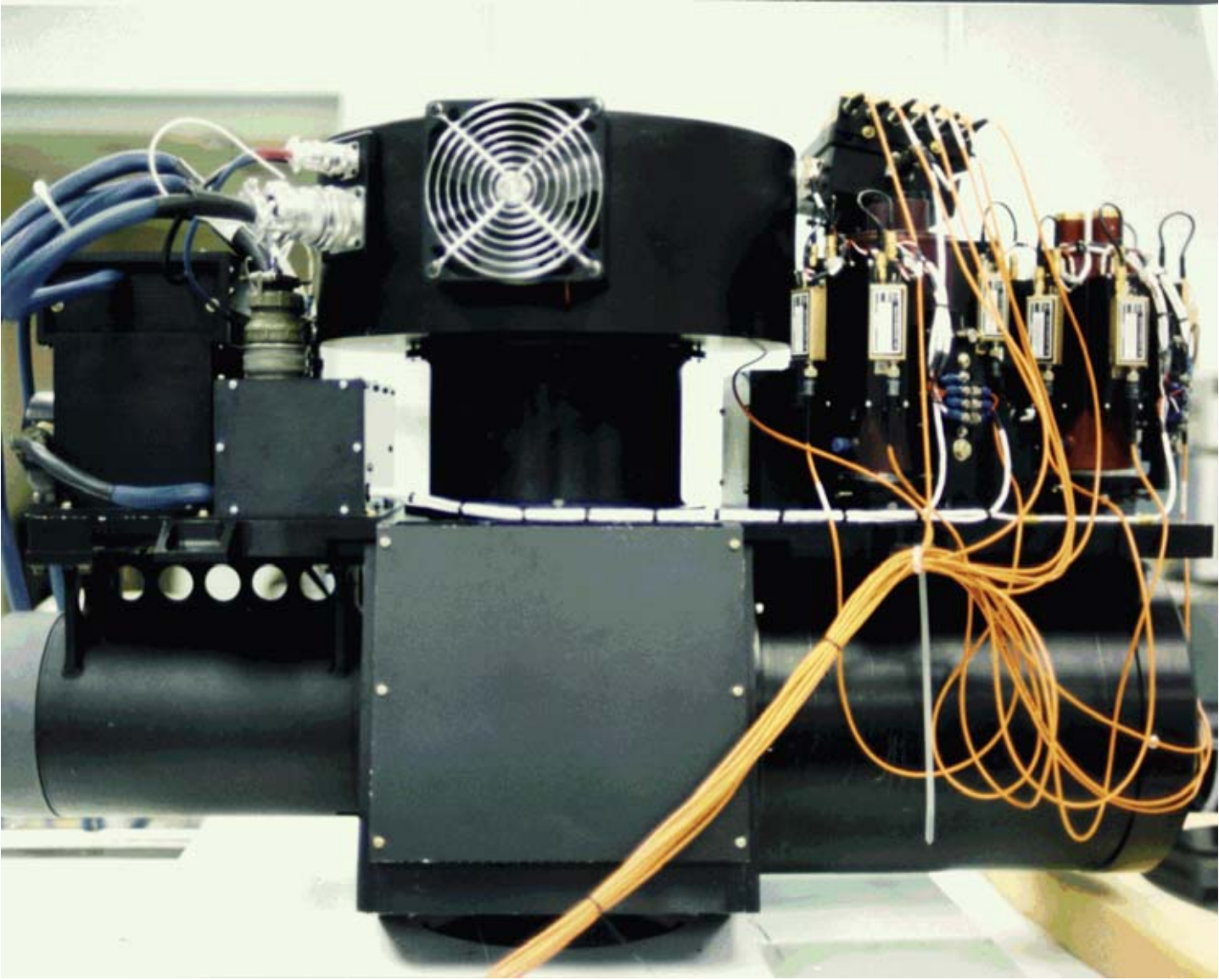






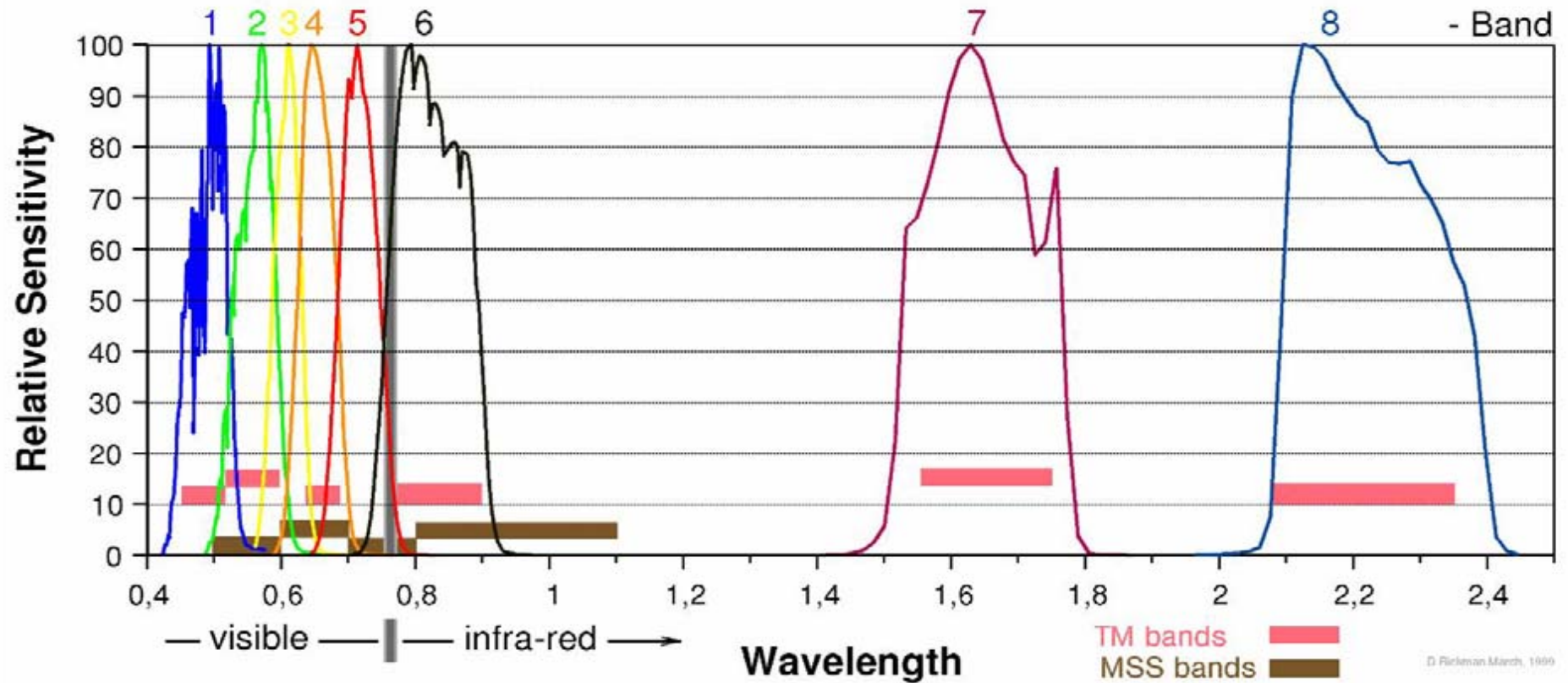


NASA
N933NA



ATLAS

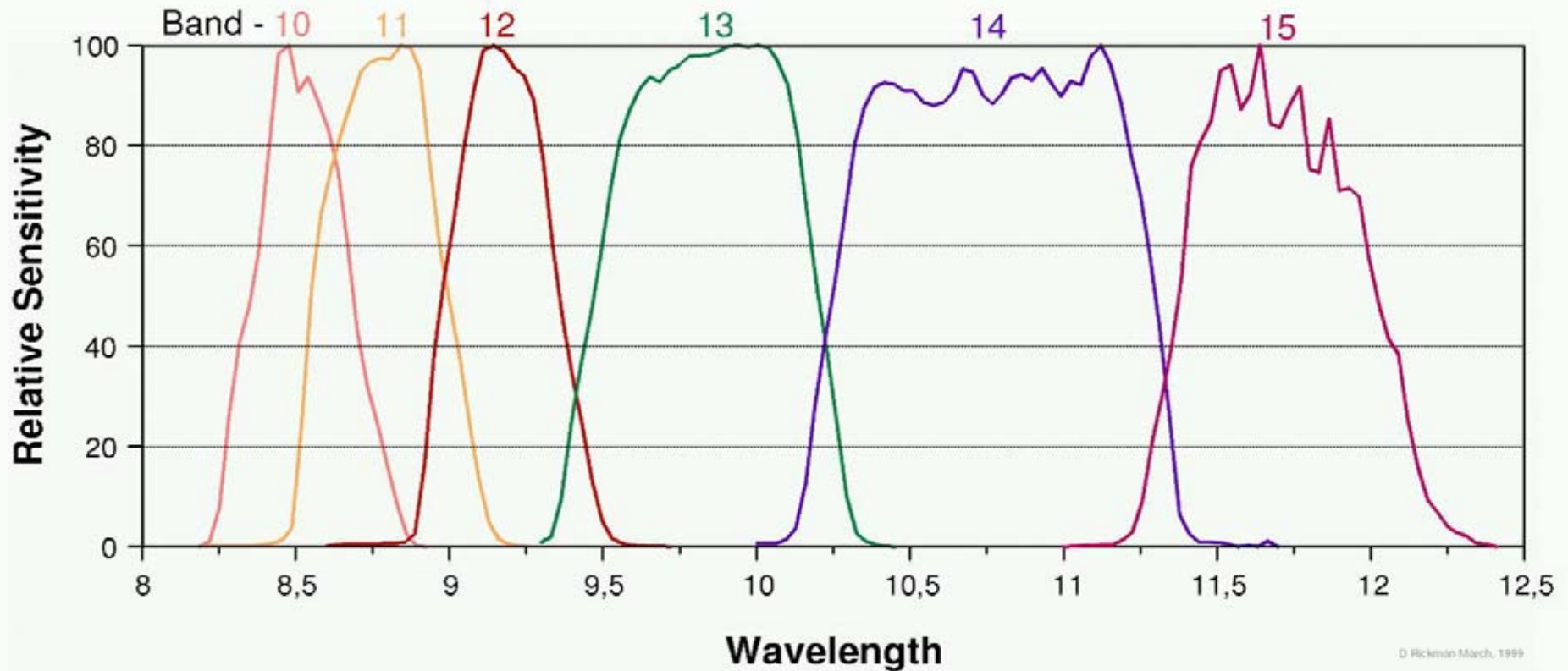
Typical Spectral Response Curves Reflected Bands



ATLAS

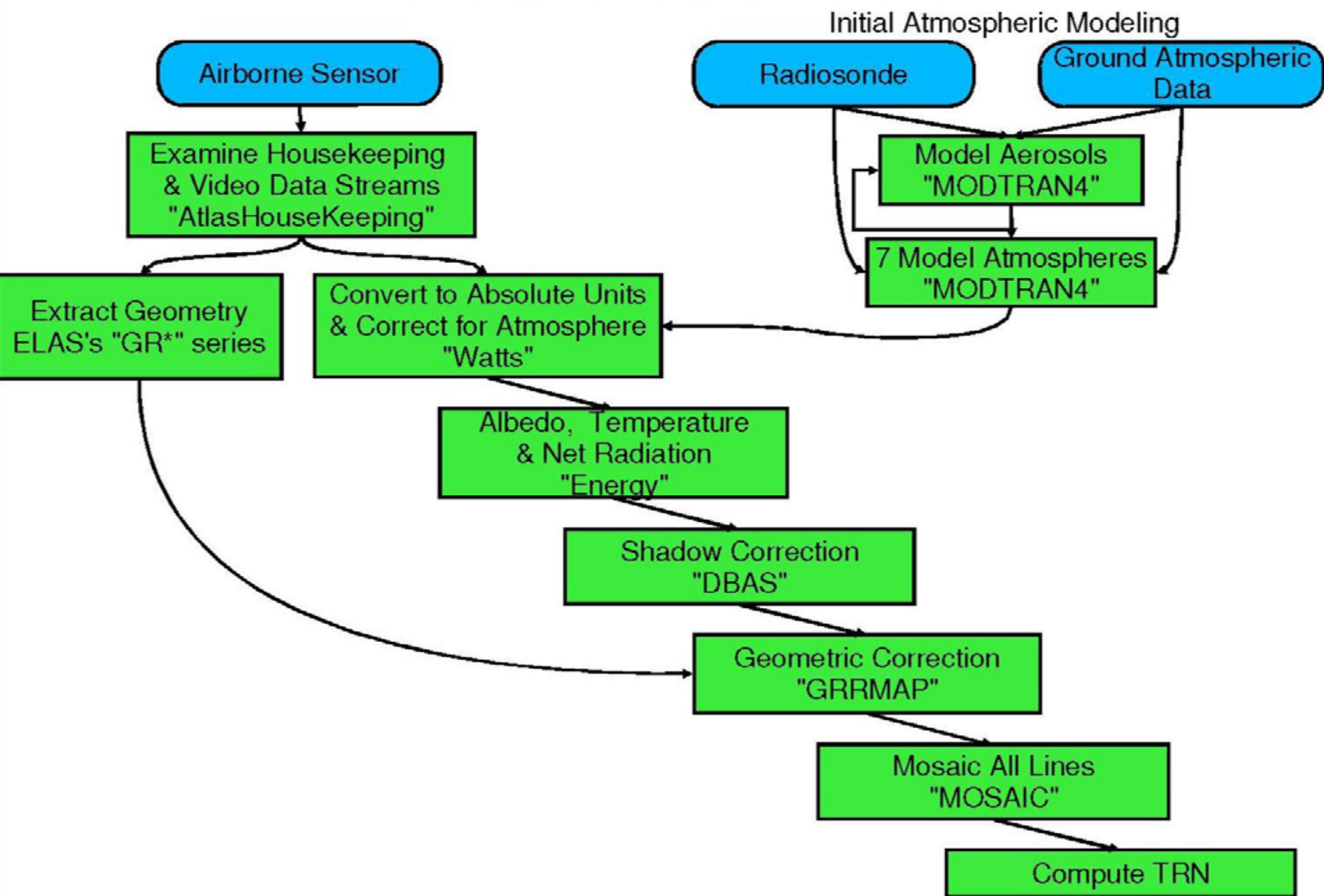
Typical Spectral Response Curves

Thermal Bands



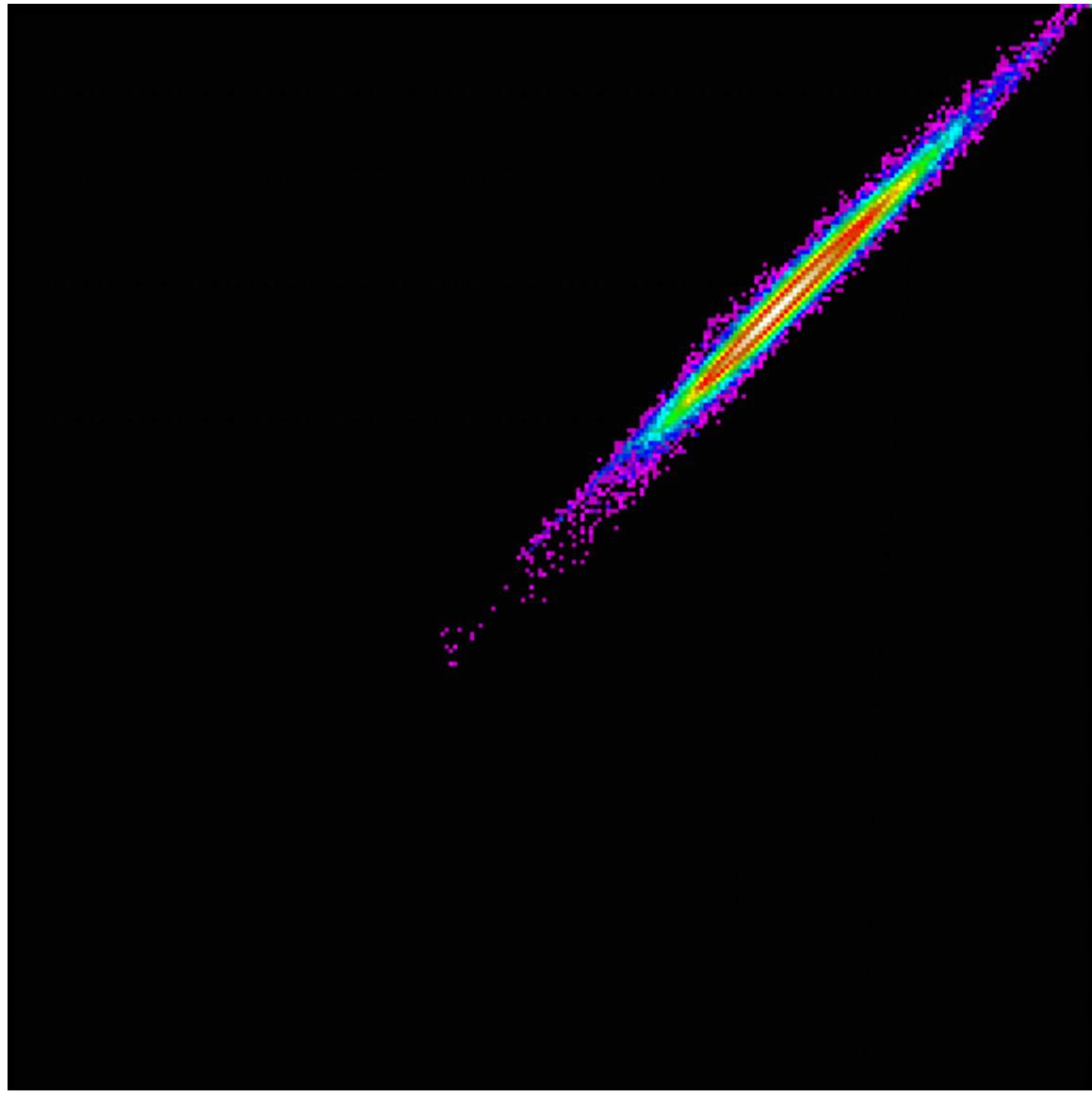
© Rickman March, 1999

Overall Process Flow





San Juan
CH 10 vs CH 11



Energy
W m⁻² sr⁻¹ micron



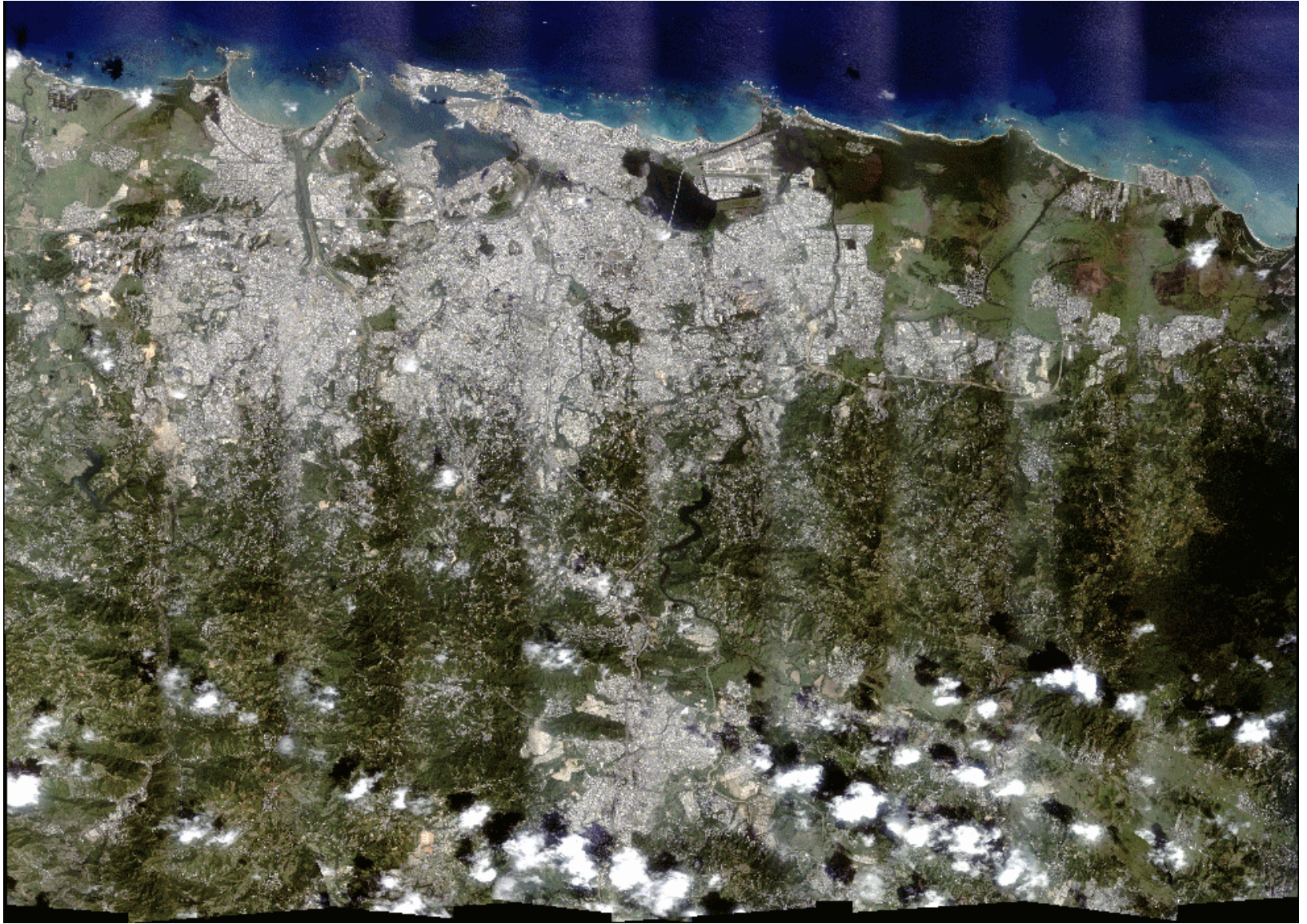
Natural Surface Albedo

<i>Surface</i>	<i>Albedo</i>
Soils	0.05-0.40
Desert	0.20-0.45
Grass	0.16-0.26
Crops	0.18-0.25
Forests-deciduous	0.15-0.20
Forests-coniferous	0.05-0.15
Water (small zenith angle)	0.03-0.10
Snow (fresh)	0.40-0.95

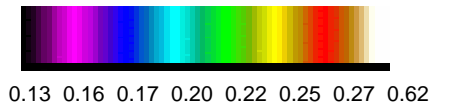
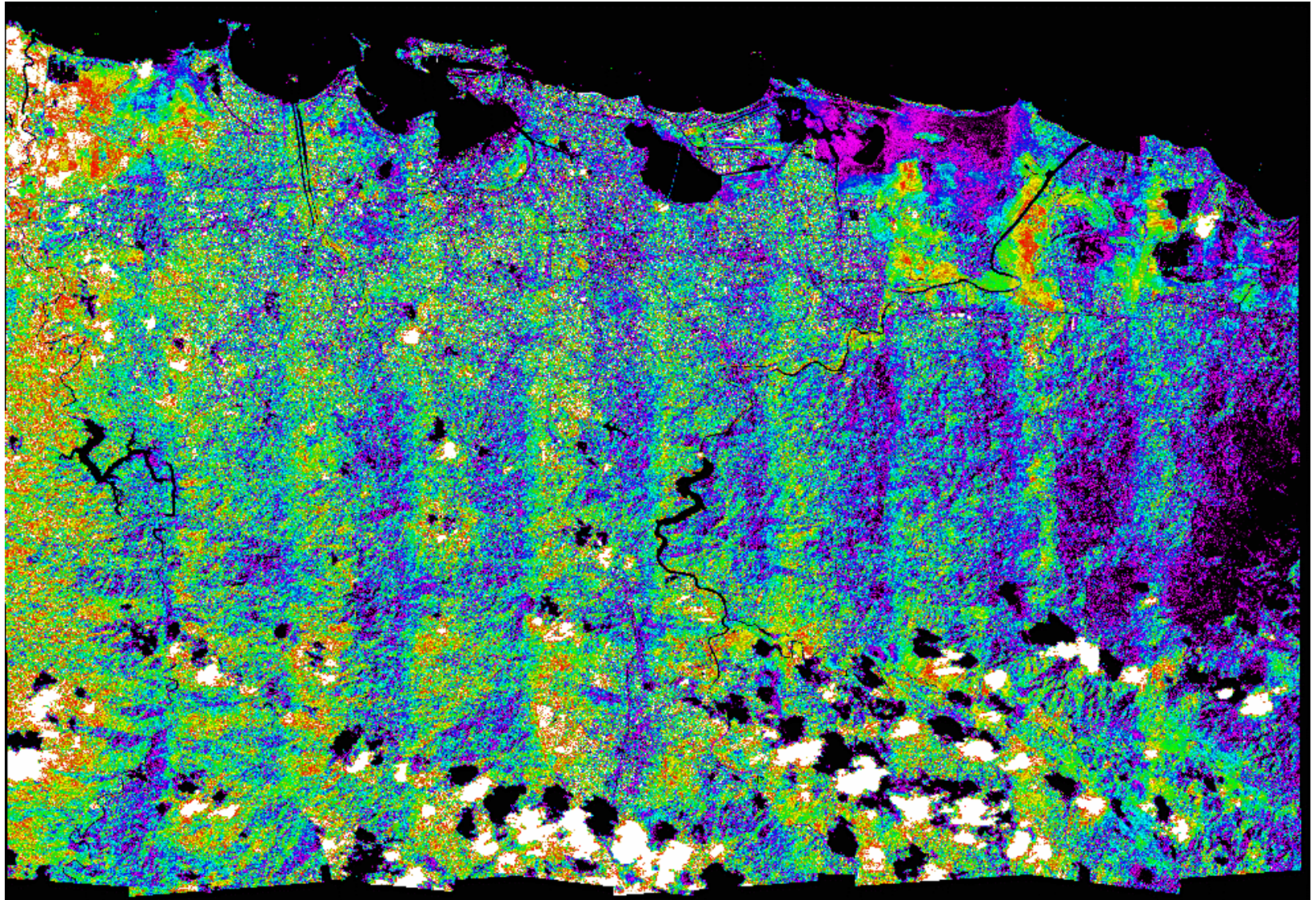
Albedo of Typical Urban Materials & Surfaces

<i>Surface</i>	<i>Albedo</i>
Asphalt Roads	0.05-0.20
Concrete	0.10-0.35
Brick	0.20-0.40
Tar & Gravel Roofs	0.08-0.18
Tile Roofs	0.10-0.35
Corrugated Iron Roofs	0.10-0.16
White Membrane	0.64-0.84
Paint-White	0.50-0.90
Paint- Red,Brown,Green	0.20-0.35
Urban Areas	0.10-0.27 (0.15)

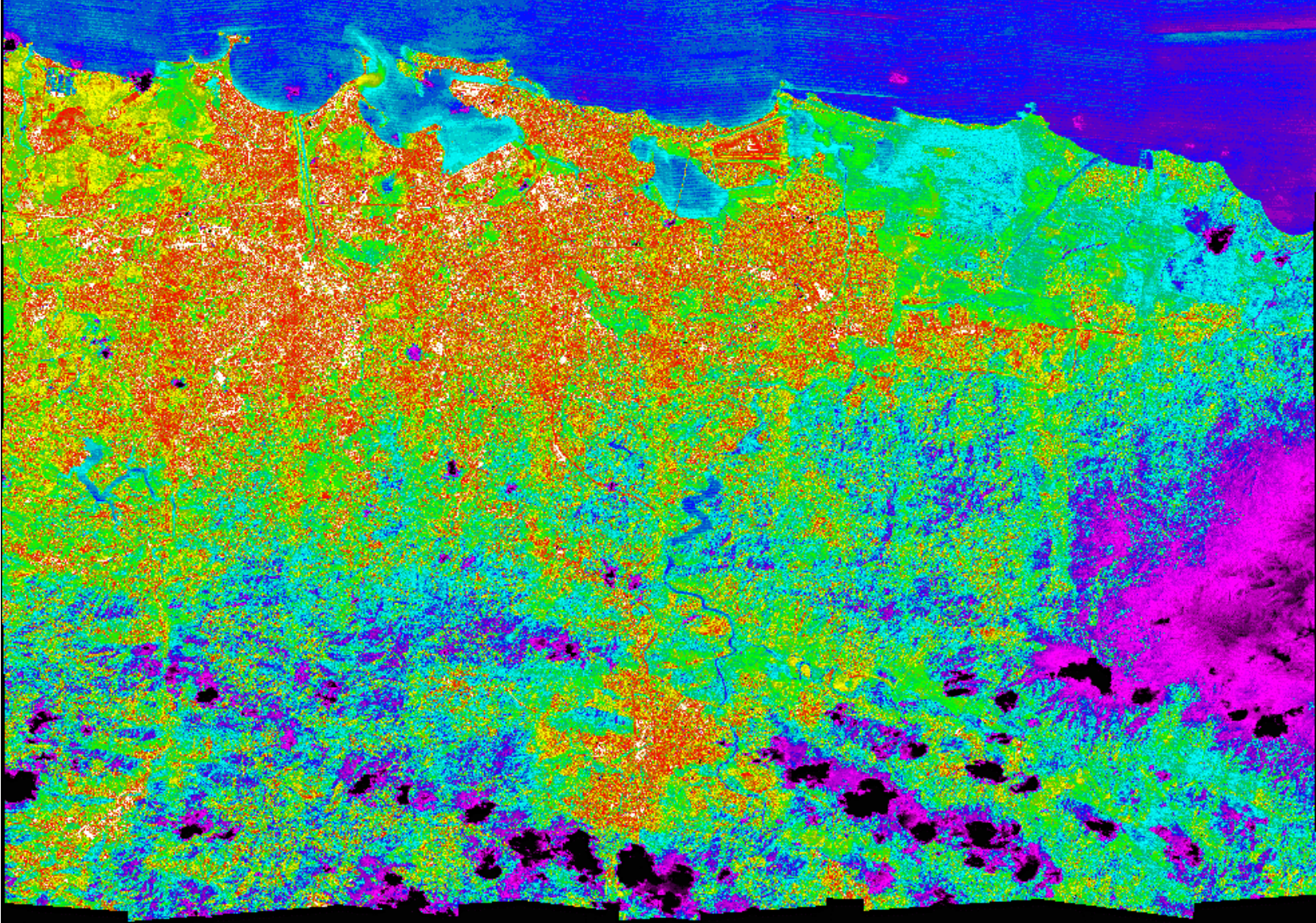
San Juan F5 Mosaic True Color



San Juan F5 Mosaic Albedo



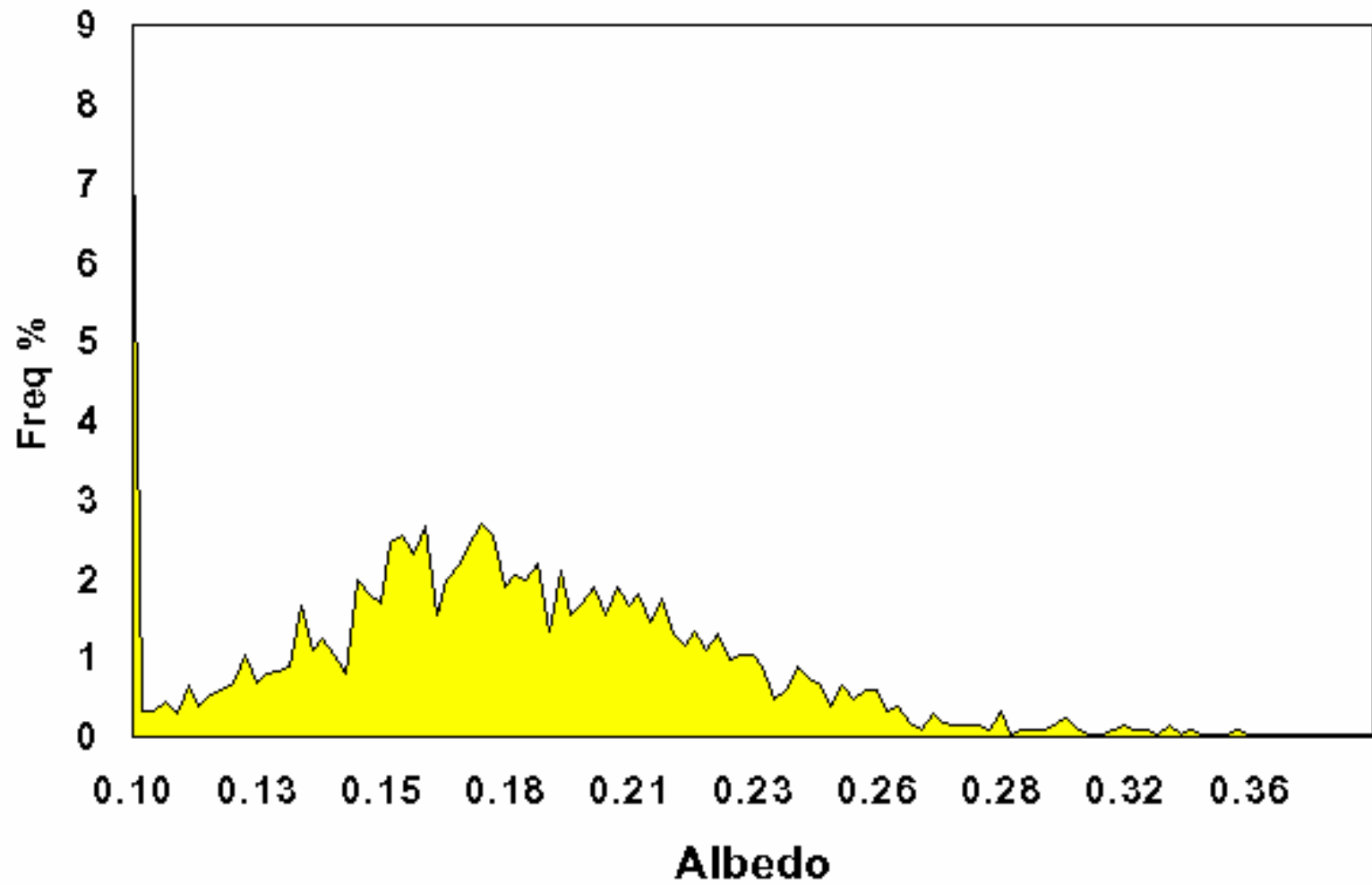
San Juan F5 Mosaic Temperature



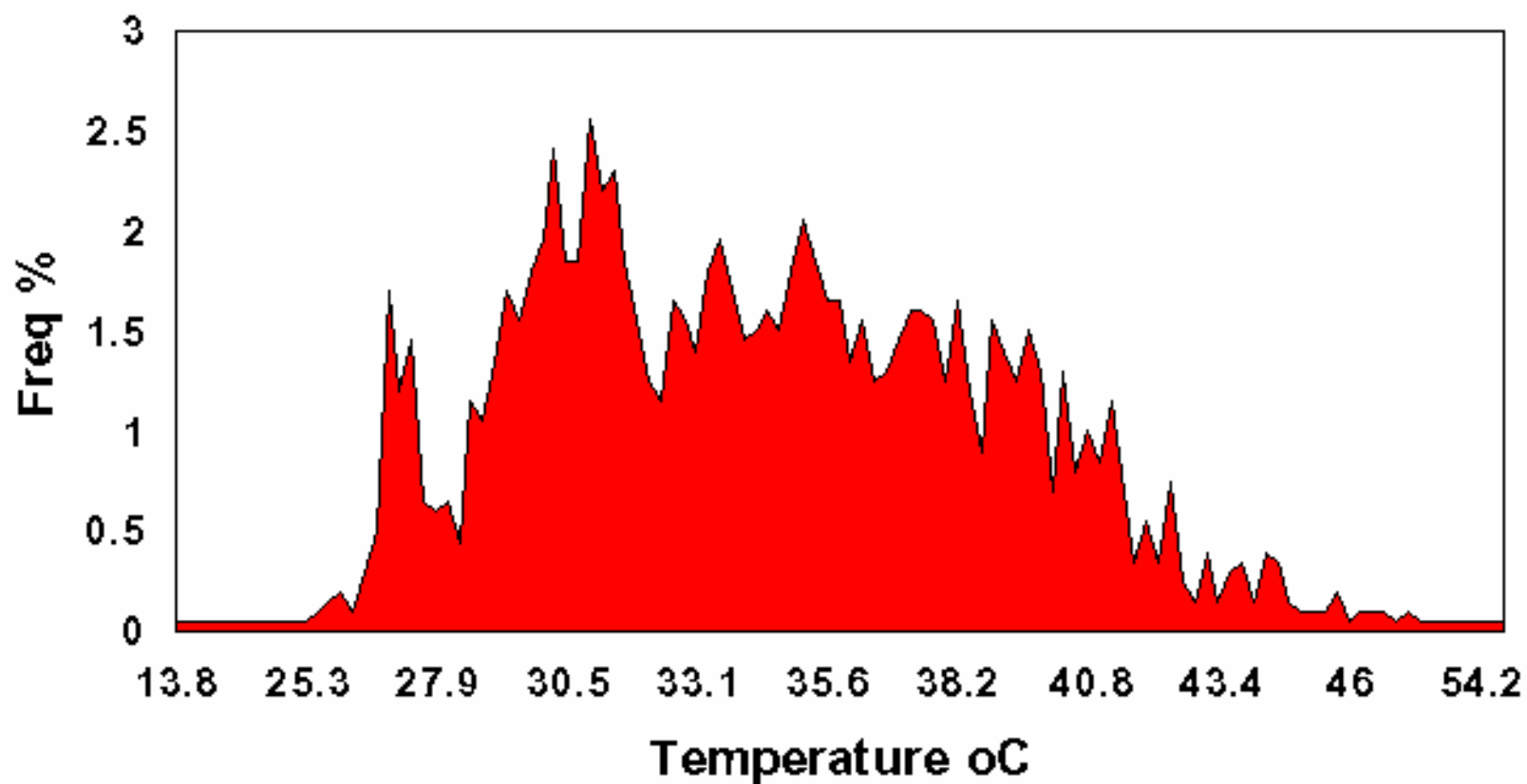
°C 10 20 26 27 28 32 39 41 48



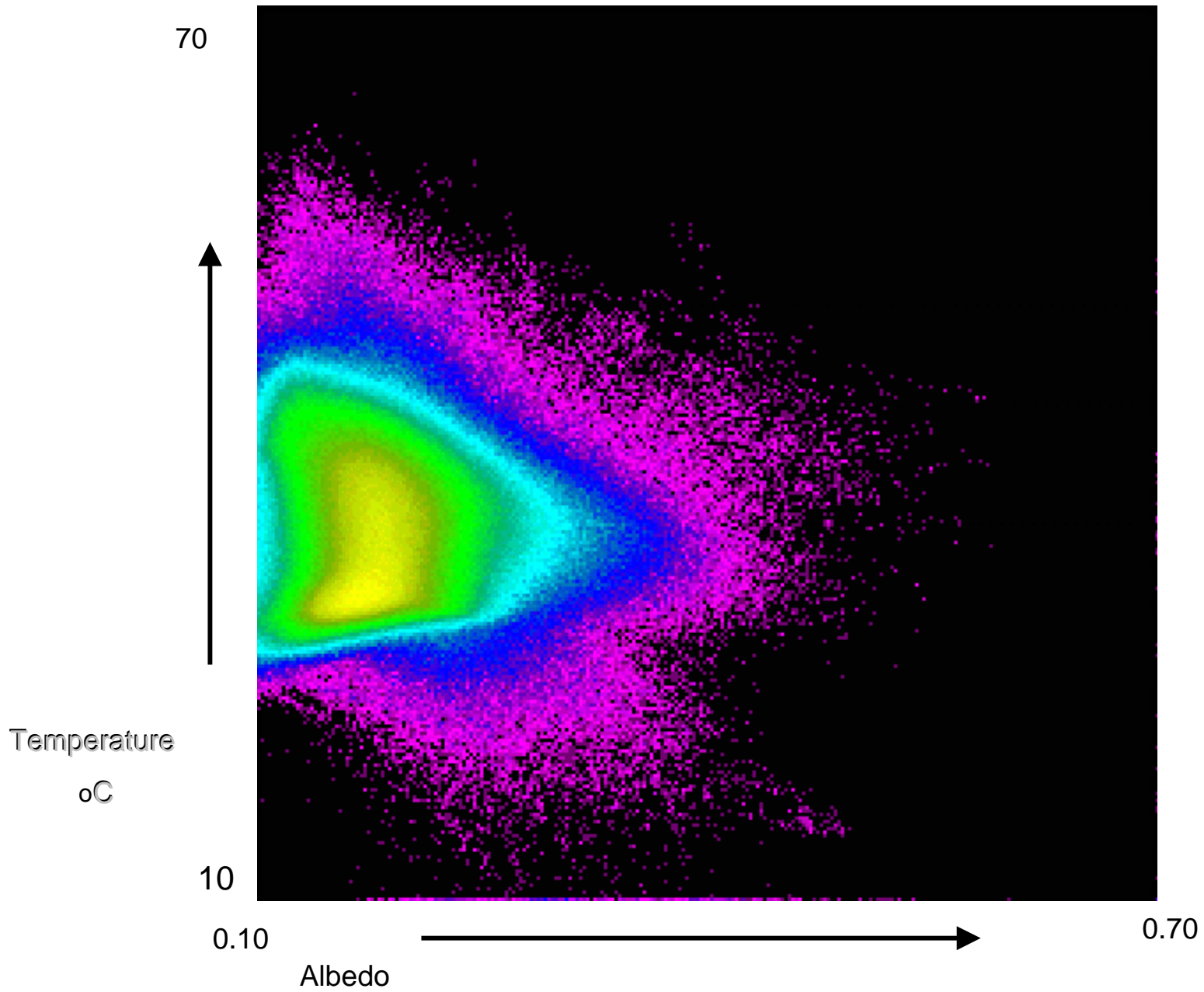
San Juan Urban Albedo

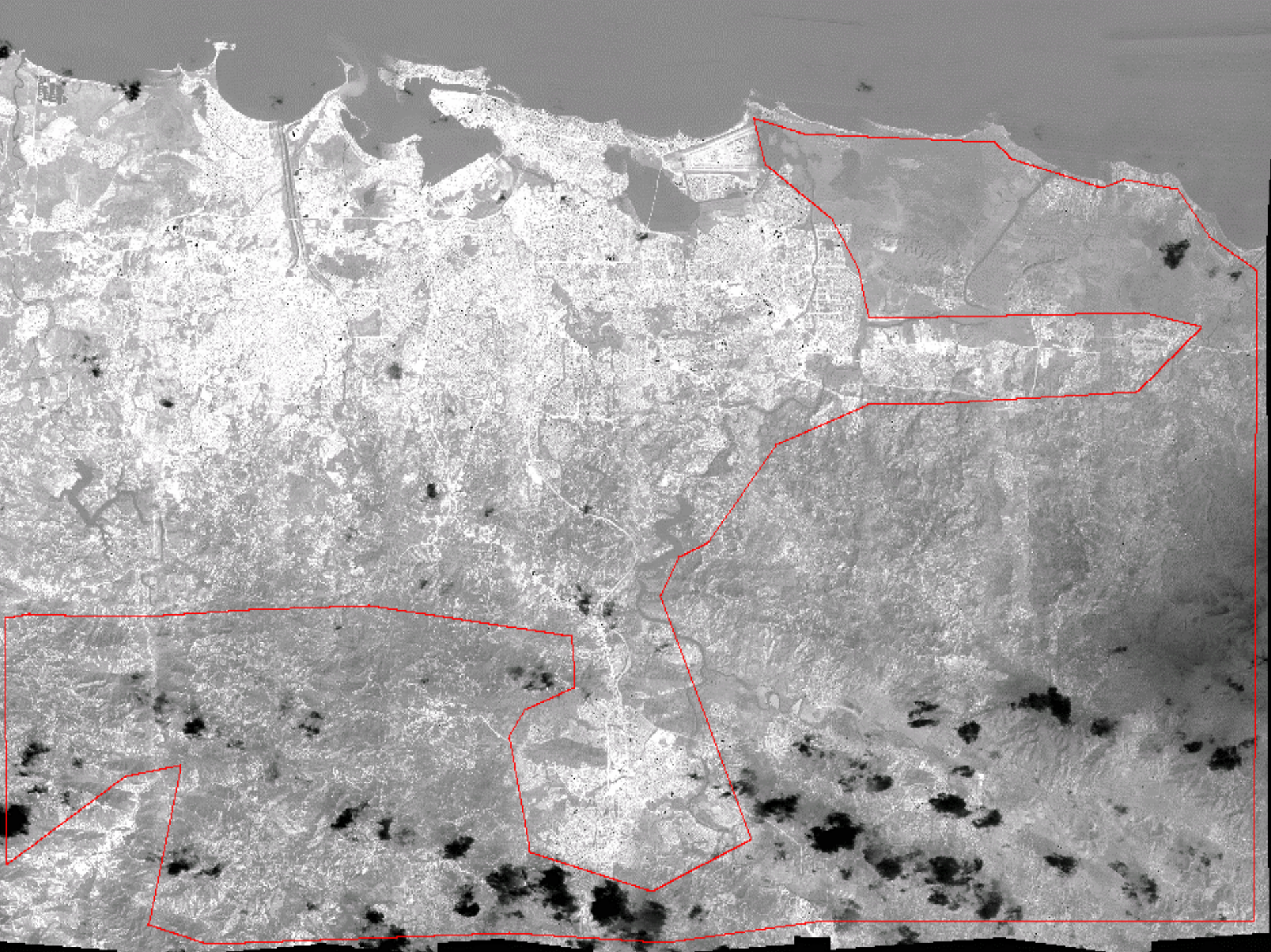


San Juan Urban Temperature

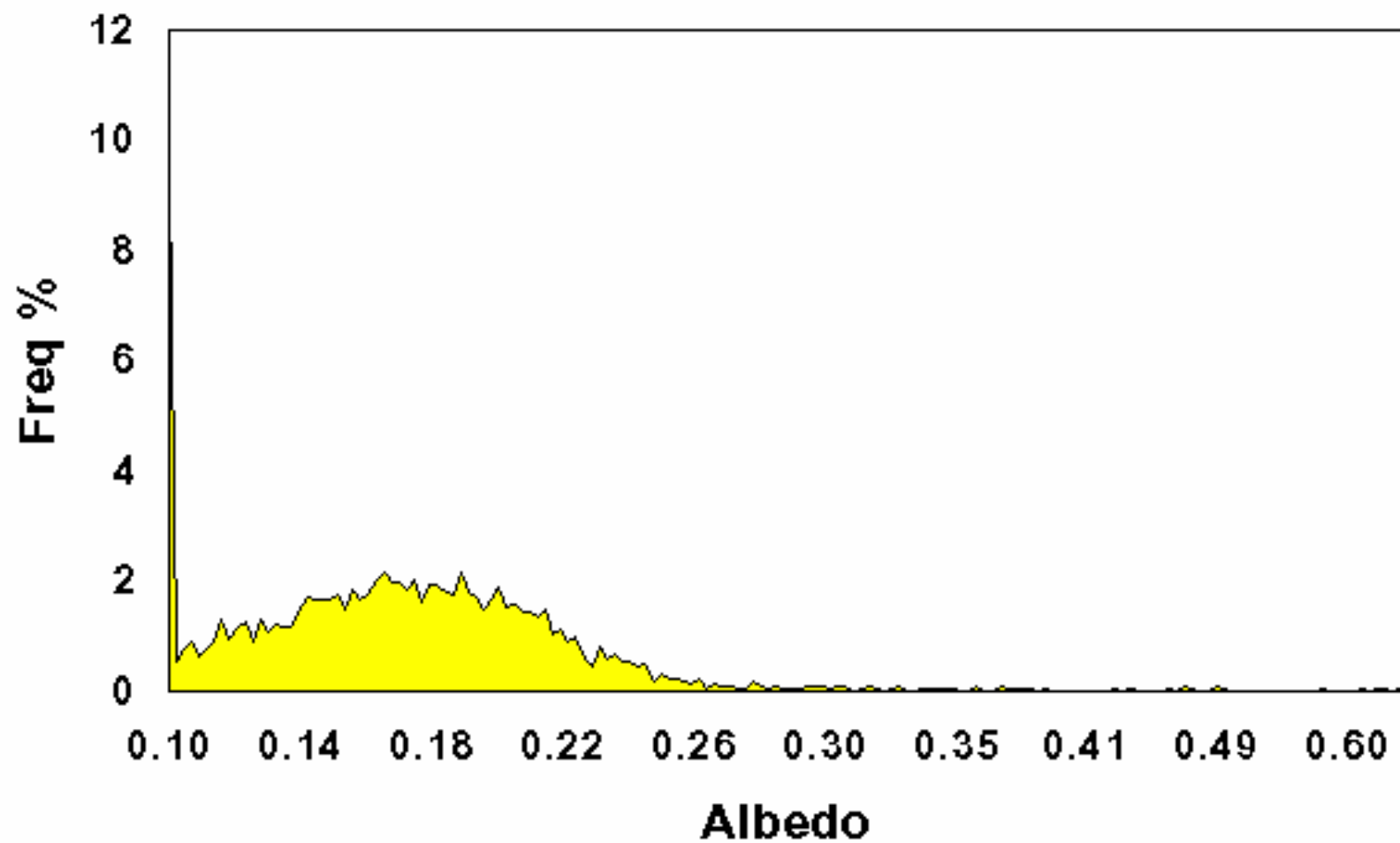


San Juan Puerto Rico Albedo vs Temperature

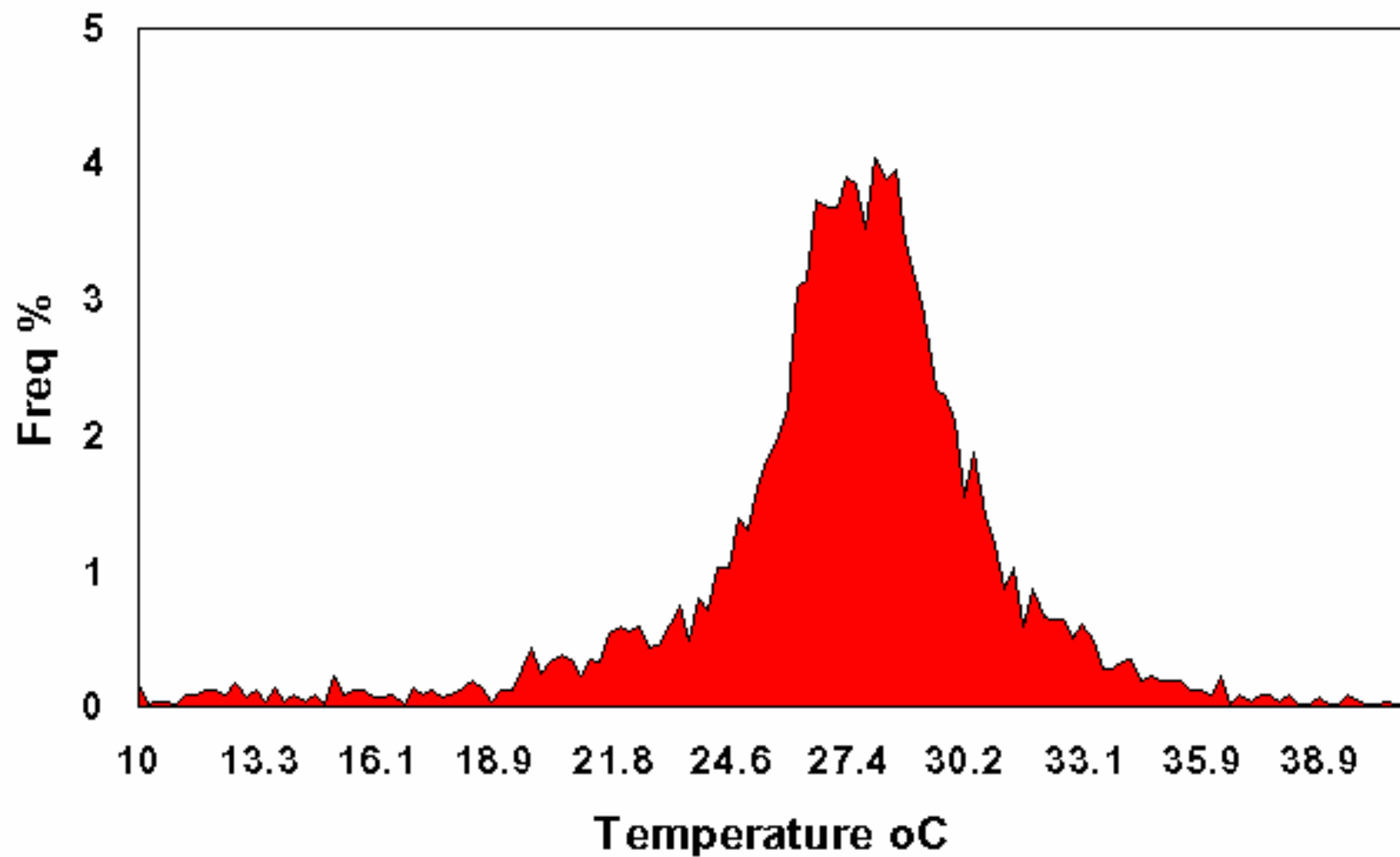




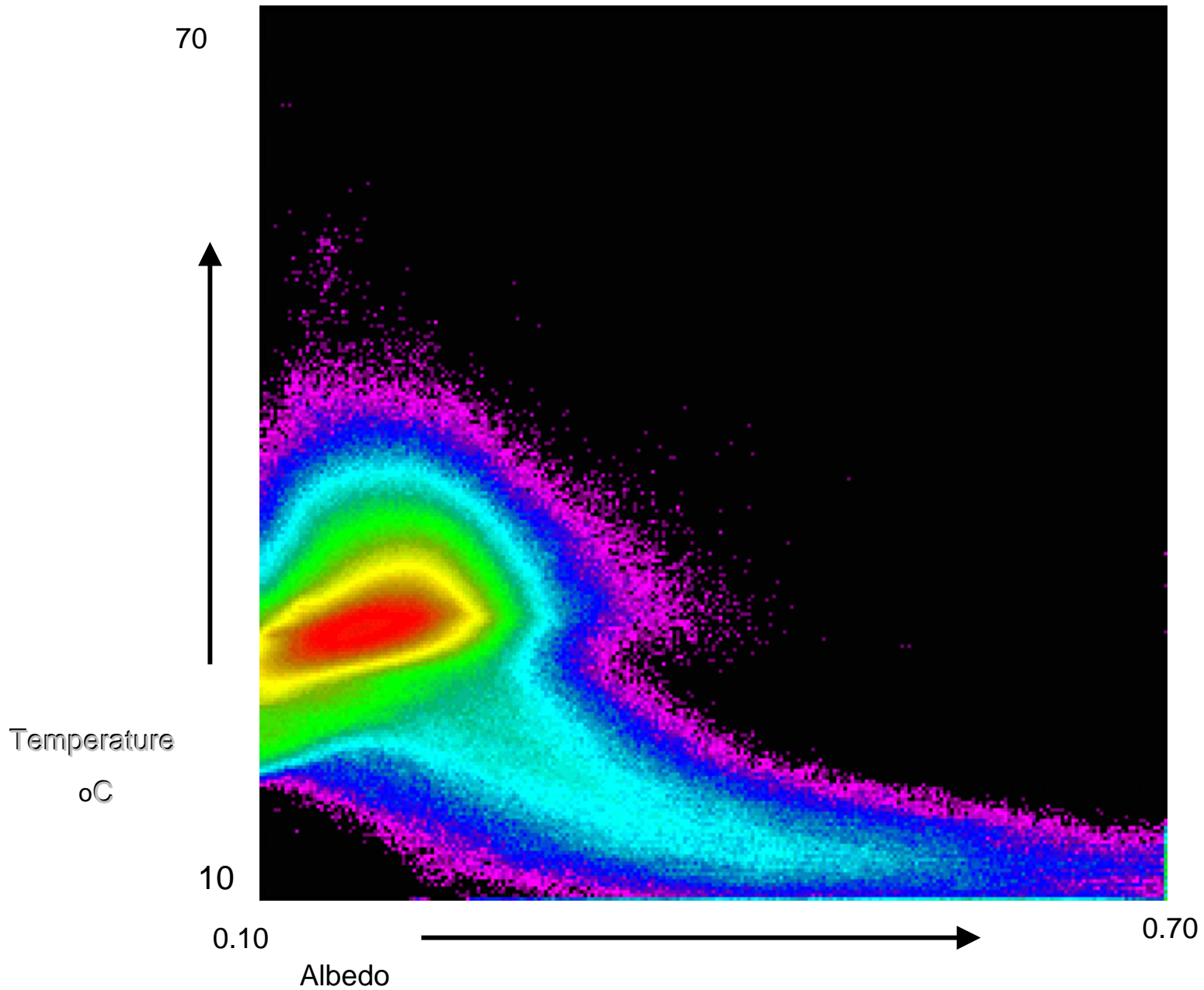
San Juan Urbanizing Area Albedo



San Juan Urbanizing Area Temperature



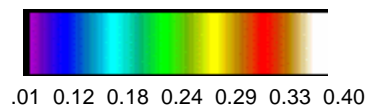
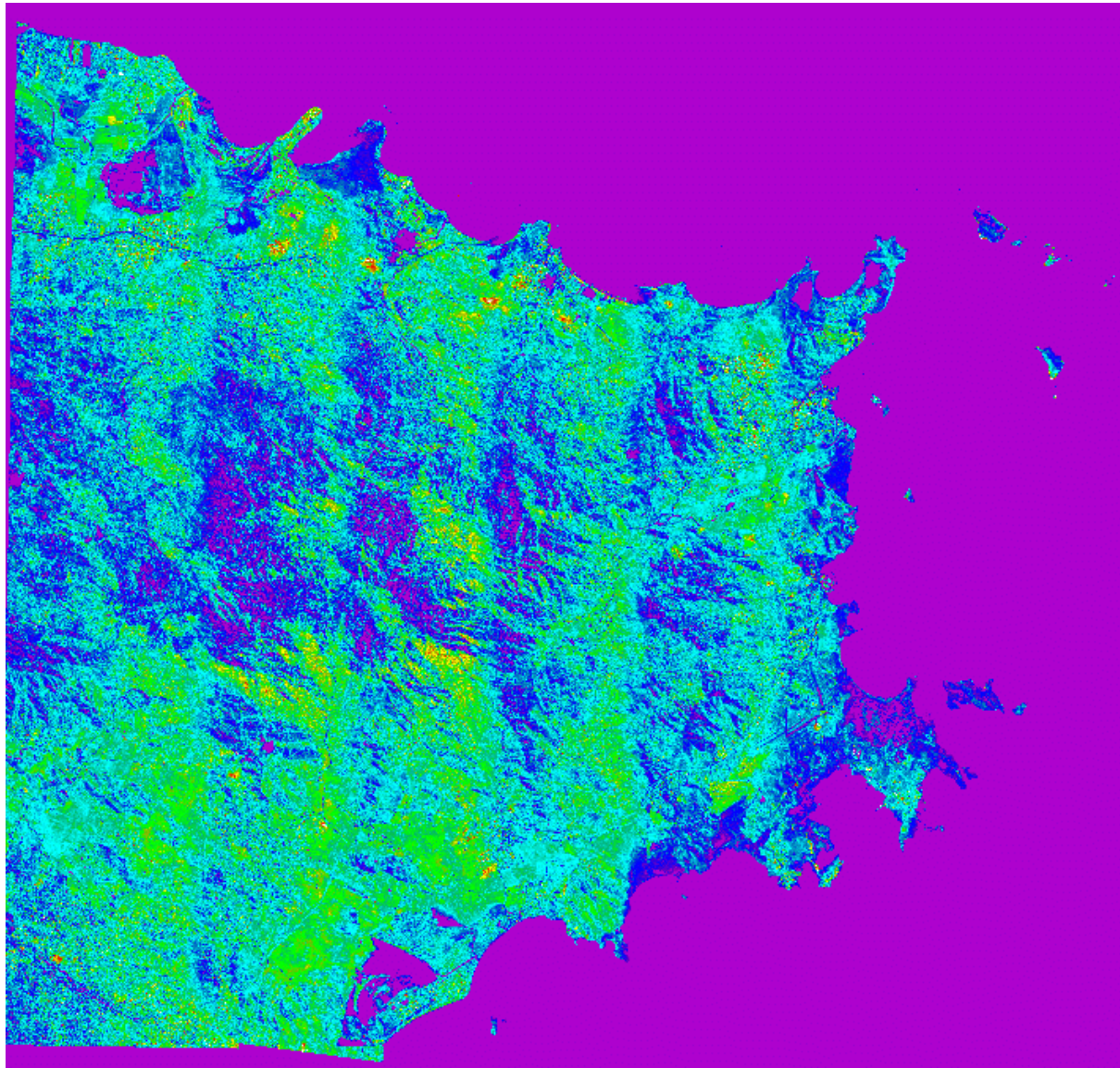
San Juan Puerto Rico Urbanizing Area Albedo vs Temperature



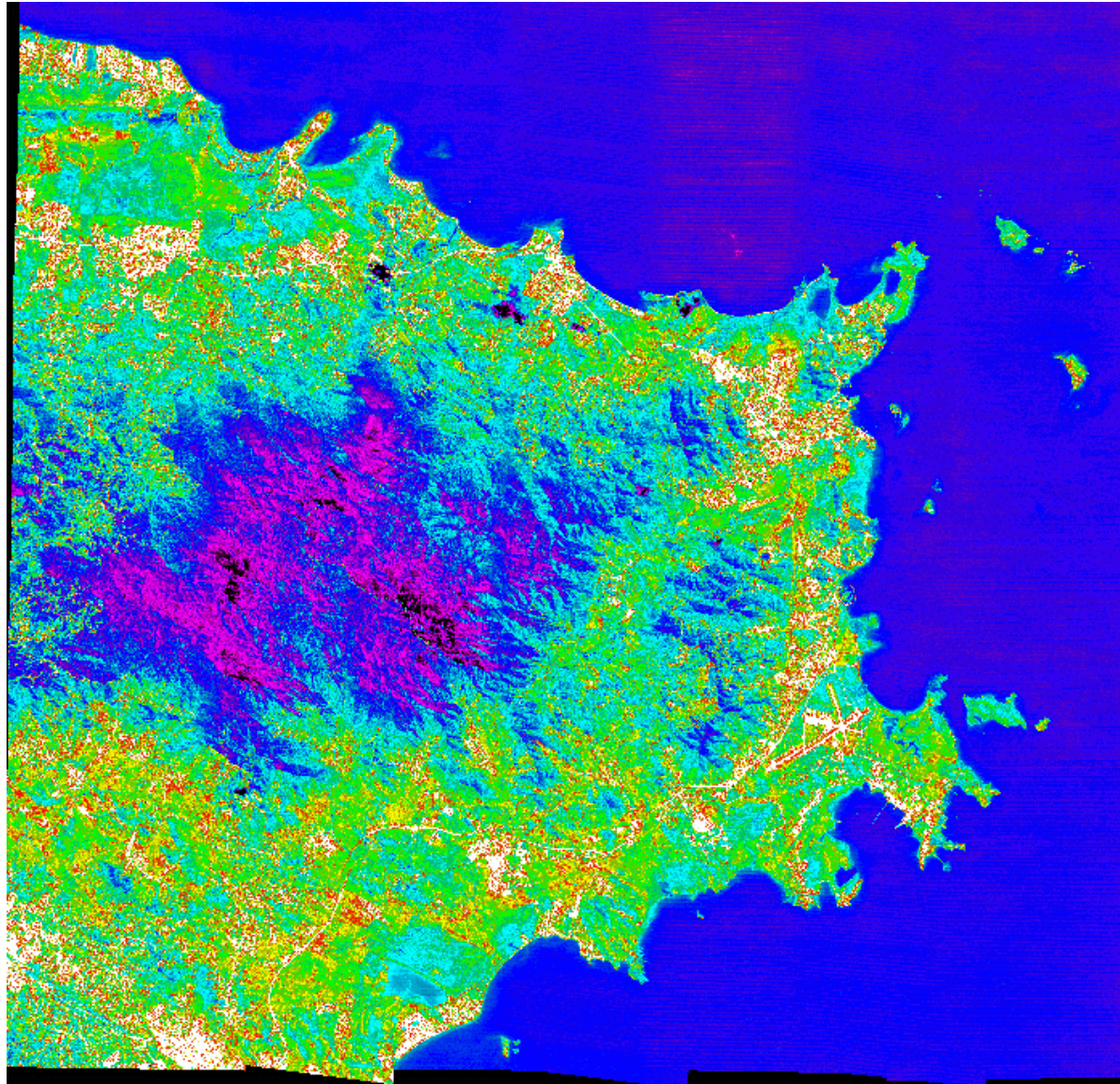
El Yunque F4 Mosaic True Color

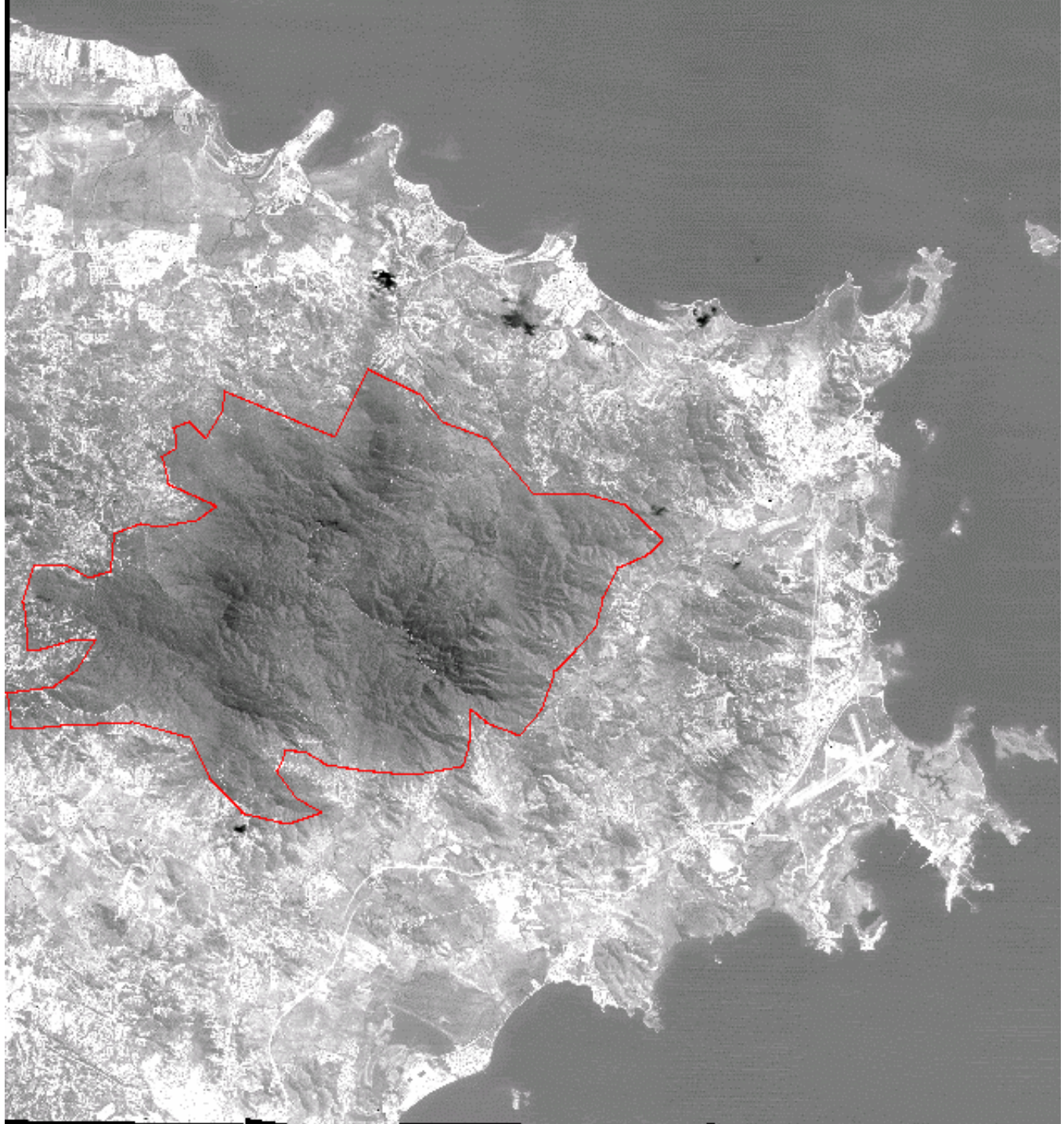


El Yunque F4 Mosaic Albedo

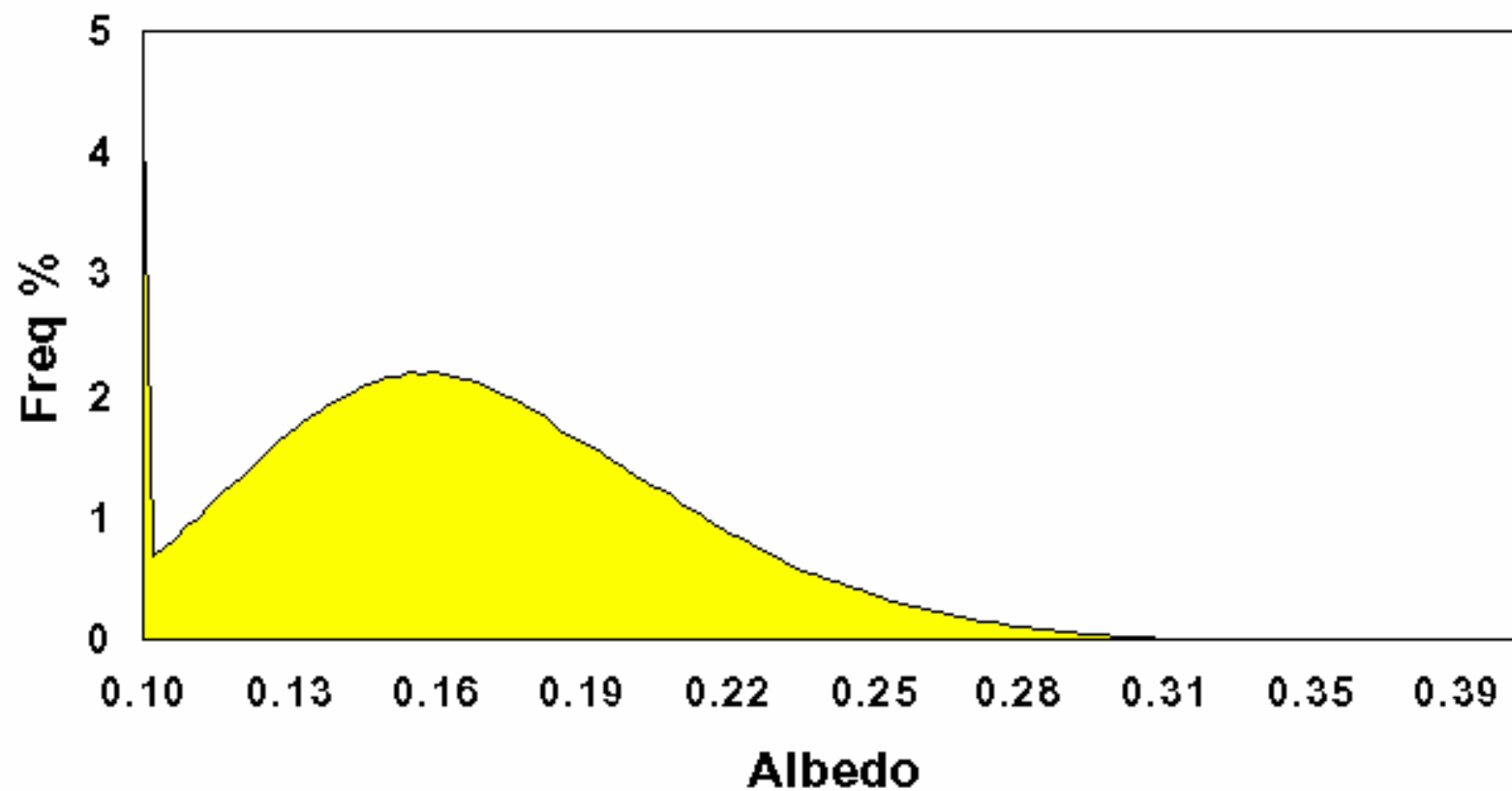


El Yunque F4 Mosaic Temperature

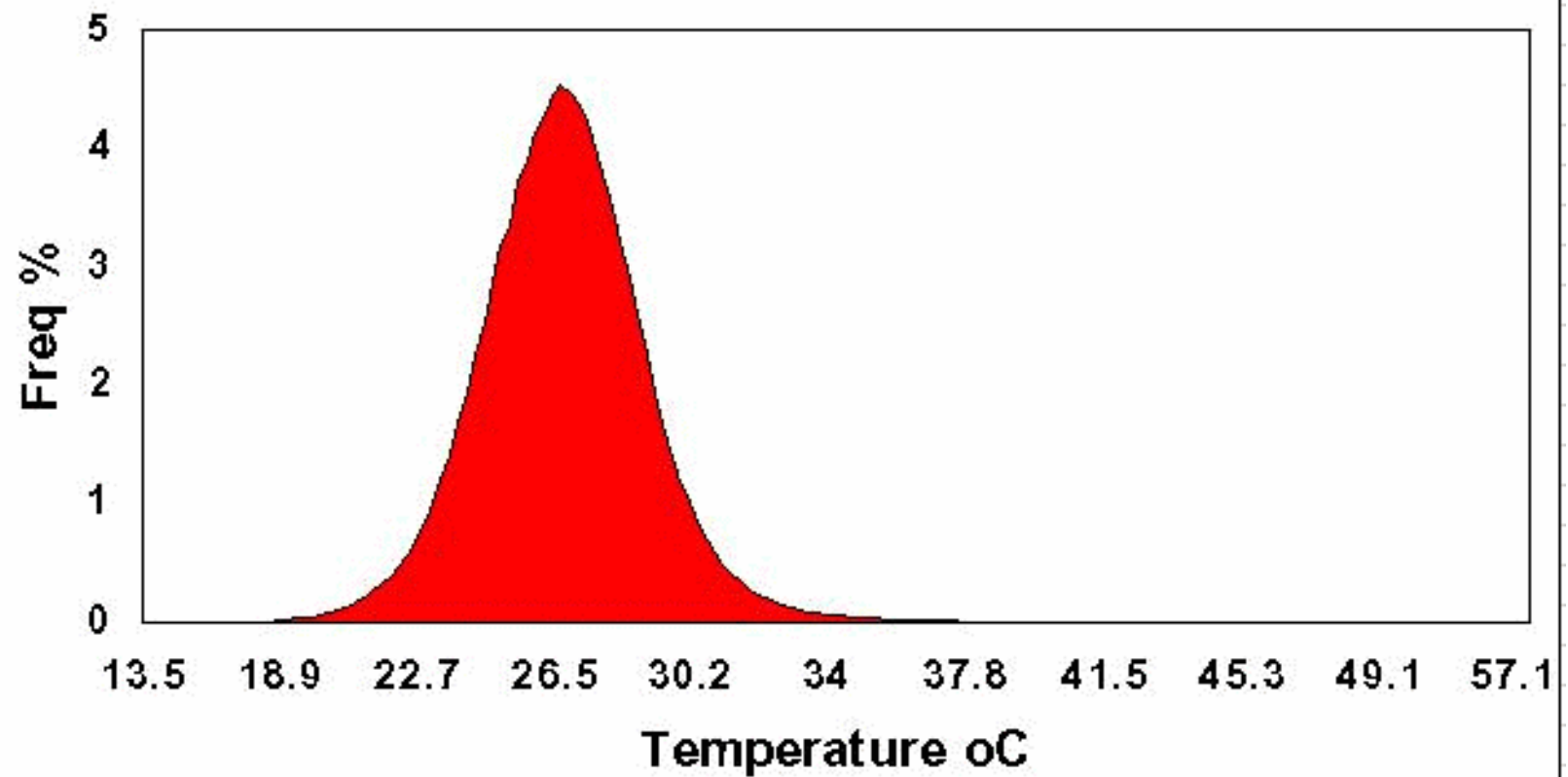




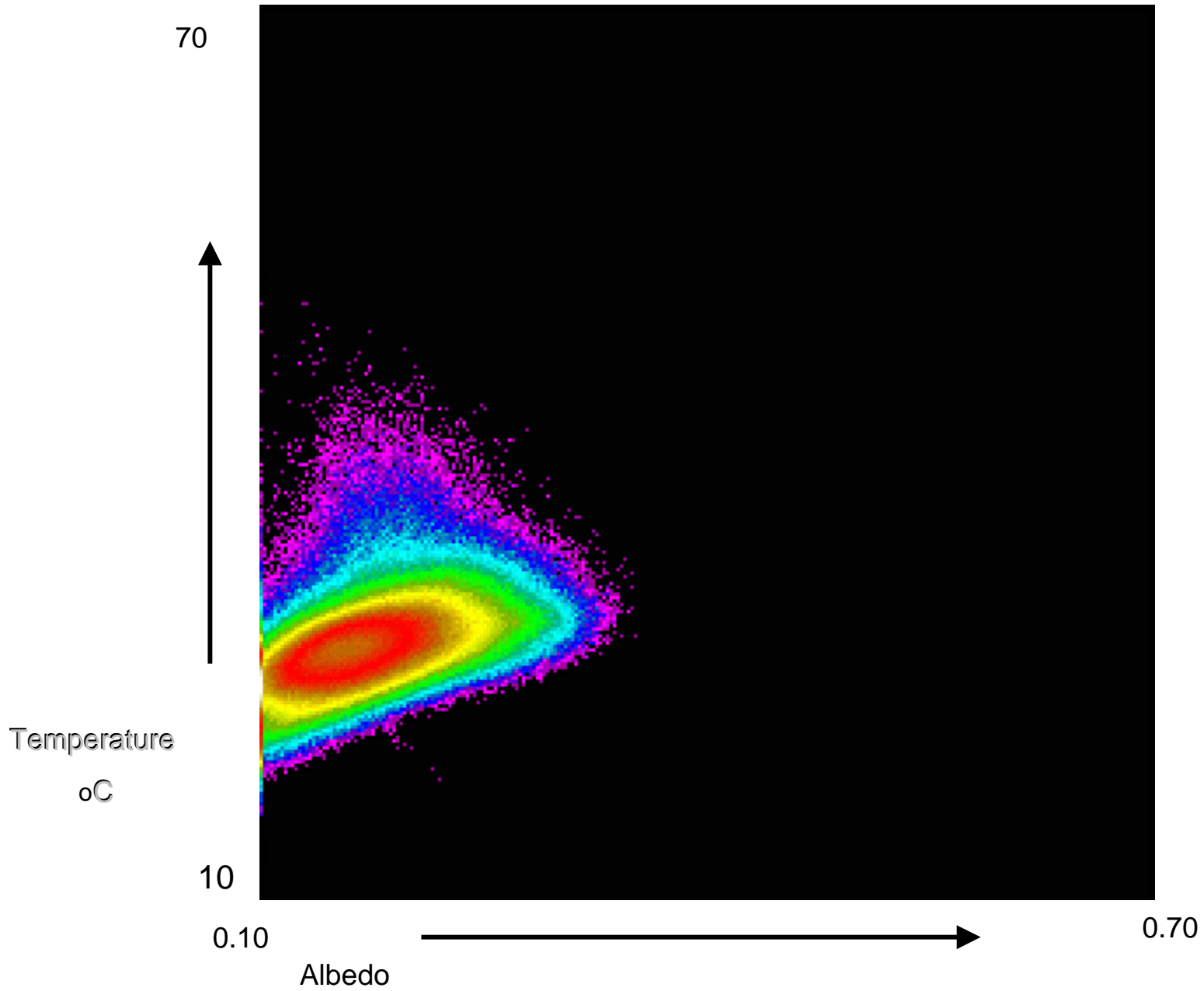
El Verde Albedo



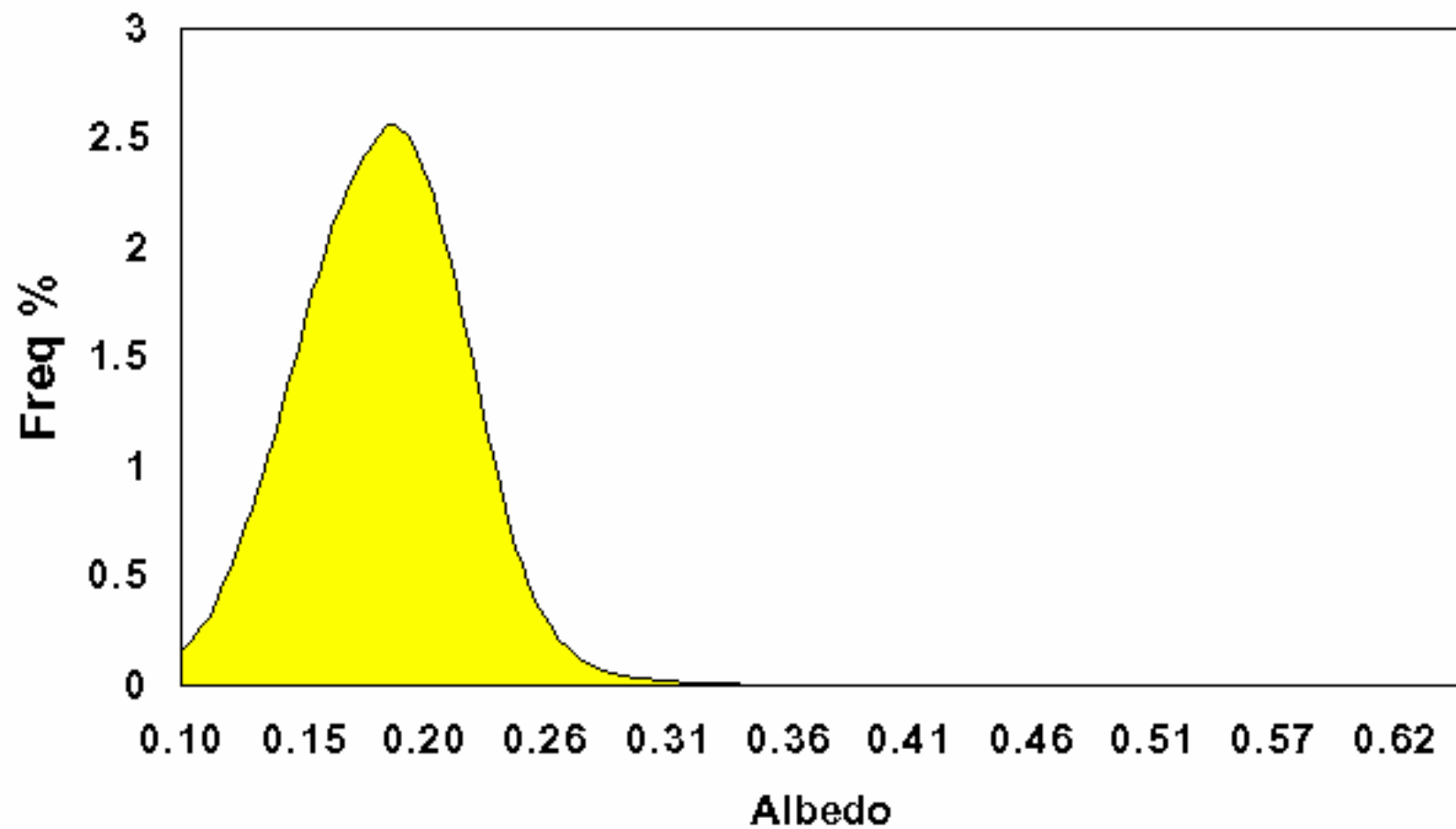
El Verde Temperature



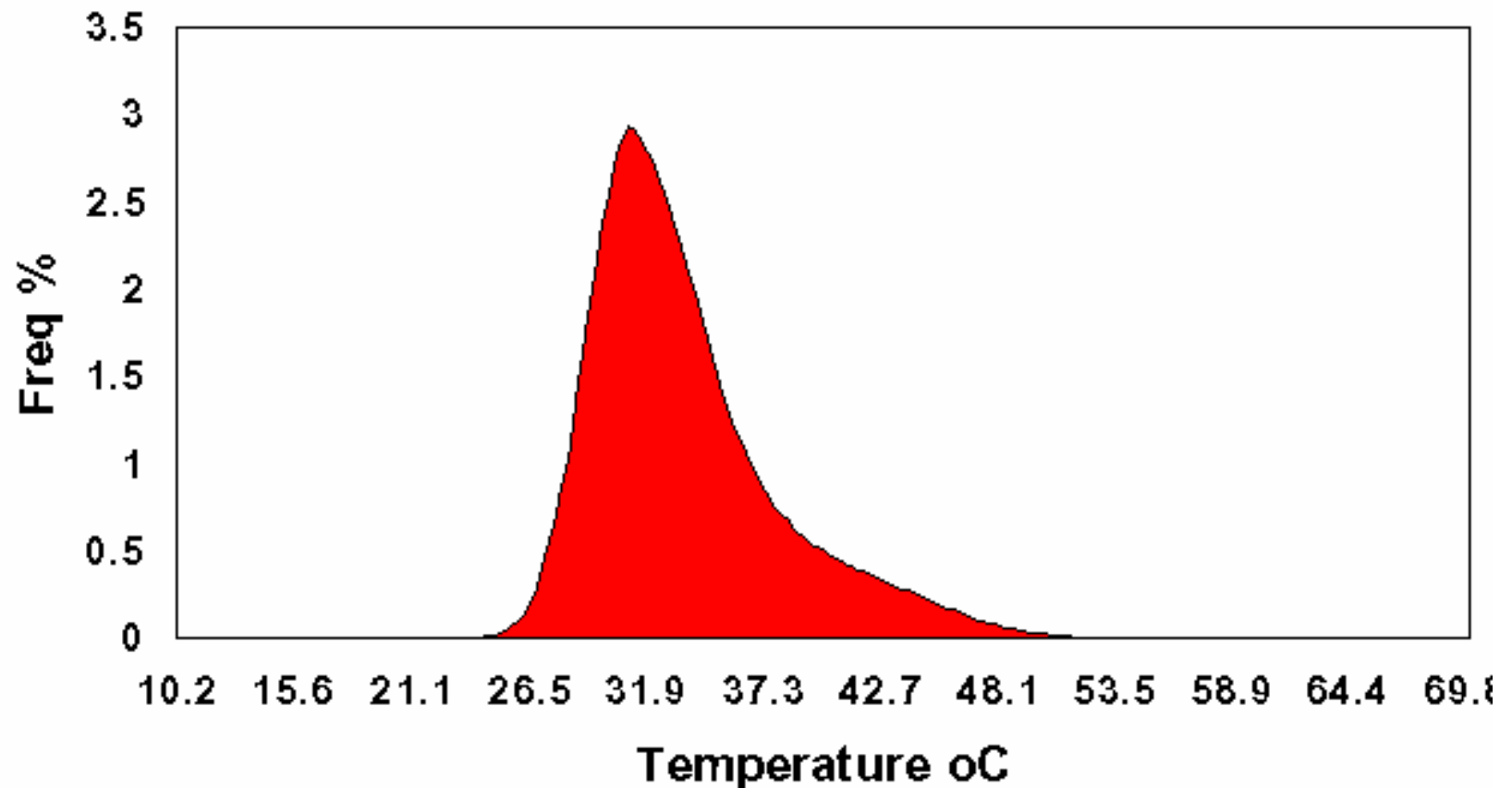
El Yunque Albedo vs Temperature



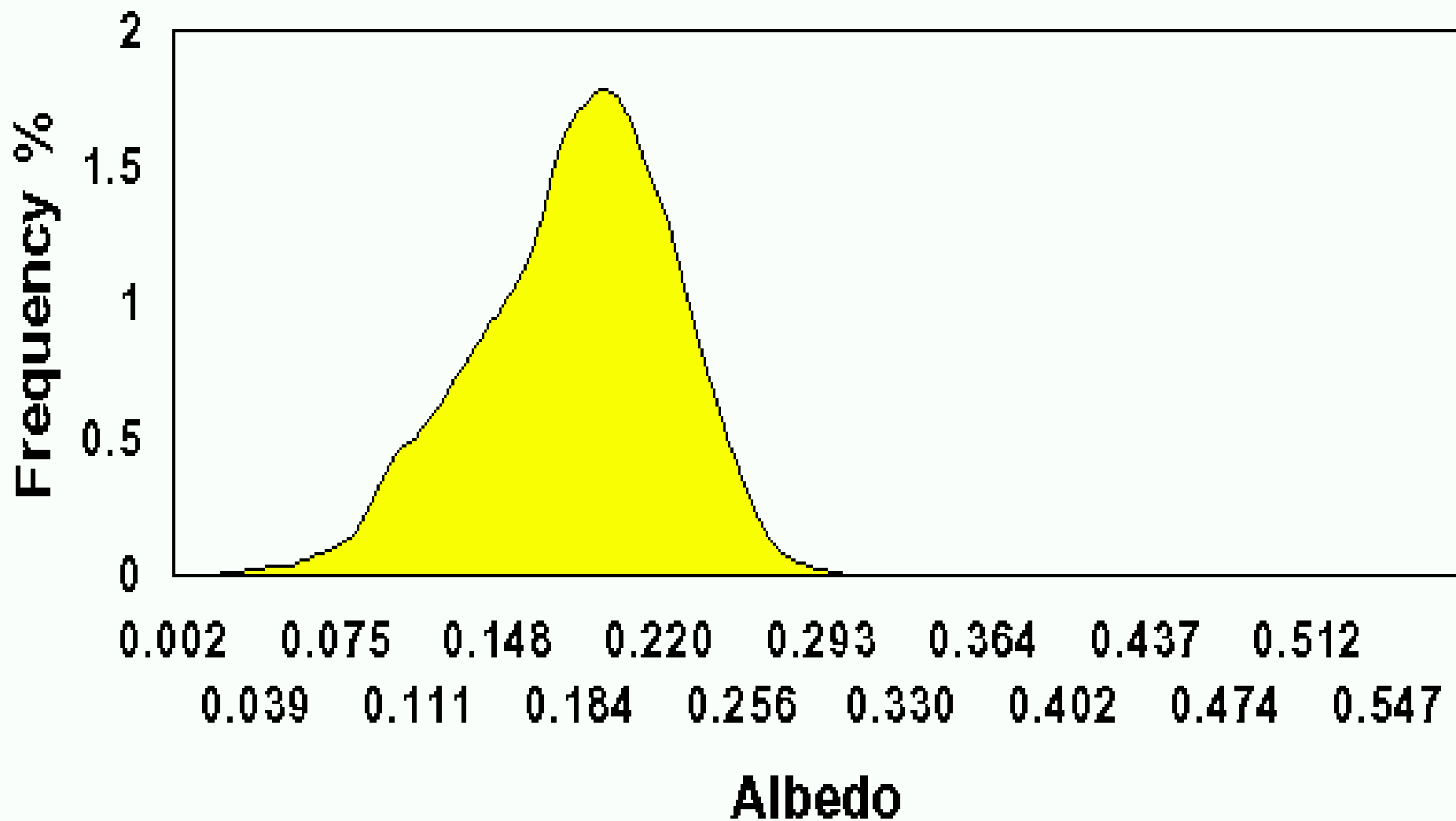
El Verde "Urban" Albedo



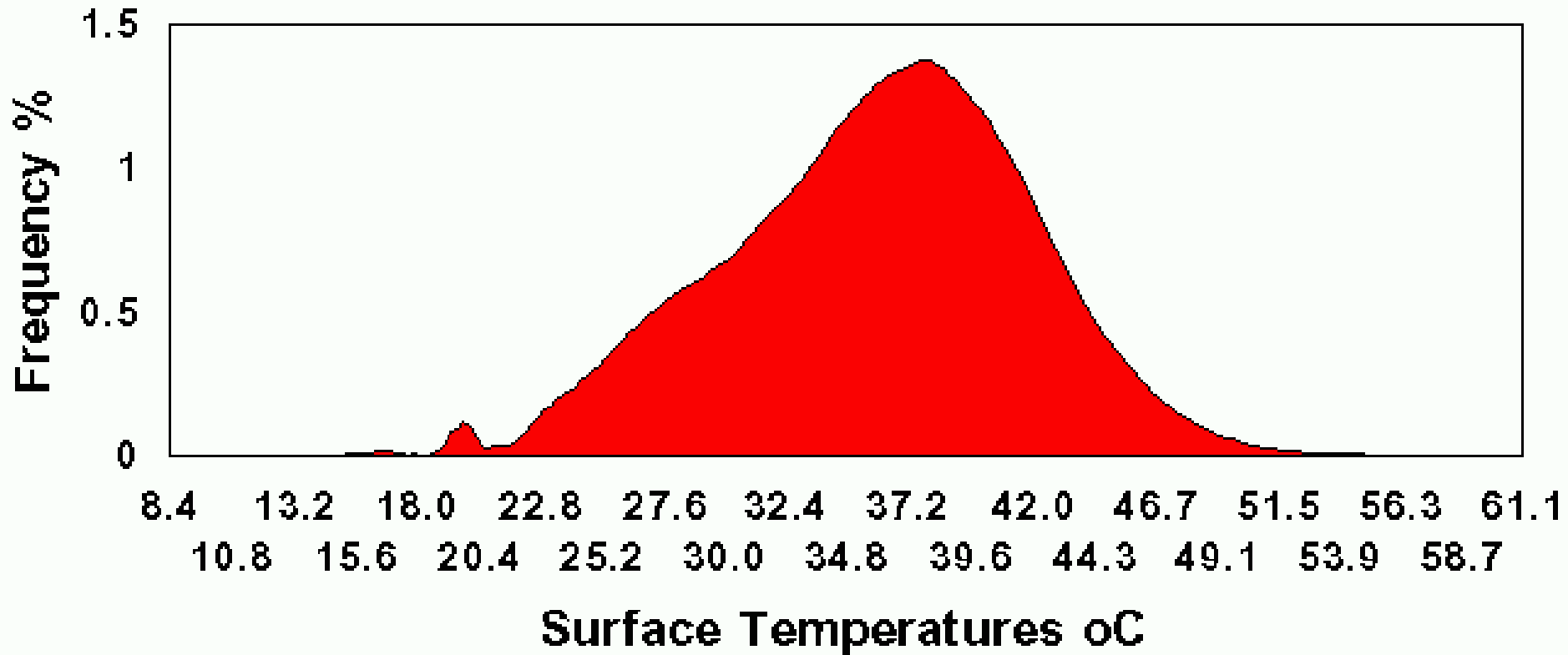
El Verde "Urban" Temperature



Sacramento Whole Mosaic

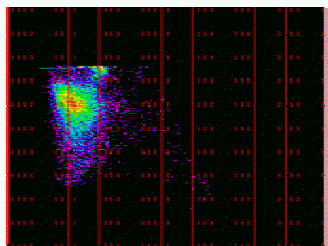


Sacramento Whole Mosaic

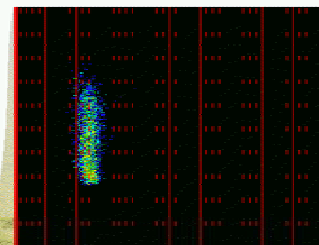


Sacramento Skattergrams Albedo vs Temperature

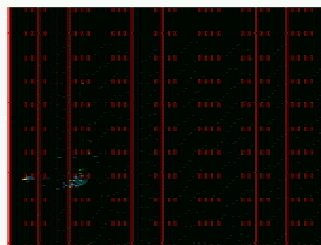
Industrial
(railyard)



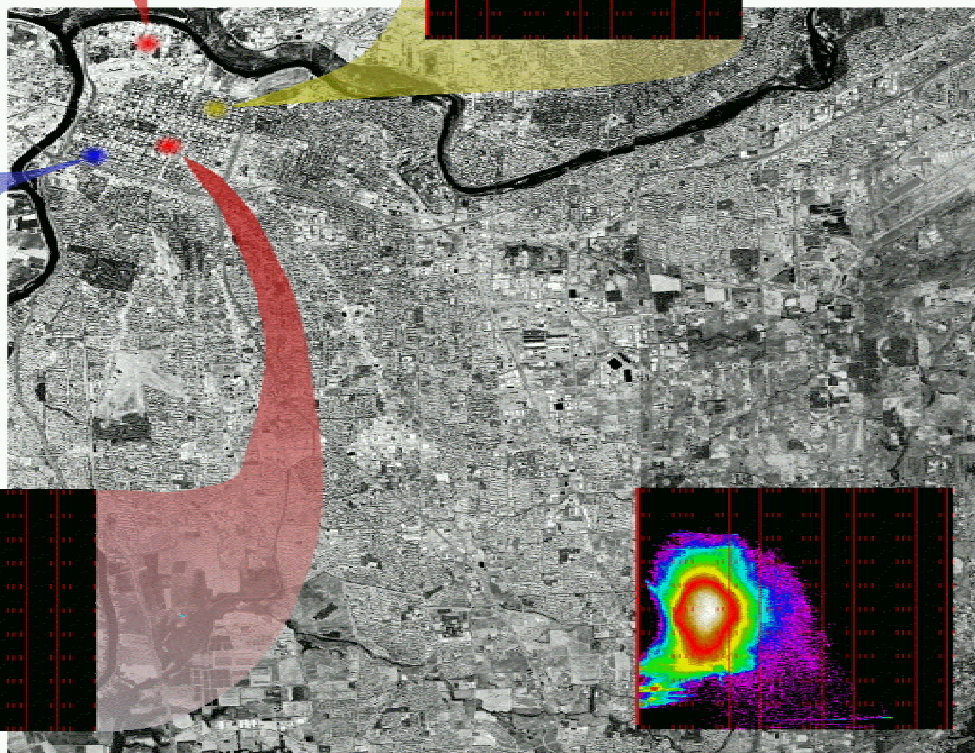
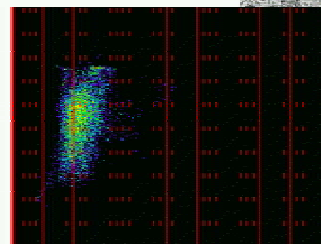
Residential



Park
(Forest)



CBD



Whole
Mosaic

