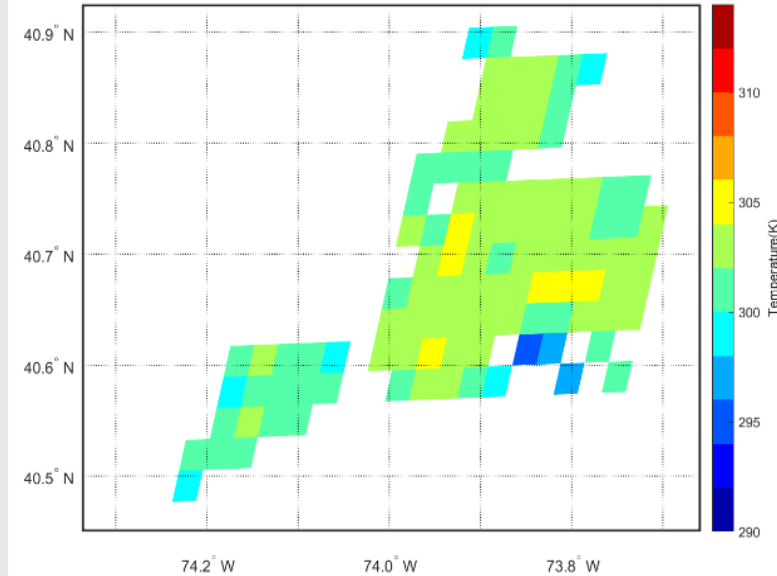
A satellite is shown in space, oriented vertically. It has a complex structure with various instruments and antennas. Large solar panels are extended from the satellite, and the Earth is visible in the background, showing a blue and white horizon. The background is a dark starry sky.

**Development of Downscaled
Urban Land Surface Temperature
for New York City**

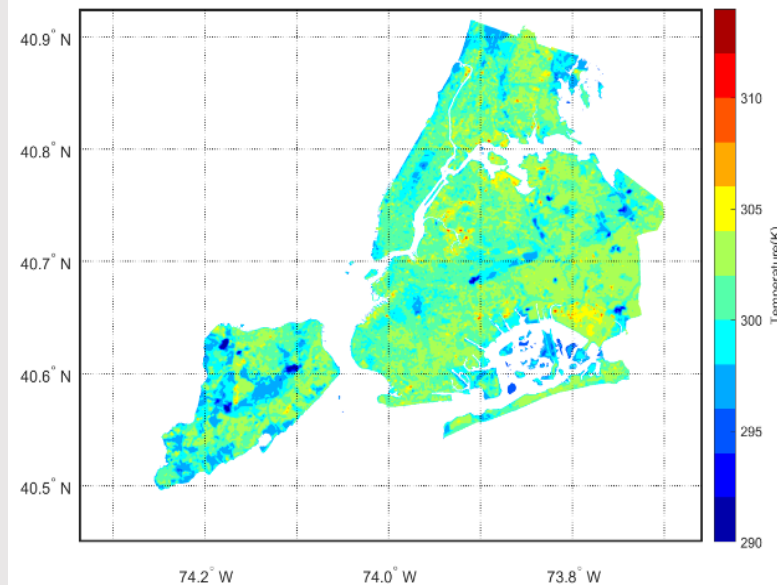
Why downscale?

- Urban areas have a complex heterogenous surface texture that can be lost in coarse resolution
- Downscaling will combine the high temporal resolution of GOES-16 of 5 minutes to the high spatial resolution of Landsat 8 at 30m
- Have a more precise data over urban regions for weather predictions

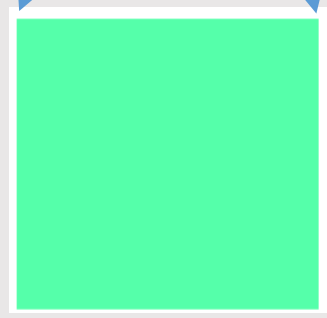
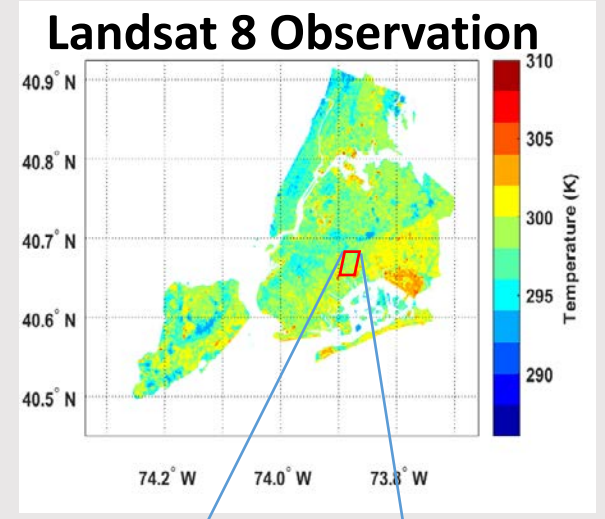
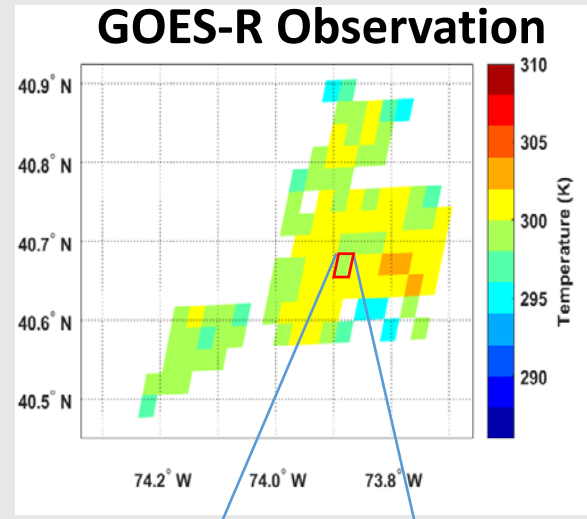
GOES-R Observation



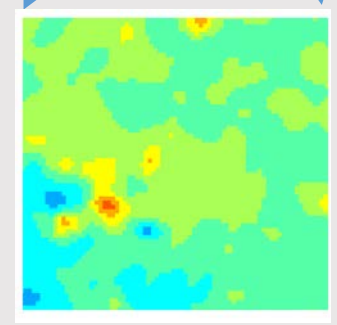
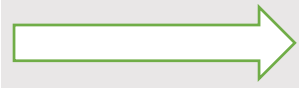
Landsat 8 Observation



Goal

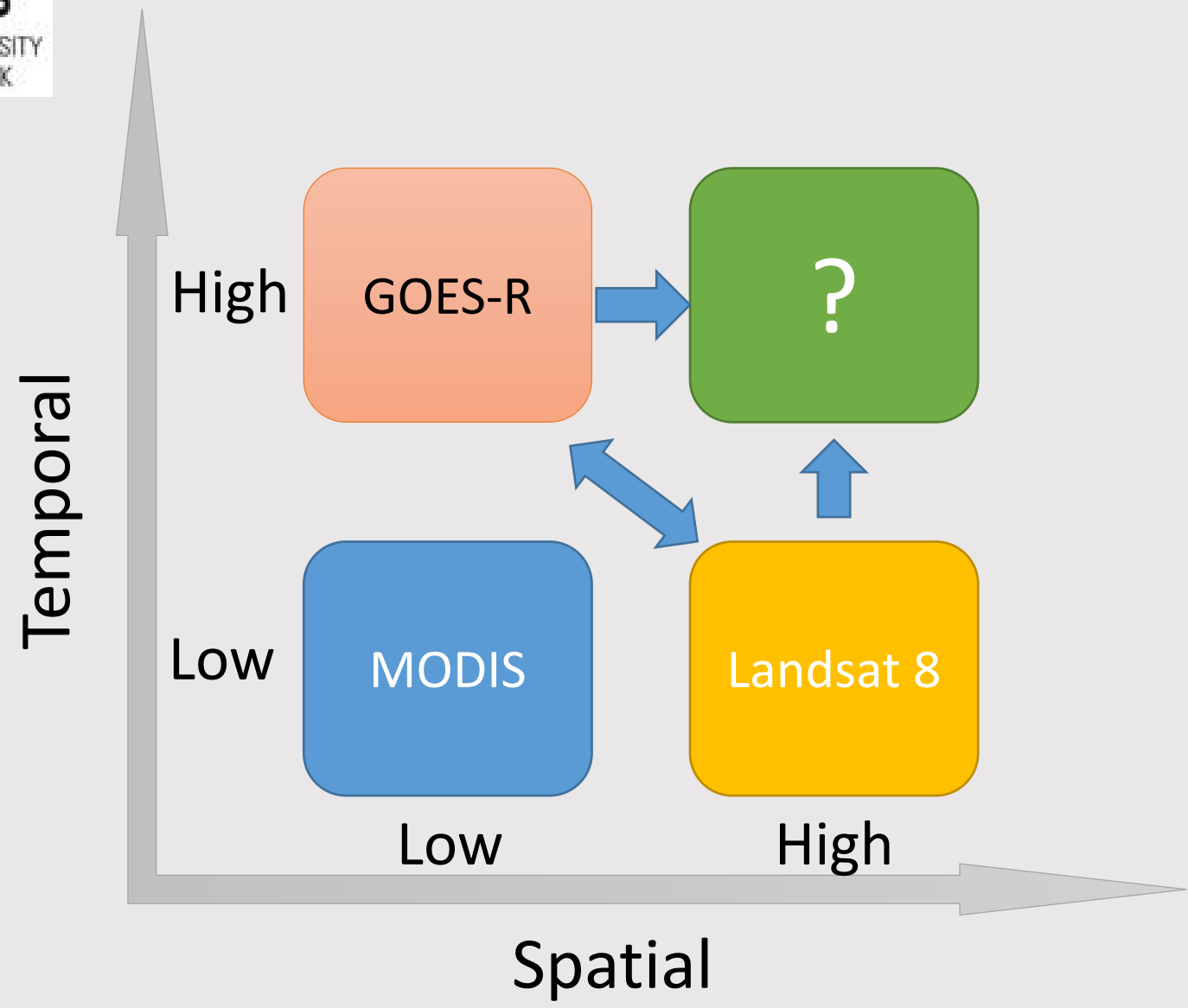


GOES-R Pixel



Landsat 8 Pixels

GOAL



Data

Instrument	Platform	Resolution (m)	Revisit (days)	Daytime overpass	TIR bands (8-12.5 μ m)	Launch year
ECOSTRESS	ISS	38x68	3-5	Multiple	5	2018
ABI	GOES-R	2000	Daily	Every 5 min	10	2016
IR cameras	Drones and Hand-on cameras	-	Daily	Every hour	-	-
TIRS	Landsat 8	30	16	3:30 pm	2	2013

Method

Computing the system bias between GOES-R and Landsat 8 initial observations

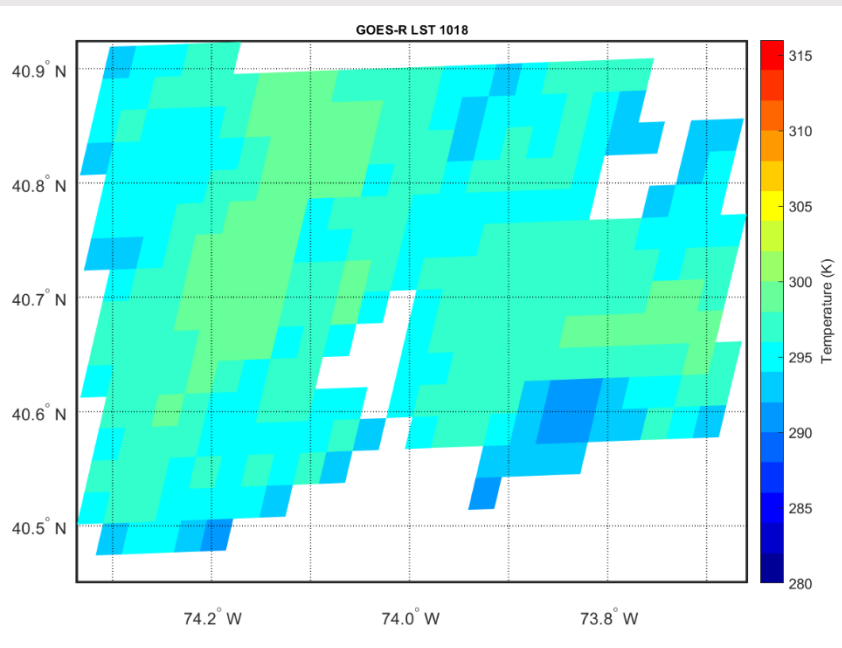
Finding the spatial difference across Landsat 8 pixels.

Generating the temporal difference of each land cover type.

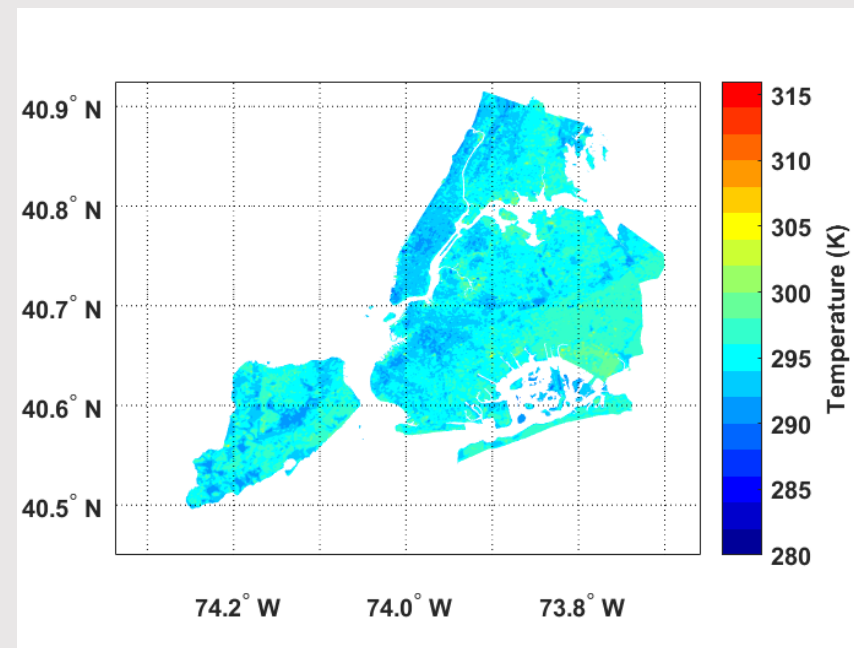
Combining GOES-R second observations, satellites' systematic biases, Landsat's pixels spatial difference and the temporal difference of the temperature for each land class to get the predicted GOES-R LST at Landsat 8 resolution.

Results

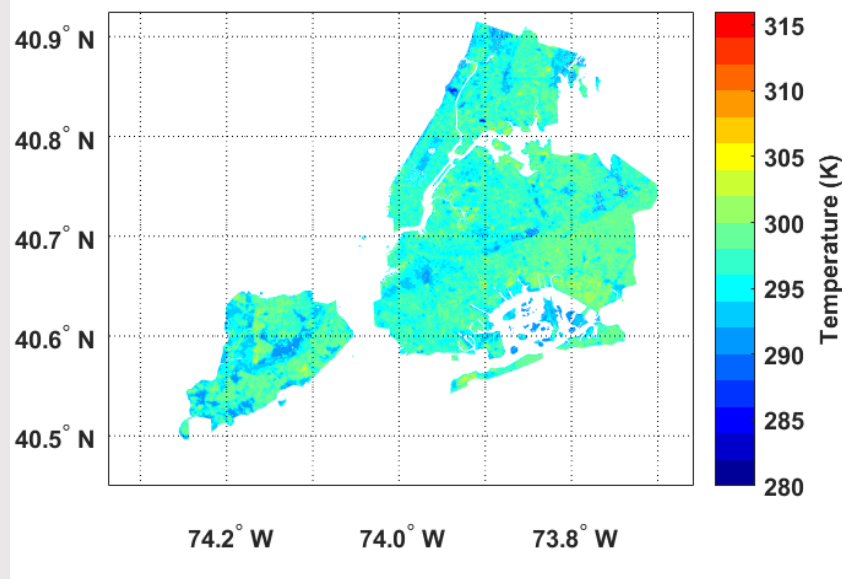
Observed GOES-R LST



Observed Landsat 8 LST



Downscaled GOES-R LST

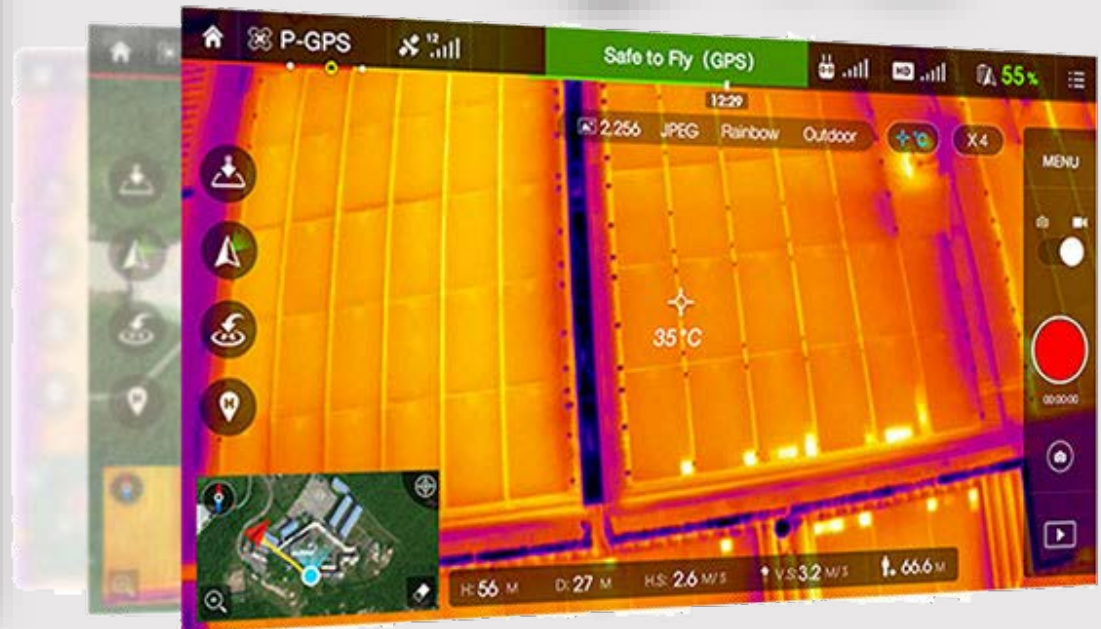


Validation

DJI Inspire One with Zenmuse XT
powered by FLIR

120m Altitude at 640 × 512
resolution

(0.06 km² area)



Thank you