

# Characterization Analysis of Desert Rock station With 1Km Synthetic Satellite Pixels

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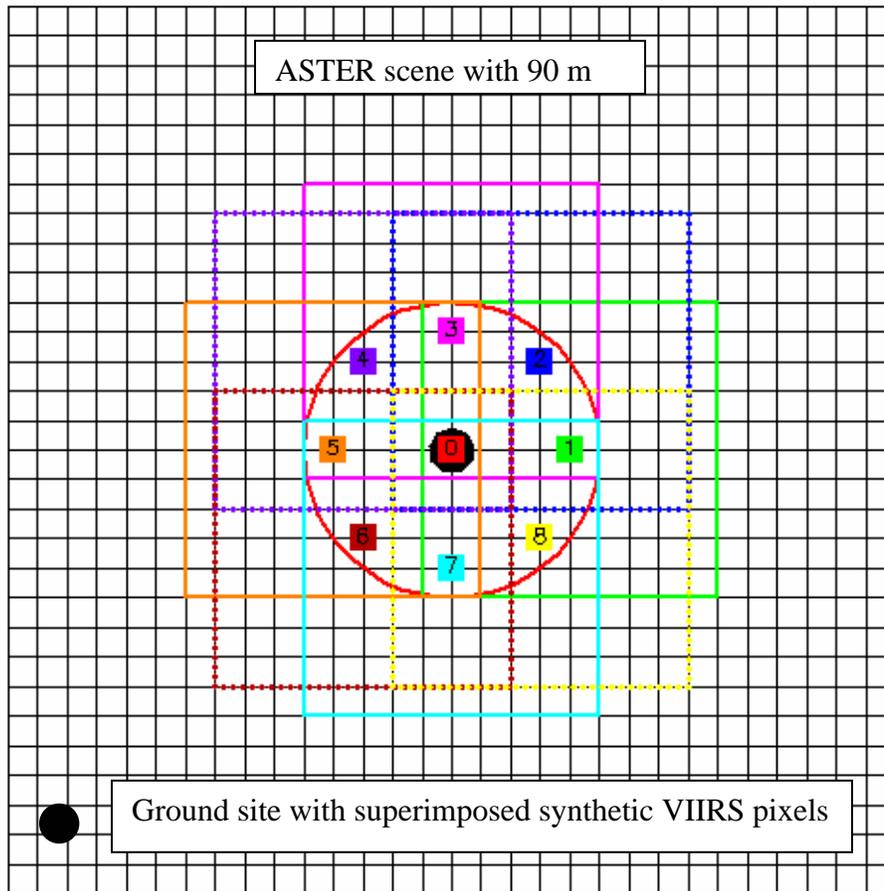
## 1. Synthetic Satellite pixels and Data Composing

- a) Data period: **2000 – 2007**
- b) Target Ground: **Desert Rock, NV (SURFRAD)**



- c) Available swaths with target ground site enclosed: **~100**
- d) Clear cases in this analysis: **46**
- e) Synthetic pixel size in this analysis: **~1Km, 13X13 ASTER TIR pixels**
- f) Number of Synthetic pixels: **9** (Figure 1)
- g) Synthesizing Criteria:
  - 1) **All the 9 synthetic pixels must be fully clear. Cloud screening was based on ASTER cloud masks plus augmented checking.**
  - 2) **Overlap (intersection) of neighboring synthetic pixels is about half of the pixel size, which may enable each individual synthetic pixel to be distinguishable from the others, that is, to have its own characteristics.**

## 2. Diagram of Synthetic Pixels

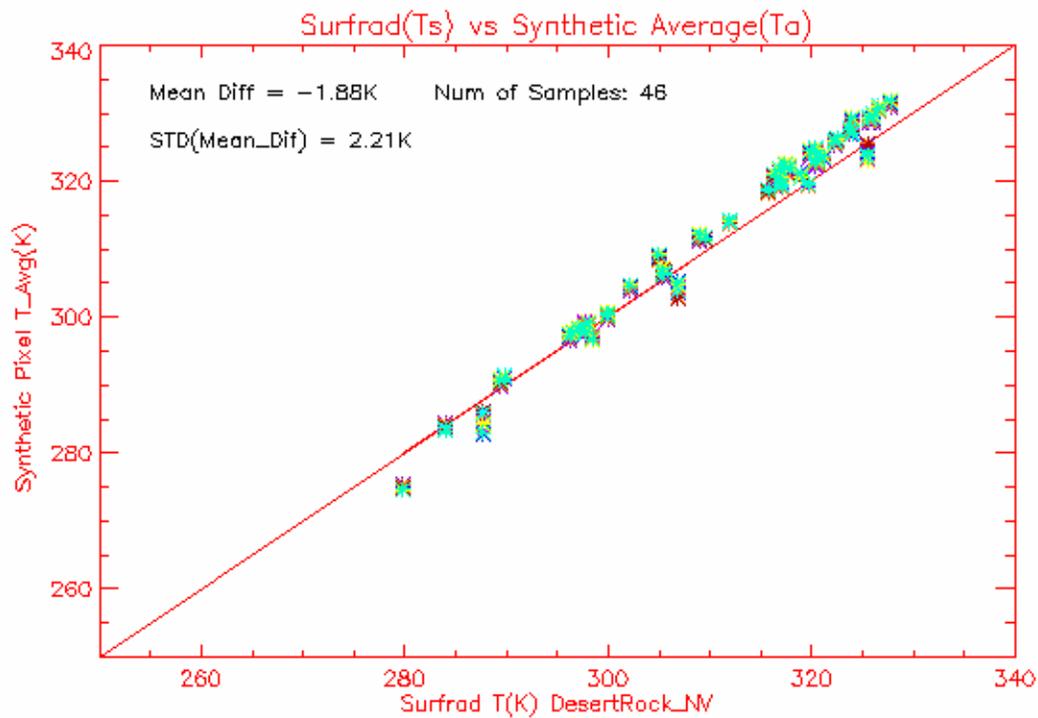


**Figure 1.** Pixels synthesized from fine-resolution (90m) ASTER TIR pixels. Each synthetic pixel has the target ground site enclosed, but the distance between the ground site and the center of synthetic pixel varies, which mimics the possible over-passing MODIS swaths. Nevertheless, the distance of every synthetic pixel center from the ground site is within the pixel size (1Km). Different colors are used for the 9 synthetic pixels, and the center of each pixel is marked with a small numbered square of the same corresponding color. The numbers on the squares are the pixel IDs used in the relevant analysis.

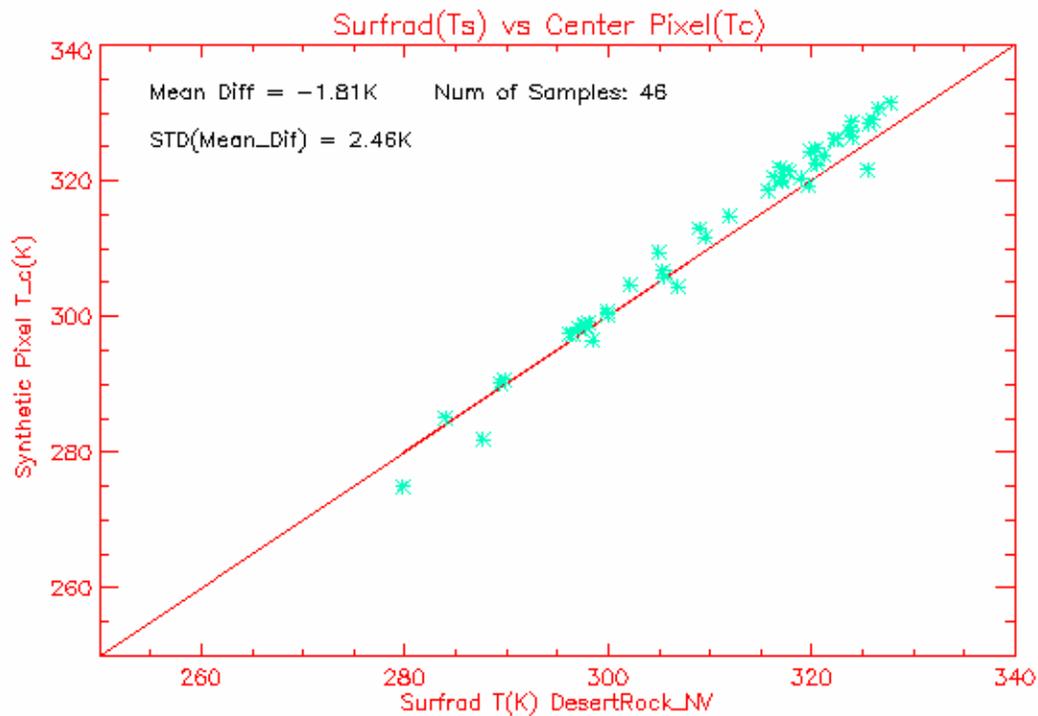
The surrounding area from Google 1Km X 1Km Map



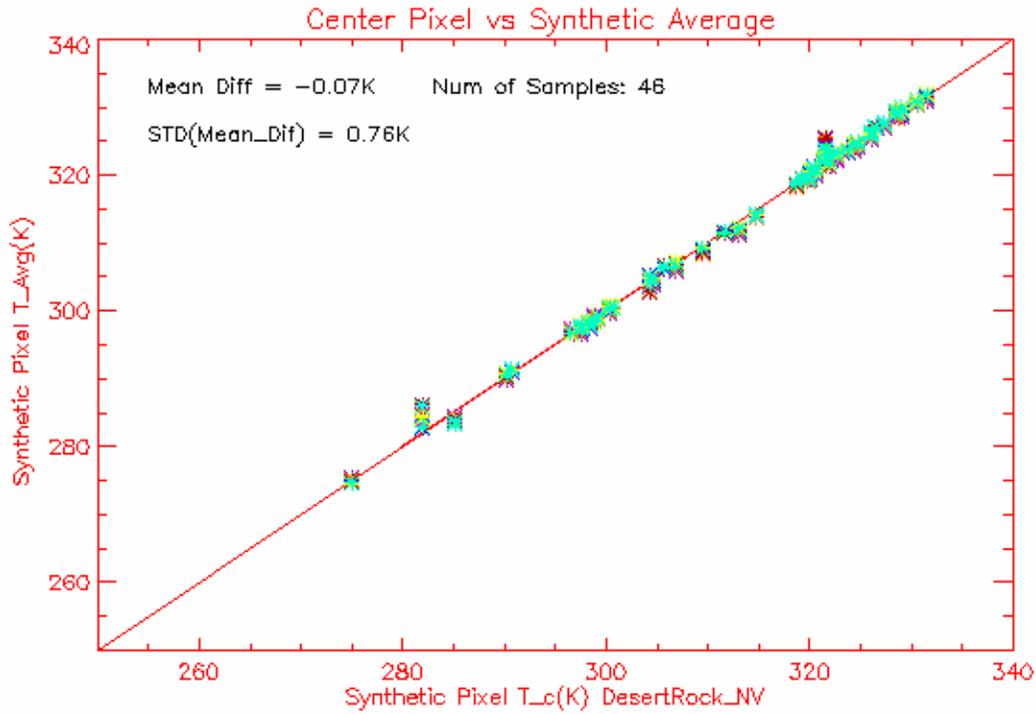
### 3. Comparison of Synthetic pixels with ground site



**Figure 2.** Comparison of synthetic pixel average temperature with the ground site temperature. Note that different colors are used for the 9 different synthetic pixels as shown in Figure 1.



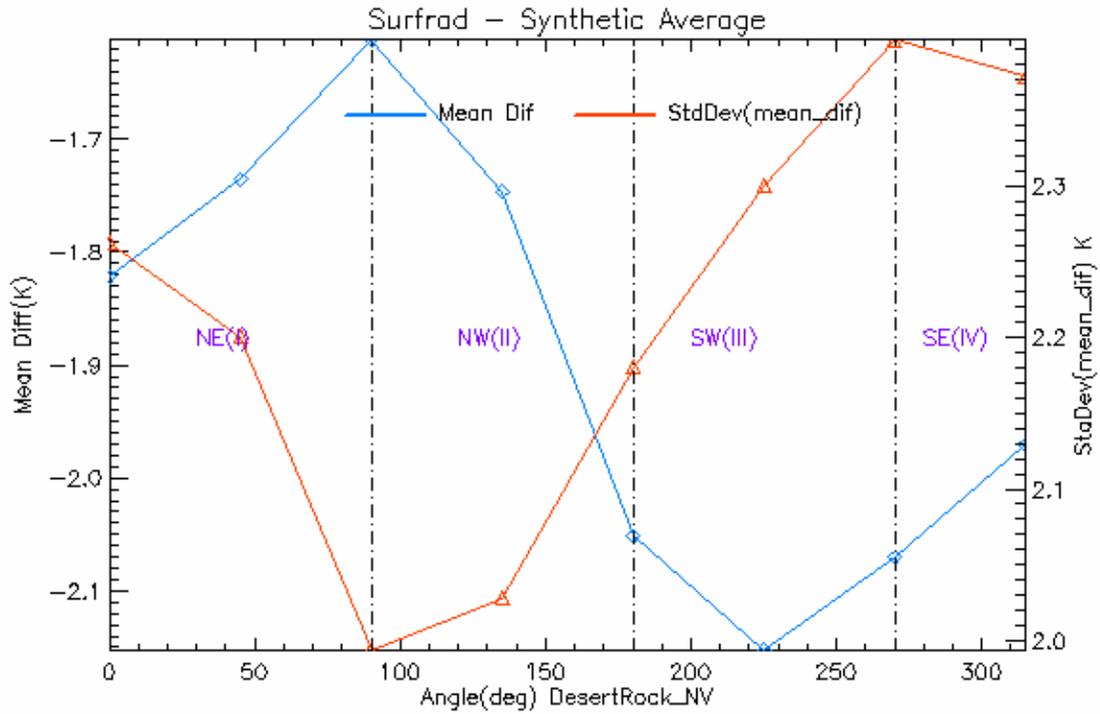
**Figure 3.** Same as Figure 2, but for the central ASTER pixel which is the nearest to the ground site.



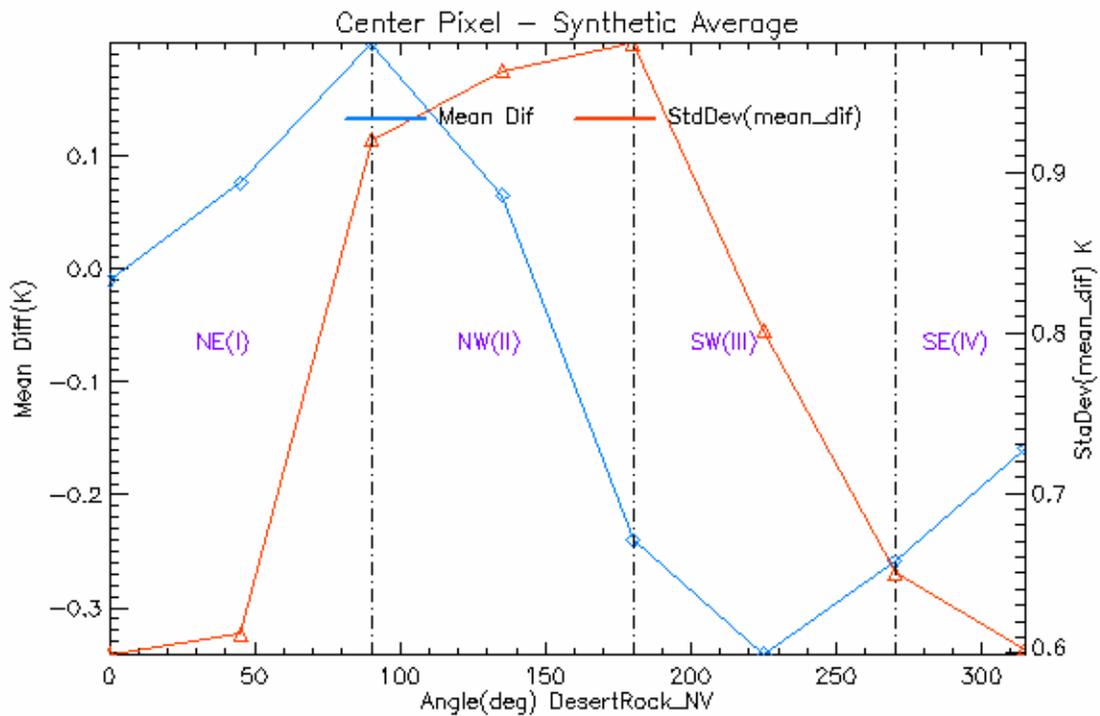
**Figure 4.** Comparison of synthetic pixel average temperature with the central ASTER pixel.

**Table 1.** Summary of synthetic pixel analysis

Pixel ID	Deg	Tsurf	Tcnt	Tavg	Mean (Ts-Ta)	StdDev (Ts-Ta)	Mean (Tc-Ta)	StdDev (Tc-Ta)	Mean (Ts-Tc)	StdDev (Ts-Tc)
0	0	310.3	312.12	312.08	-1.78	2.13	0.04	0.69	-1.81	2.46
1	0	310.3	312.12	312.13	-1.82	2.26	-0.01	0.60	-1.81	2.46
2	45	310.3	312.12	312.04	-1.74	2.20	0.08	0.61	-1.81	2.46
3	90	310.3	312.12	311.92	-1.61	1.99	0.20	0.92	-1.81	2.46
4	135	310.3	312.12	312.05	-1.75	2.03	0.06	0.96	-1.81	2.46
5	180	310.3	312.12	312.36	-2.05	2.18	-0.24	0.98	-1.81	2.46
6	225	310.3	312.12	312.46	-2.15	2.30	-0.34	0.80	-1.81	2.46
7	270	310.3	312.12	312.37	-2.07	2.40	-0.26	0.65	-1.81	2.46
8	315	310.3	312.12	312.27	-1.97	2.37	-0.16	0.60	-1.81	2.46
Average		310.3	312.12	312.19	-1.88	2.21	-0.07	0.76	-1.81	2.46



**Figure 5.** Variation of mean difference between the ground and synthetic pixel with respect to the directions. NE: Northern East - I quadrant NW: Northern West – II quadrant SW: Southern West - III quadrant NW: Southern East – IV quadrant



**Figure 6.** Same as Figure 5, but for mean difference between the center ASTER pixel and synthetic pixel with respect to the directions.

**Note :** Figures 5-6 show very consistent statistics as the surface heterogeneities from the 4Km X 4Km Google map.

