

Characterization Analysis of Penn State station With 1Km Synthetic Satellite Pixels

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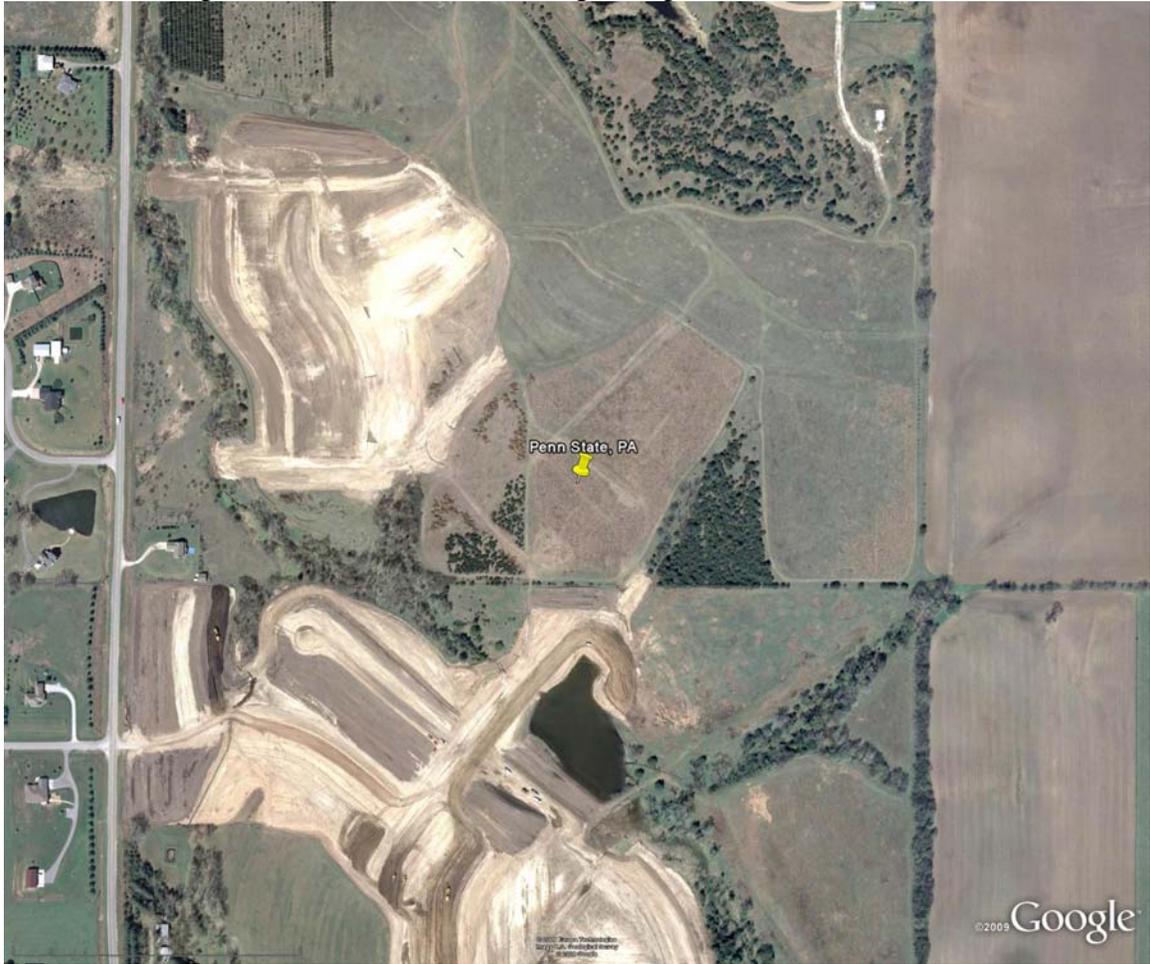
1. Synthetic Satellite pixels and Data Composing

- a) Data period: **2000 – 2007**
- b) Target Ground: **Penn State, PA (SURFRAD)**



- c) Available swaths with target ground site enclosed: **~100**
- d) Clear cases in this analysis: **20**
- e) Synthetic pixel size in this analysis: **~1Km, 13X13 ASTER TIR pixels**
- f) Number of Synthetic pixels: **9** (see Desert Rock Station)
- 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.**

The surrounding area from 1Km X1Km Google Map



2. Comparison of Synthetic pixels with ground site

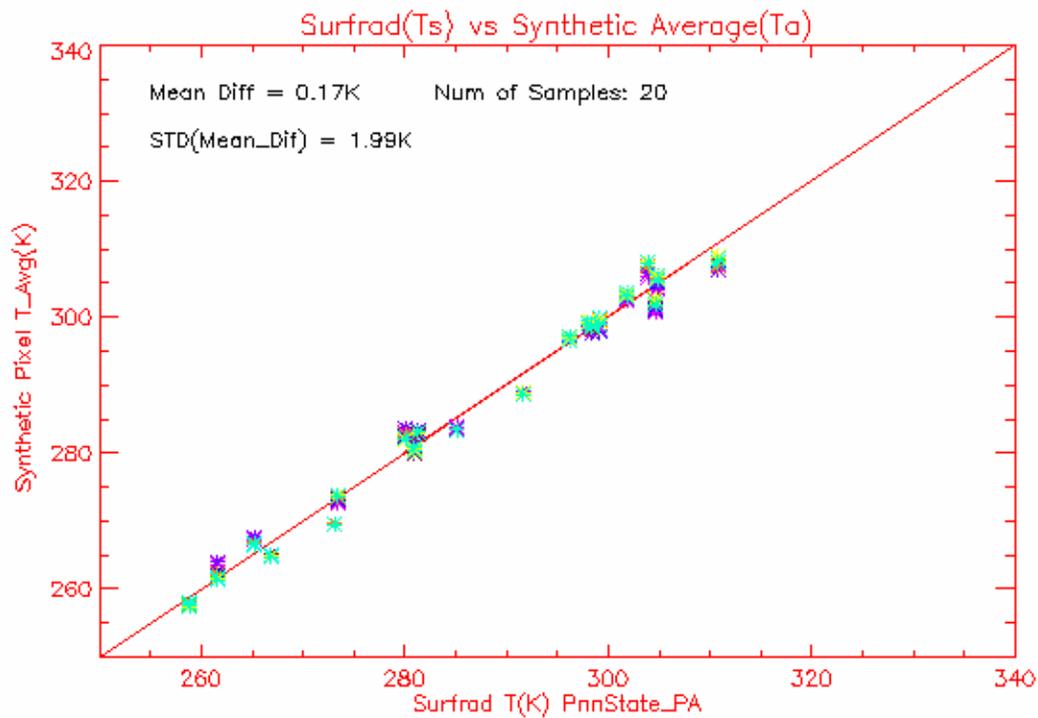


Figure 1. Comparison of synthetic pixel average temperature with the ground site temperature. Note that different colors are used for the 9 different synthetic pixels as shown in the Diagram (see Desert Rock).

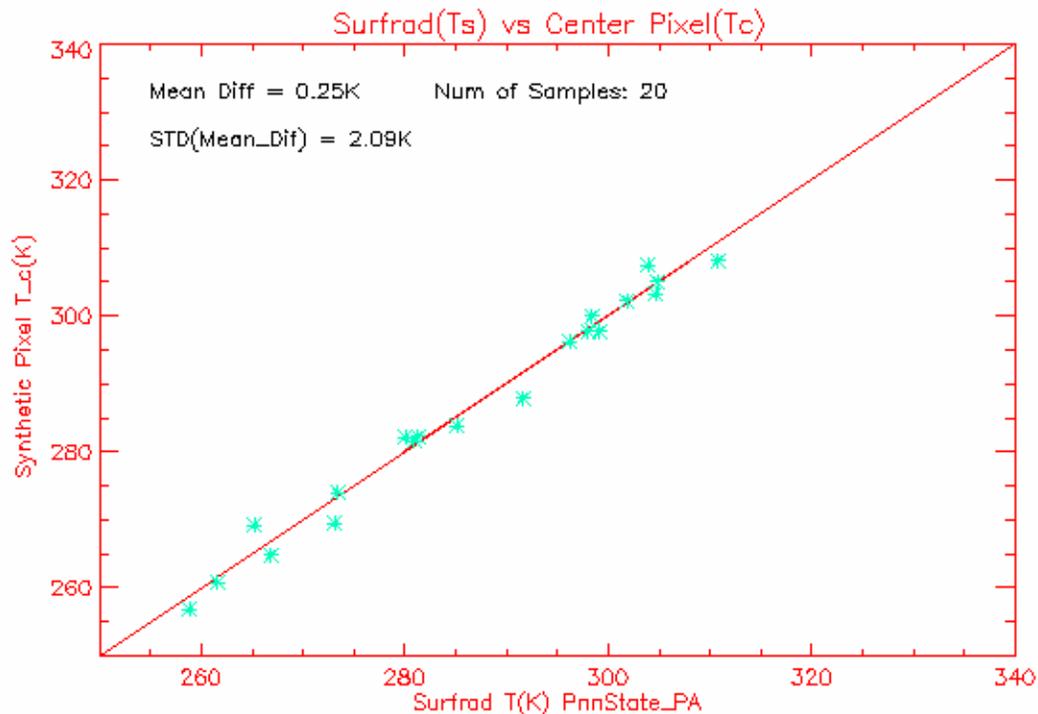


Figure 2. Same as Figure 1, but for the central ASTER pixel which is the nearest to the ground site.

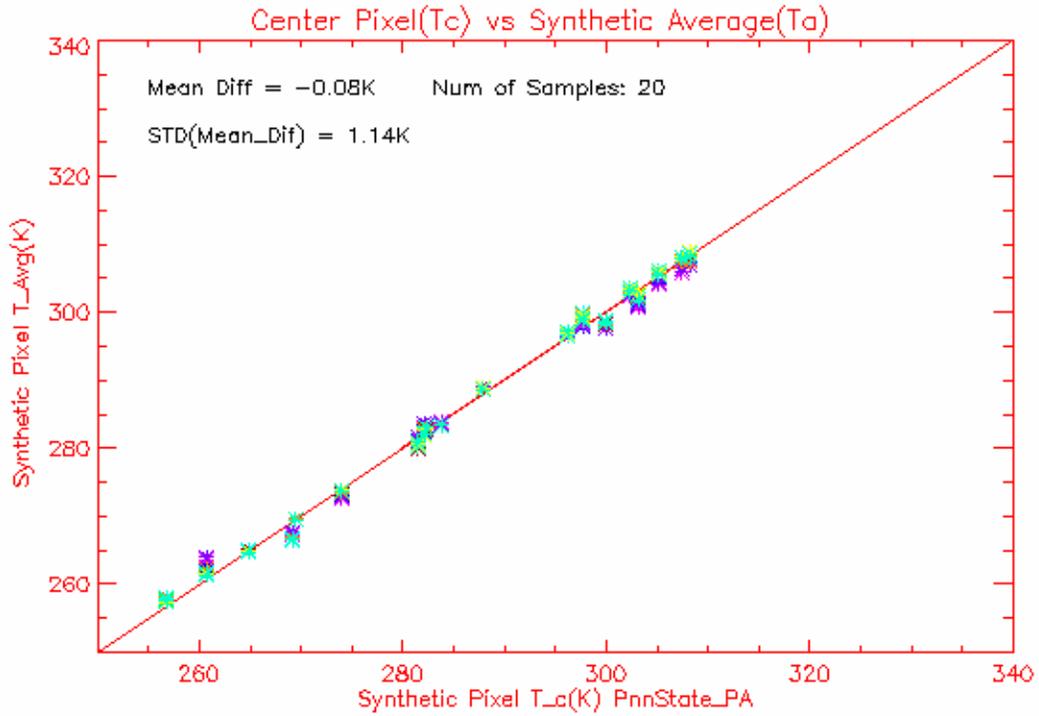


Figure 3. Comparison of synthetic pixel average temperature with the central ASTER pixel.

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	286.78	286.53	286.67	0.1	1.99	-0.15	1.05	0.25	2.09
1	0	286.78	286.53	286.35	0.43	1.93	0.18	1.13	0.25	2.09
2	45	286.78	286.53	286.37	0.41	2.07	0.15	1.36	0.25	2.09
3	90	286.78	286.53	286.58	0.20	2.19	-0.05	1.38	0.25	2.09
4	135	286.78	286.53	286.68	0.09	1.91	-0.16	1.07	0.25	2.09
5	180	286.78	286.53	286.67	0.10	1.96	-0.15	1.14	0.25	2.09
6	225	286.78	286.53	286.77	0.01	1.93	-0.25	1.13	0.25	2.09
7	270	286.78	286.53	286.73	0.04	1.91	-0.21	1.03	0.25	2.09
8	315	286.78	286.53	286.59	0.19	1.98	-0.06	0.99	0.25	2.09
Average		286.78	286.53	286.60	0.17	1.99	-0.08	1.14	0.25	2.09

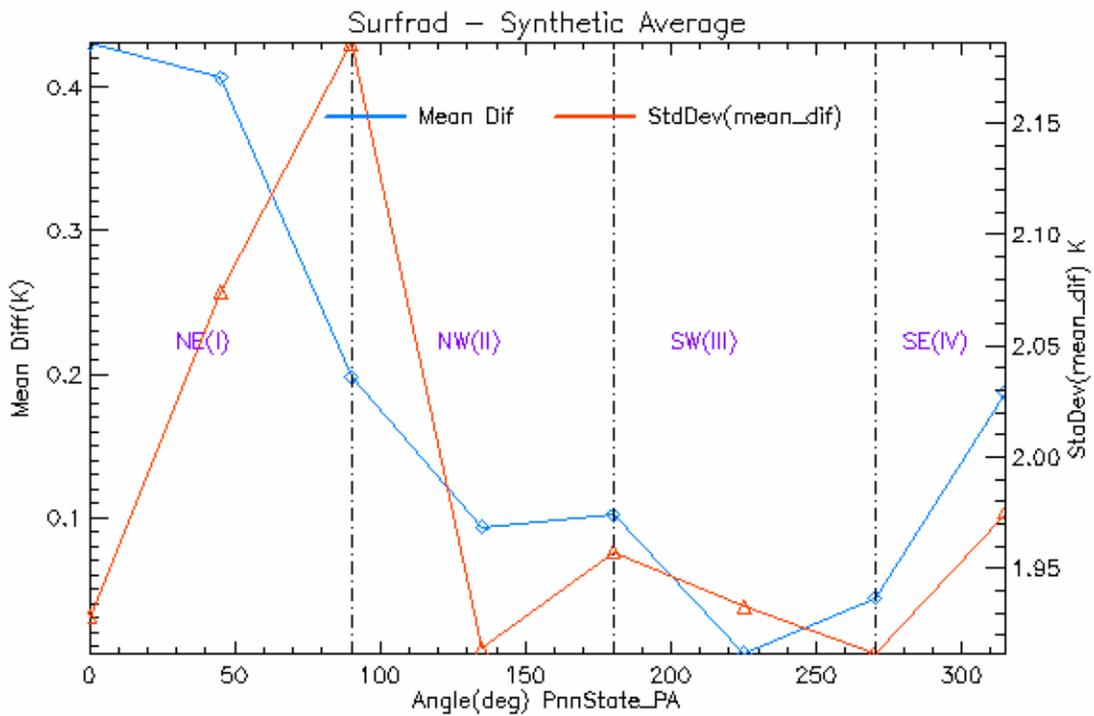


Figure 4. Variation of mean difference between the ground and synthetic pixel with respect to the directions. NE: Northern East - I quadrant NW: Northern West - II quadrant SW: Southern West - III quadrant NW: Southern East - IV quadrant

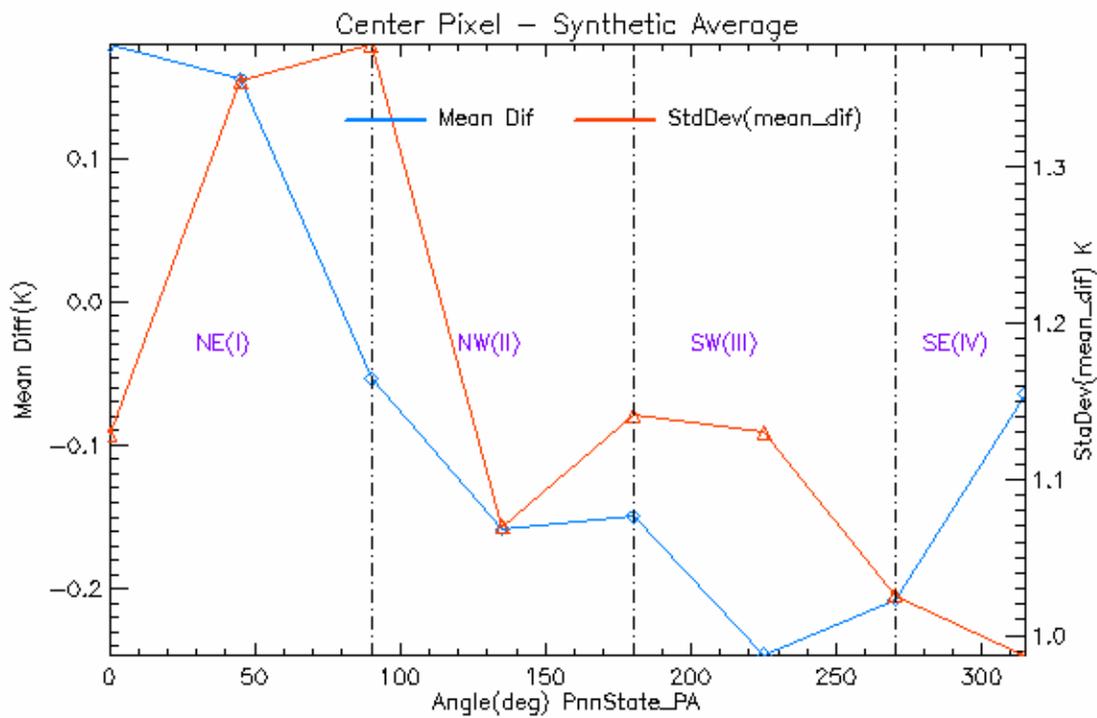


Figure 5. Same as Figure 4, but for mean difference between the center ASTER pixel and synthetic pixel with respect to the directions.

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

