

Land Surface Emissivity of SURFRAD sites from UW-Madison Baseline Fit Emissivity Database

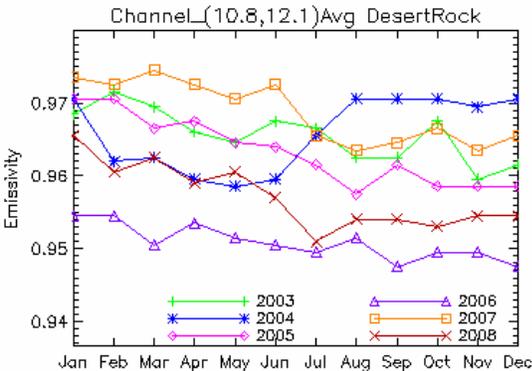
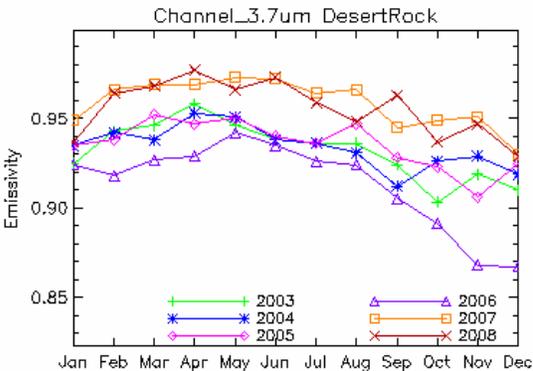
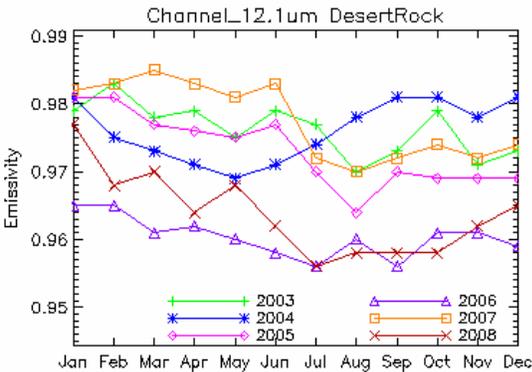
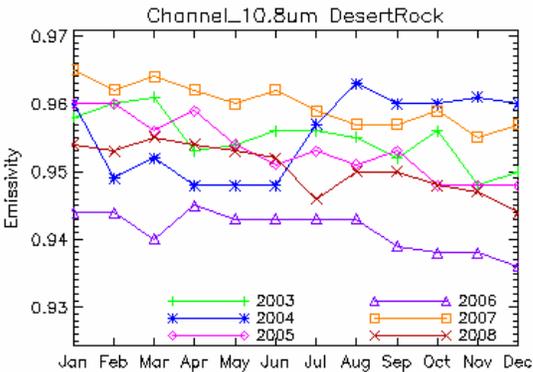
This global database of infrared land surface emissivity is derived using input from the Moderate Resolution Imaging Spectroradiometer (MODIS) operational land surface emissivity product (MOD11). The baseline fit method (Seemann et al., 2007), based on a conceptual model developed from laboratory measurements of surface emissivity, is applied to fill in the spectral gaps between the six emissivity wavelengths available in MOD11. The six available MOD11 wavelengths span only three spectral regions (3.8-4, 8.6, and 11-12 microns). Emissivity in the baseline fit database is available globally at ten wavelengths (3.6, 4.3, 5.0, 5.8, 7.6, 8.3, 9.3, 10.8, 12.1, and 14.3 microns) with 0.05 degree spatial resolution. The wavelengths in the database were chosen as hinge points to capture as much of the shape of the higher resolution emissivity spectra as possible between 3.6 and 14.3 microns.

Database server website:

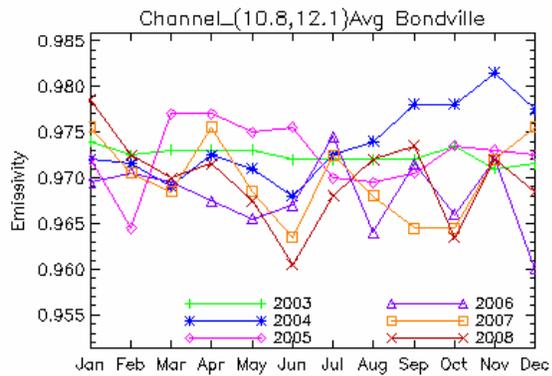
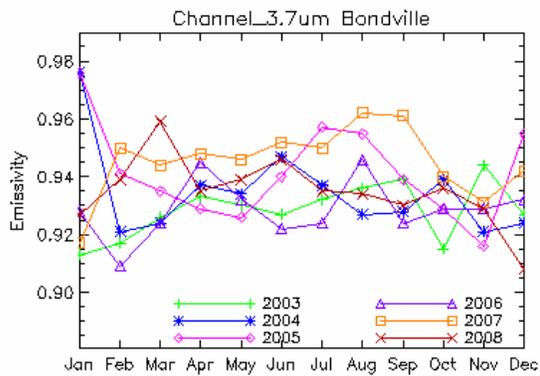
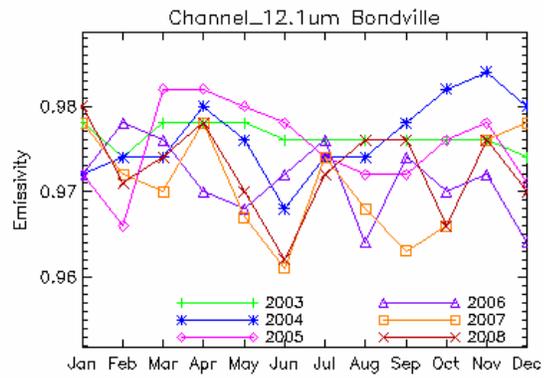
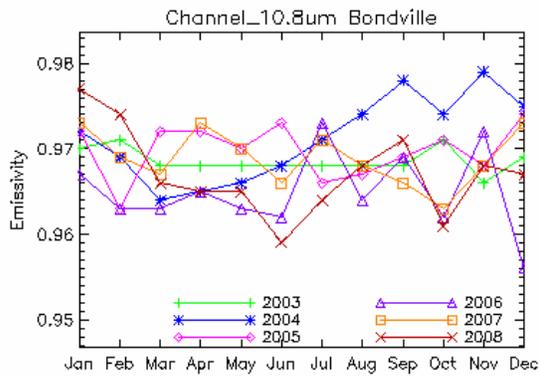
<http://cimss.ssec.wisc.edu/iremisp/>

1. $\frac{d\varepsilon}{\varepsilon} \approx -4 \times \frac{dT}{T} \quad dT \approx -\frac{T}{4} \times \frac{d\varepsilon}{\varepsilon} \Rightarrow DT \approx -75 \times \frac{d\varepsilon}{\varepsilon}$
2. In general, the magnitude of seasonal (monthly) variation is about 0.01, which would case about 0.5 to 1K temperature difference.
3. Inter-annual change is about 0.02, so the inter-annual temperature difference is about 1.5K. Therefore, a standard deviation of value 1.5K for the difference between Satellite pixel and SURFRAD over different years is not abnormal.
4. The seasonal change doesn't show some "seasonal" patterns.

Emissivity of DesertRock, NV



Emissivity of Bondville, IL



Emissivity of Fort Peck, MT

