

Latitudinal Variation in the Solar Intensity During the Decline of Cycle 23

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We have measured latitudinal variation in the solar photospheric intensity using images from the Precision Solar Photometric Telescope at the Mauna Loa Solar Observatory. Along with the expected brightening of the solar activity belts, we have found a weak enhancement of the mean continuum intensity at polar latitudes (continuum intensity enhancement $\sim 0.1 - 0.2\%$ corresponding to a brightness temperature enhancement of $\sim 2.5\text{K}$). This appears to be thermal in origin and not due to a polar accumulation of weak magnetic elements, with both the continuum and CaIIK intensity distributions shifted towards higher values with little change in shape from their mid-latitude distributions. We discuss this result, efforts to understand systematic instrumental and processing errors in the data, and the potential to measure cycle dependent center-to-limb variation with consequent implications for solar structure.