

## **Vitalizing Four Solar Cycles of Kitt Peak Synoptic Magnetograms**

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Solar magnetism spans many decades of spatial and temporal scales. Studies of the larger end of these ranges requires frequent observations of the full solar disk over long durations. To aid investigations of the solar cycle and individual active region evolution, nearly daily magnetograms of the solar cycle and individual active region evolution, nearly daily magnetograms have been observed from Kitt Peak during solar cycles 20-23. These data were used in real time for space weather predictions, and archived observations have so far served more than 1500 refereed research publications (including reconstructions of solar irradiance).

Unfortunately, these observations still suffer from various instrumental problems. We report ongoing efforts to restore and correct observations from 1970-2003 in order to maximize their scientific value. The main improvements are reductions of certain instrumental noise, signal biases, imperfect scanning geometry, and gain discrepancies. The improved data will be used to make synchronic and diachronic synoptic maps, a catalog of active region properties, and estimates of tracer flow patterns.

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