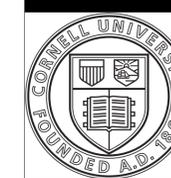


# Multi-Instrument Full-Surface Coronal Hole Tracking: Boundary and Flux Evolution



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## Abstract

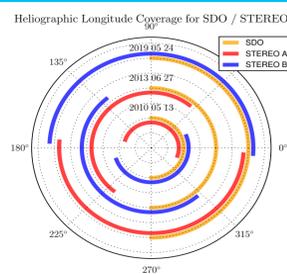
Coronal holes are areas of open field lines in the sun's magnetic field where magnetic flux escapes. We have tracked the changes in in the boundary of a specific, large coronal hole and the resulting change in flux over the course of several weeks at one hour cadence.

## Motivation

- How are coronal holes shaped by magnetic fields?
- Are daily hmi-updated synoptic magnetic charts more accurate than the full rotation hmi charts for this purpose?
- Can we consistently track how a coronal hole's boundary evolution over multiple rotations?
- How do changes in coronal hole boundaries encompass new flux?

## Data Collection

EUV data comes from SDO, STEREO A and B satellites. 193 and 195 Å images were obtained at one hour cadence. Magnetic field data is collected by the HMI sensor only on SDO. STEREO A and B are placed around the sun so as to obtain a full view of the sun (see graphic).

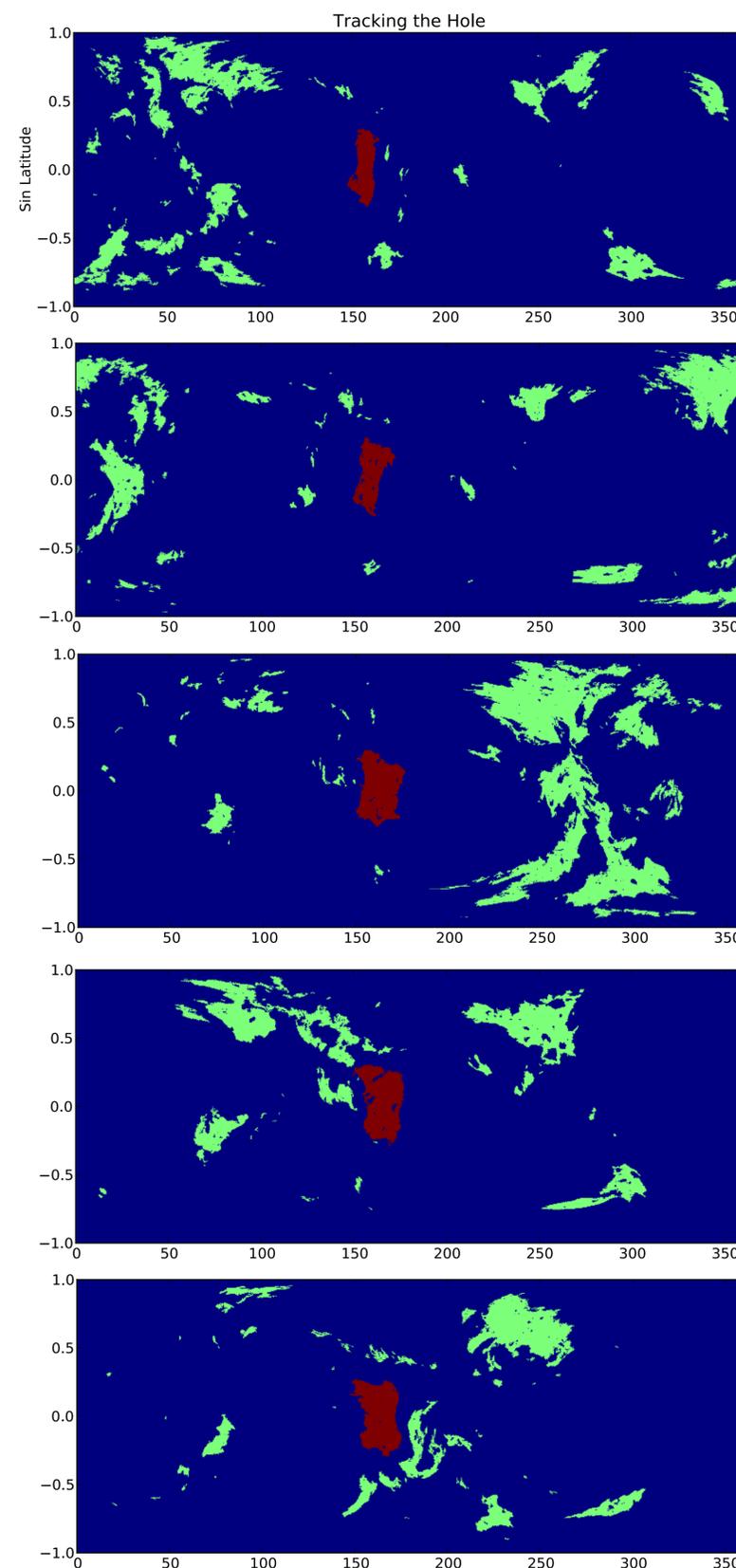


## Previous Work

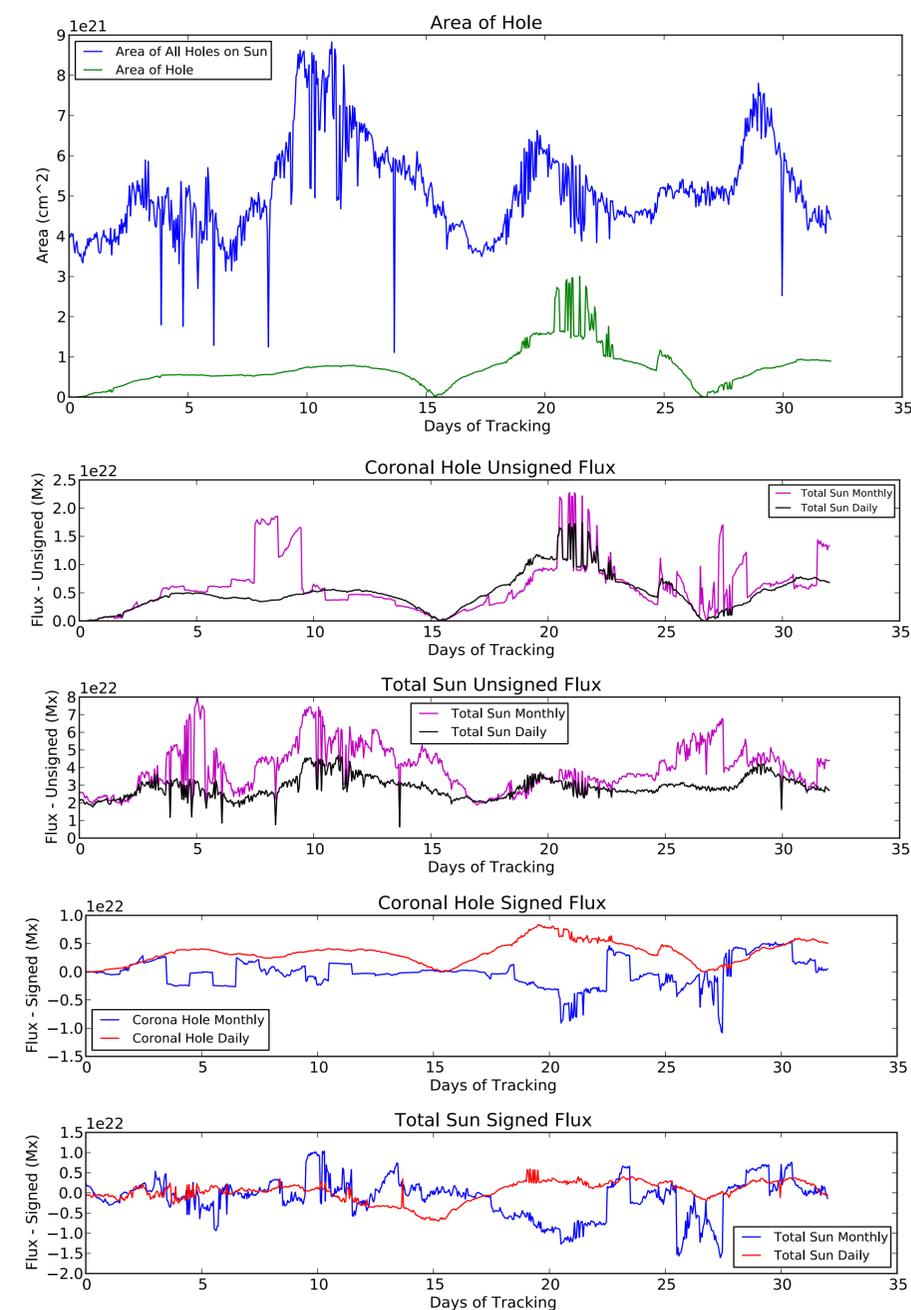
- Previously, Chris Lowder has tracked coronal holes across the sun at a twelve hour cadence. We redid this procedure at a 1 hour cadence looking at one specific hole
- Earlier work looked at the entire sun, this work focuses on a mid-latitude coronal hole

## Works Cited

- Cranmer, Steve R. "Coronal Holes." *Living Reviews in Solar Physics* 6 (2009): n. pag. Web. 1 July 2013. <http://www.livingreviews.org/lrsp-2009-3>
- C. Lowder, et al. Full Surface Automated Coronal Hole detection and Characterization to Constrain Global Magnetic Field Models. Unpublished.



## Results



## Conclusions

- Accurate tracking of coronal holes at high cadence for multiple rotations is possible.
- To track coronal holes accurately, daily-updated hmi charts are needed because they produce smoother/more consistent development than the monthly hmi charts.