



SOUTHWEST RESEARCH INSTITUTE

Solar Dynamo Dataverse Update: A repository of long-term Magnetic and Optical Data

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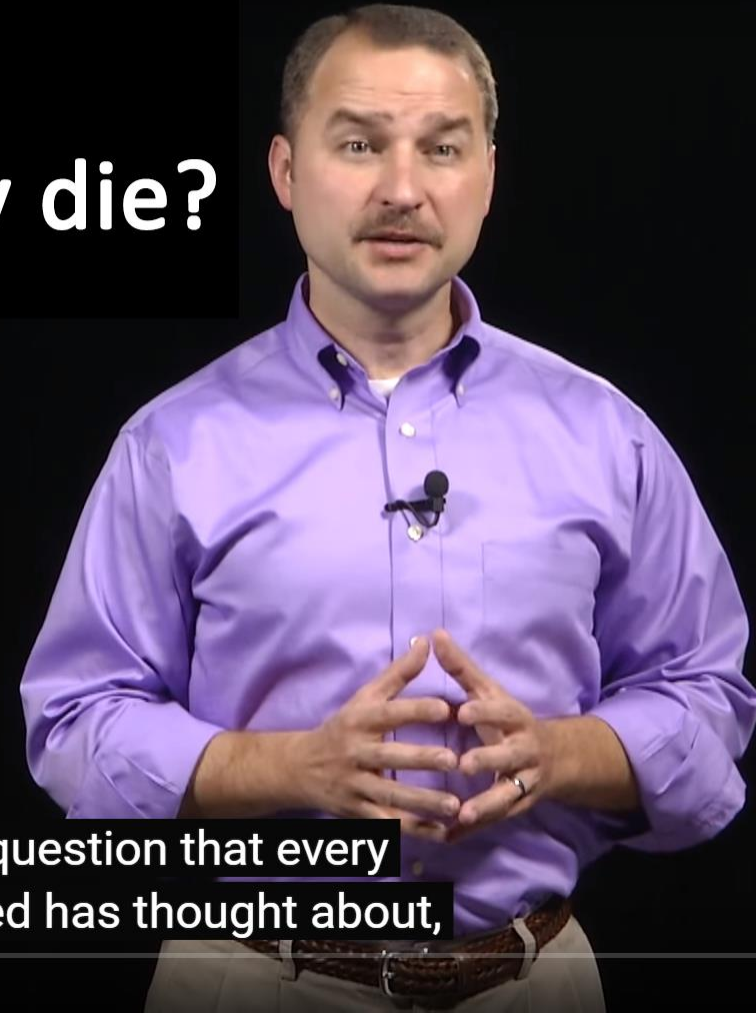
Take home message

- Solar dynamo dataverse <https://dataverse.harvard.edu/dataverse/solardynamo> has an increasing range of long-term data:
 - Sunspot Groups.
 - Magnetograms.
 - Active regions.
- We should not keep invaluable data **exclusively** in our hard-drives or even in institutional websites.
- We should use long-term repositories that are citable and have long-term policies for data storage and retention.
- I'm happy to help create mirrors of any data, if you are interested.

**WHERE DO DATA GO WHEN THEY
DIE?**

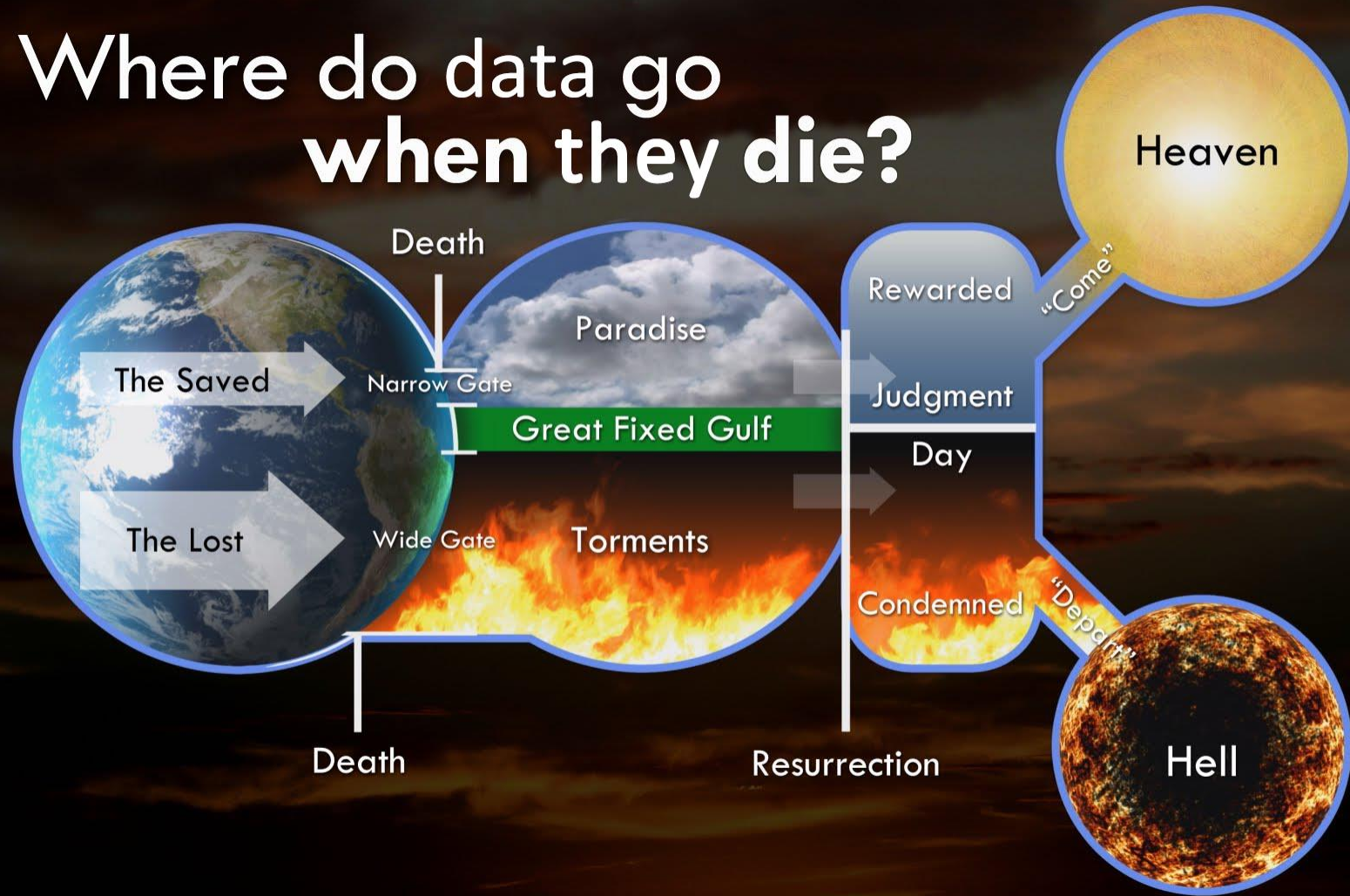


Where do data
go when they die?



I suppose this is a question that every
man who has ever lived has thought about,

Where do data go when they die?



HOW TO ATTAIN DATA SALVATION?

I'm a responsible data owner, I keep them on my personal webpage!

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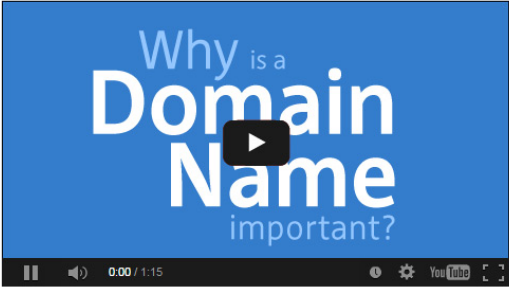
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0:00 / 1:15

Ah, but my webpage is institutional, that's not
going to happen to me

404

File not found

The Space Weather Prediction Center recently revamped its entire website. The content you're looking for has likely moved to a new location. Please, try searching for it instead. If you still can't find it, let us know. We may have overlooked it.

REACHING ENLIGHTENMENT THANKS TO THE ApJ/AAS

- The answer is on the 6th line of the 6th section of the latest AAS LaTeX template (version 6).
- <https://github.com/AASJournals/Tutorials/tree/master/Repositories>
- There are three online repositories that the AAS recommends:
 - <https://zenodo.org/> (CERN)
 - <https://figshare.com/> (Private)
 - <https://dataverse.harvard.edu/> (Harvard)

REACHING ENLIGHTENMENT THANKS TO THE ApJ/AAS

1. They assign each database a unique DOI identifier.
 2. They have contingency plans for migrating databases to another repository should their operation end.
- There are three online repositories that the AAS recommends:
 - <https://zenodo.org/> (CERN)
 - <https://figshare.com/> (Private)
 - <https://dataverse.harvard.edu/> (Harvard)

SOLAR DYNAMO DATAVERSE

Solar Dynamo Dataverse

A collective of databases and data products tailored to understanding and predicting the solar cycle.

(SouthWest Research Institute)

[Harvard Dataverse](#) >

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A collective of databases and data products tailored to understanding and predicting the solar cycle. Emphasis is placed on long-term variability and surface magnetic fields.

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Dataverse Category

[Researcher \(4\)](#)

Publication Year

[2023 \(1\)](#)

[2016 \(3\)](#)

Subject

[Astronomy and Astrophysics \(4\)](#)

[Physics \(1\)](#)

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[Full Disk Magnetograms Dataverse](#) (Southwest Research Institute)

Jul 28, 2023



[Sunspot Group Dataverse](#) (Southwest Research Institute)

Apr 15, 2016



Catalogs of sunspot group data. Areas, latitudes, etc.



[Magnetic Catalogs Dataverse](#) (Southwest Research Institute)

Mar 30, 2016



Catalogs of solar magnetic features (i.e. bipolar magnetic regions, ephemeral regions, magnetic elements, etc.).



[Solar Polar Fields Dataverse](#) (Southwest Research Institute)

Mar 22, 2016

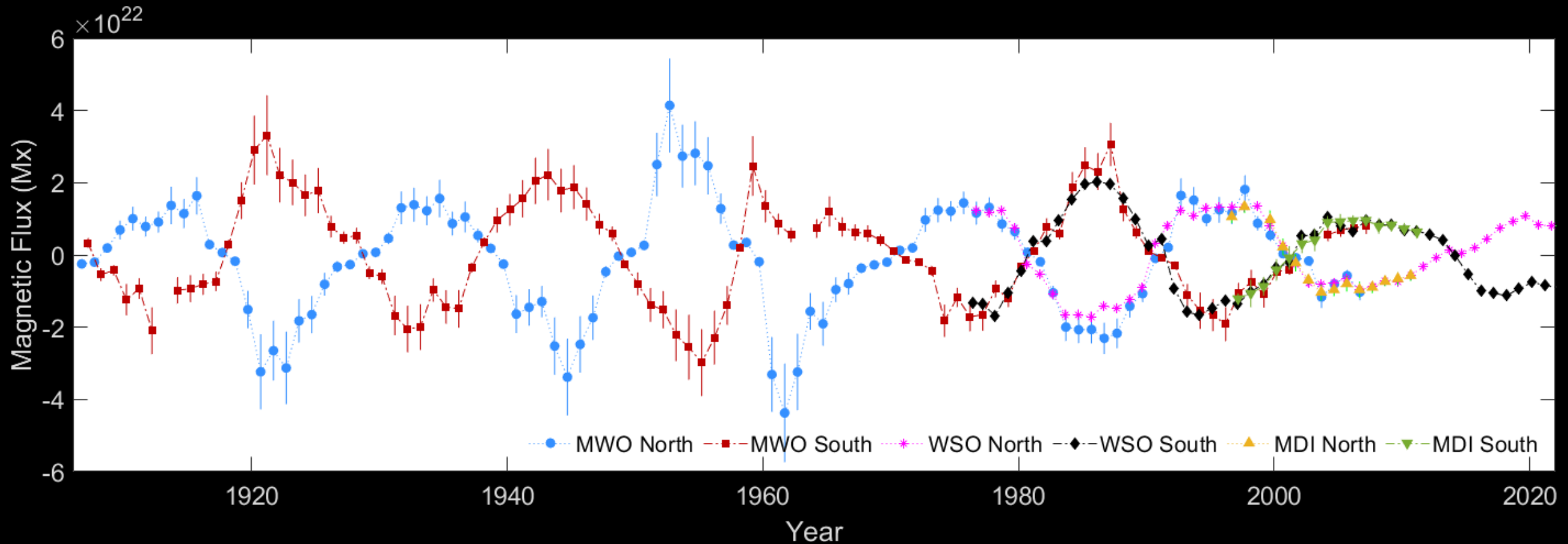


Mount Wilson Polar faculae, counted by Neil Sheeley, Jr., calibrated to Wilcox Solar Observatory magnetic fields and SOHO/MDI polar flux. All steps in the calibration (starting with the raw original data) are available for download.



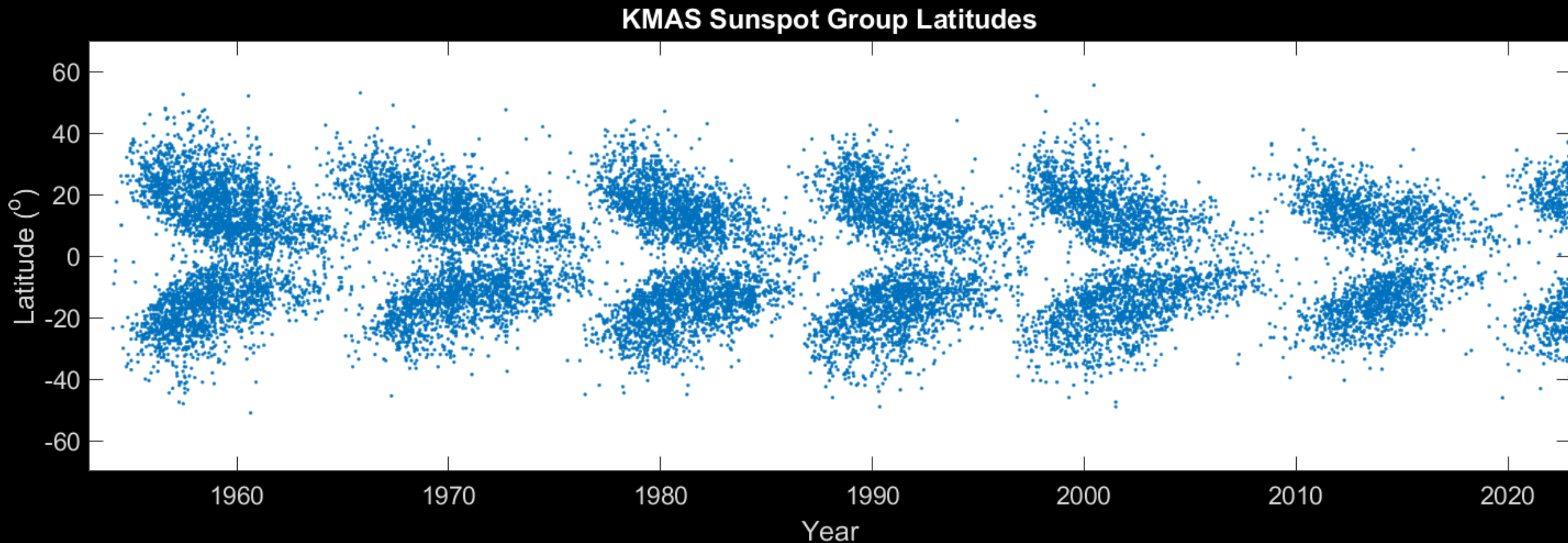
A century of Calibrated Polar Faculae to MDI polar flux and WSO polar field

Muñoz-Jaramillo et al. (2012)



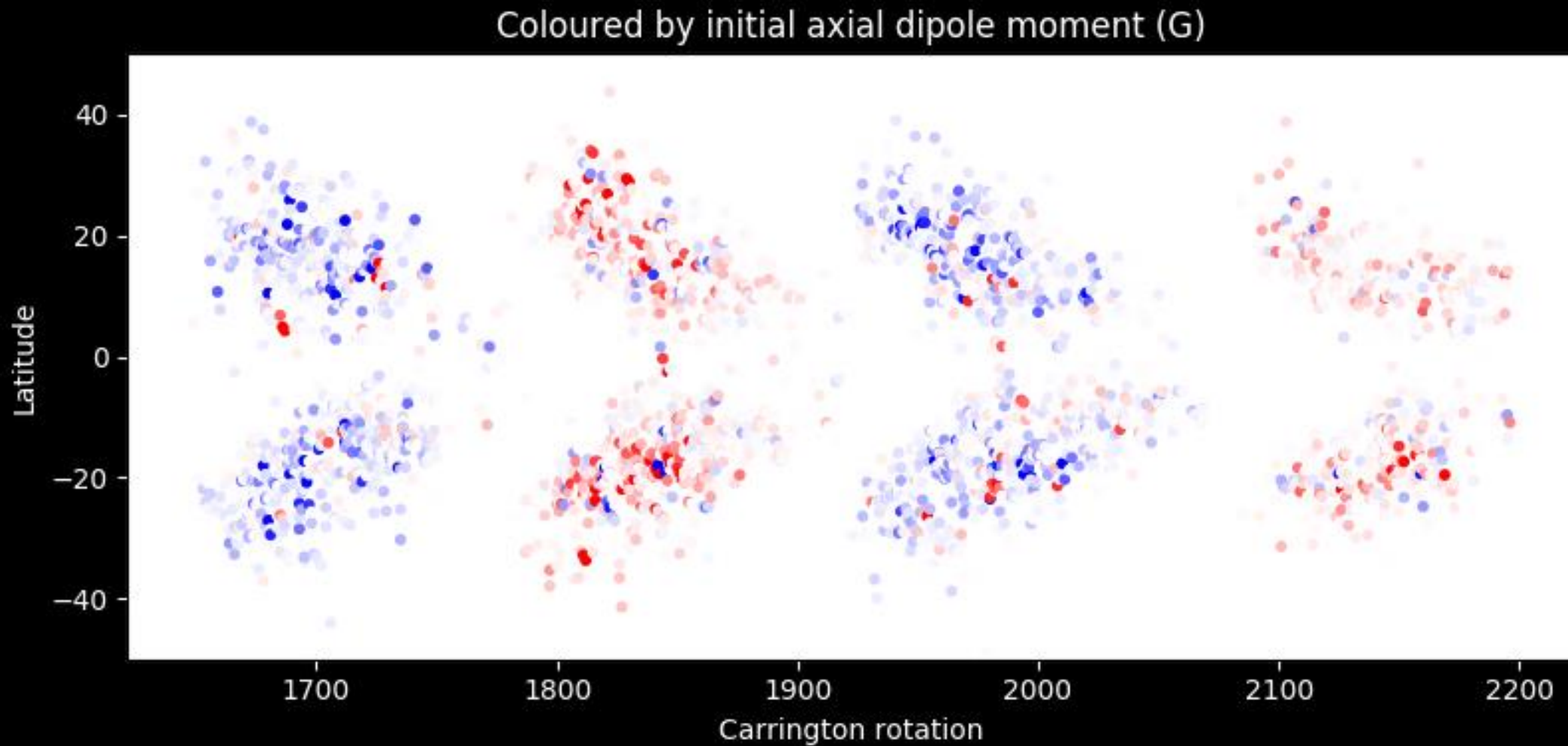
Mirror of the Kislovodsk Mountain Station Sunspot Groups

Muñoz-Jaramillo et al. (2015)



Active regions detected from NSO synoptic Carrington maps

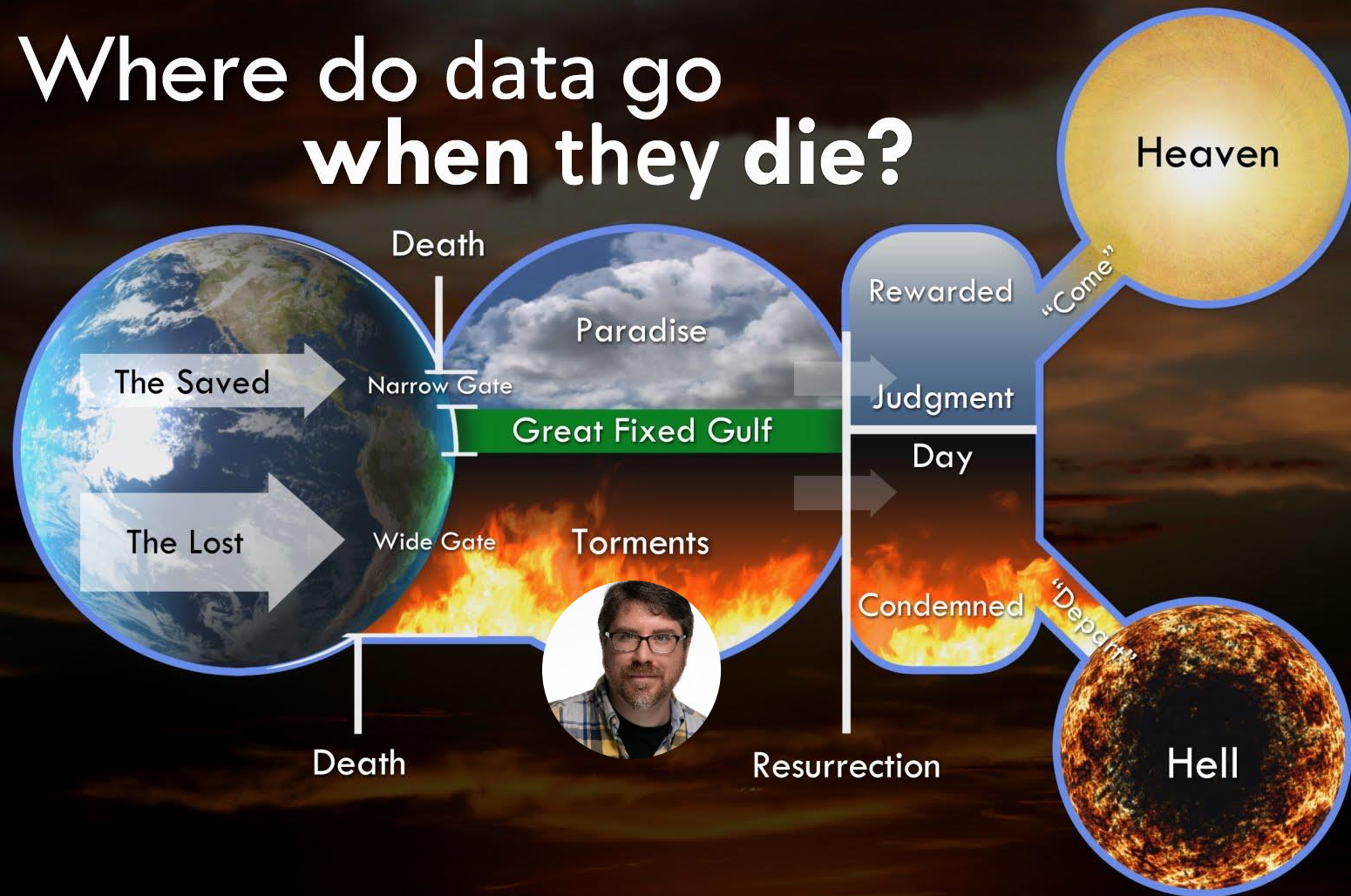
Yeates et al. (2007)





FORGIVE ME, FOR I HAVE SINNED

Where do data go when they die?



I have several unique data products sitting on my hard-drive

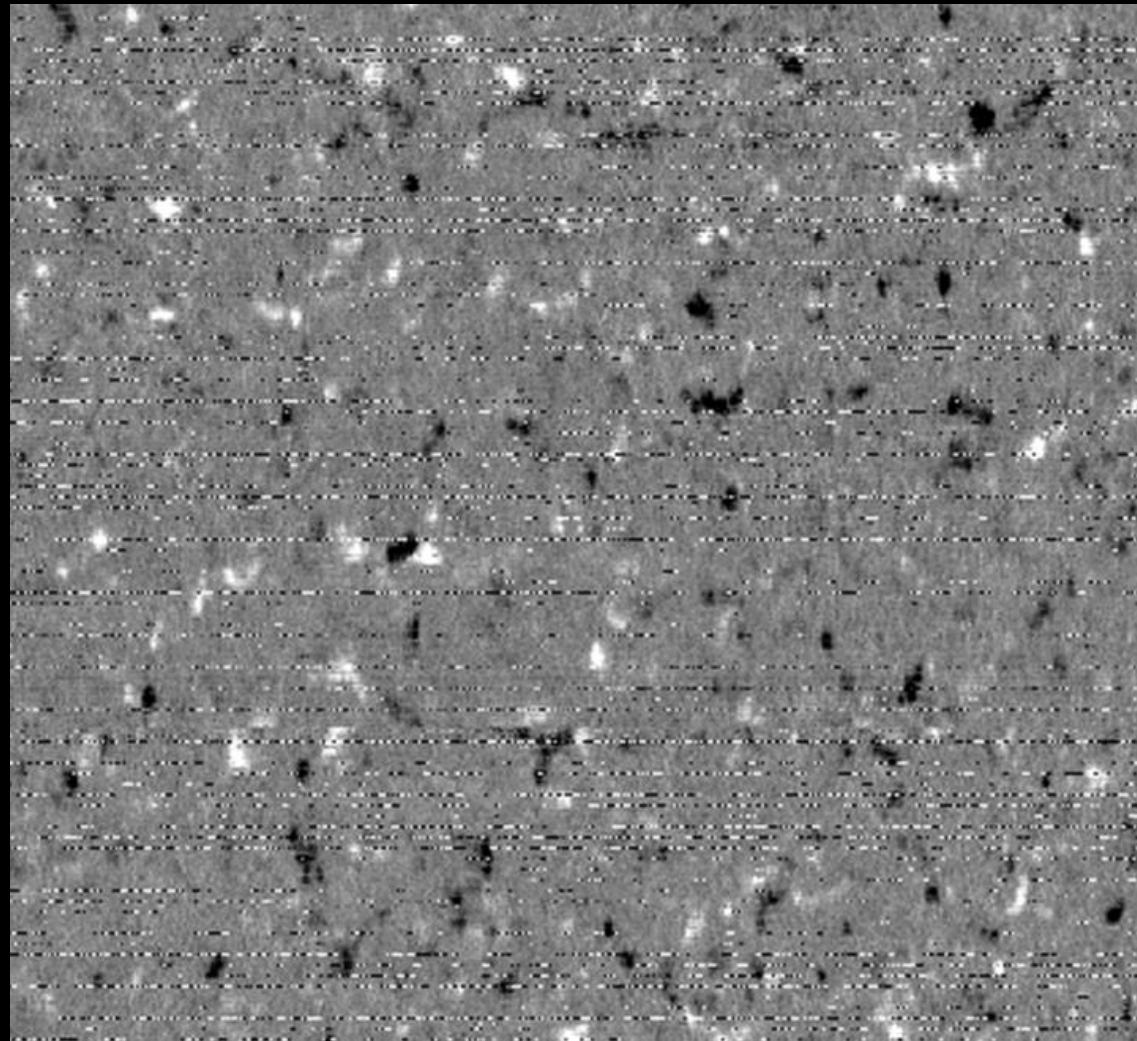


Consequences of Fields and Flows in the Interior and Exterior of the Sun

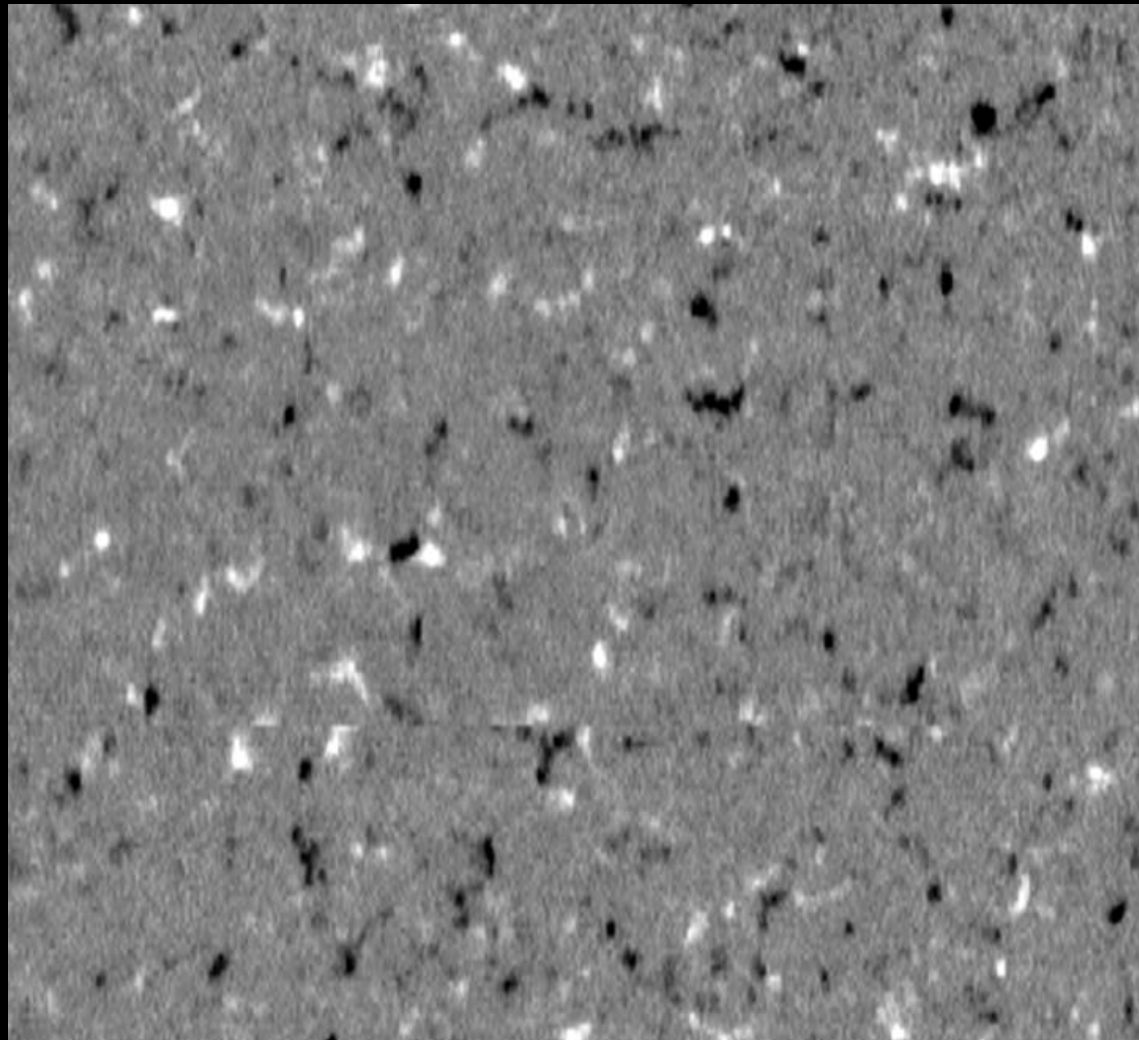
Restoration of the Kitt Peak Vacuum Telescope magnetograms

Work with Jack Harvey

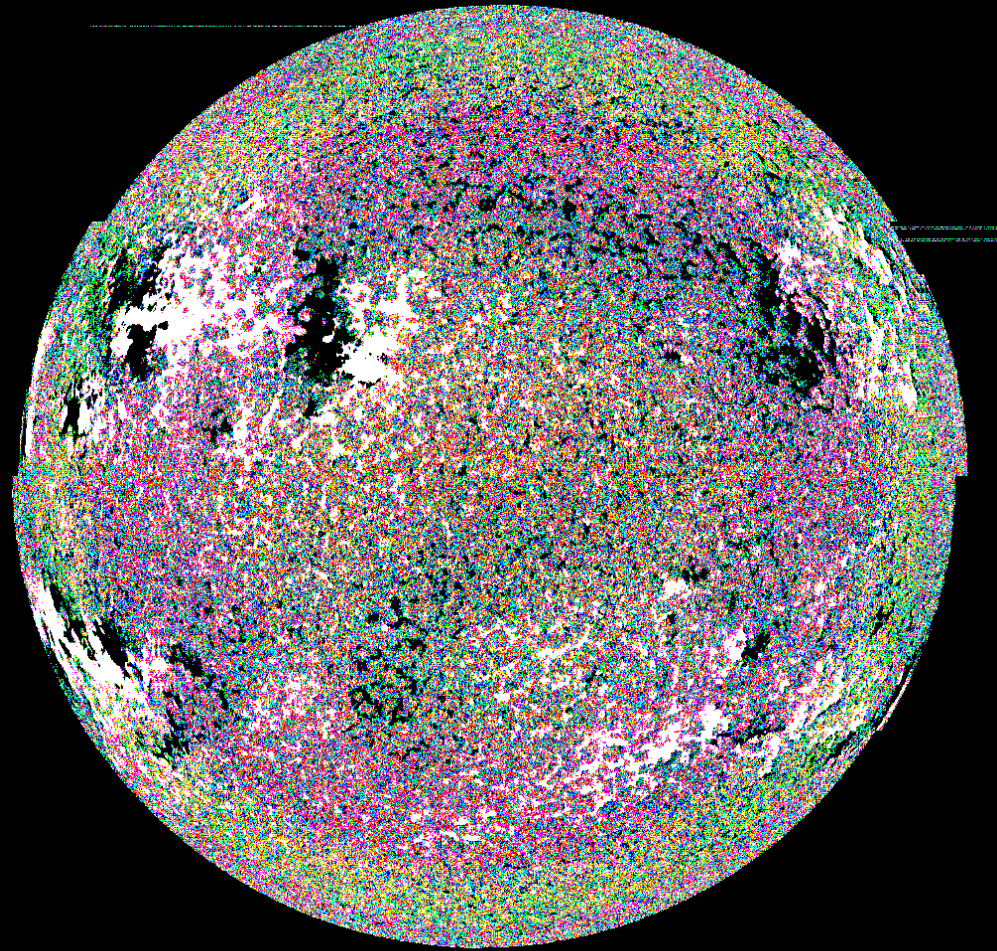
Readout Errors



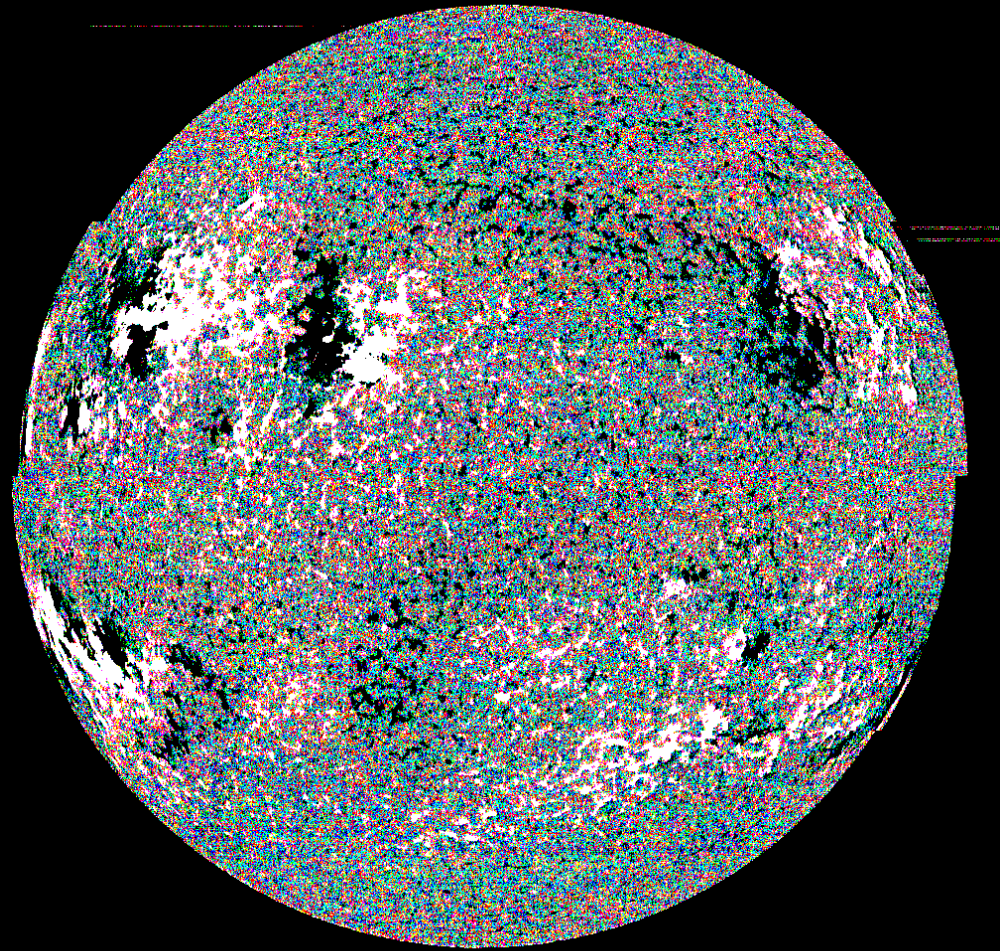
Readout Errors



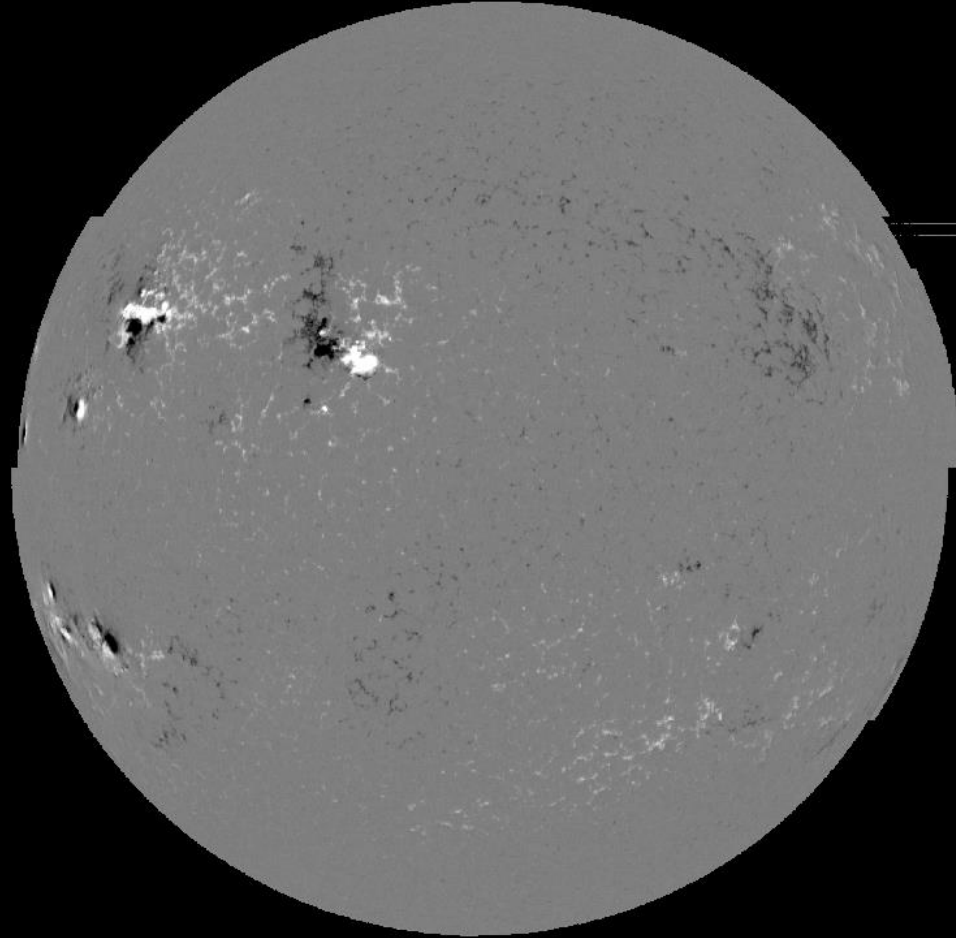
Zero Point Errors



Zero Point Errors

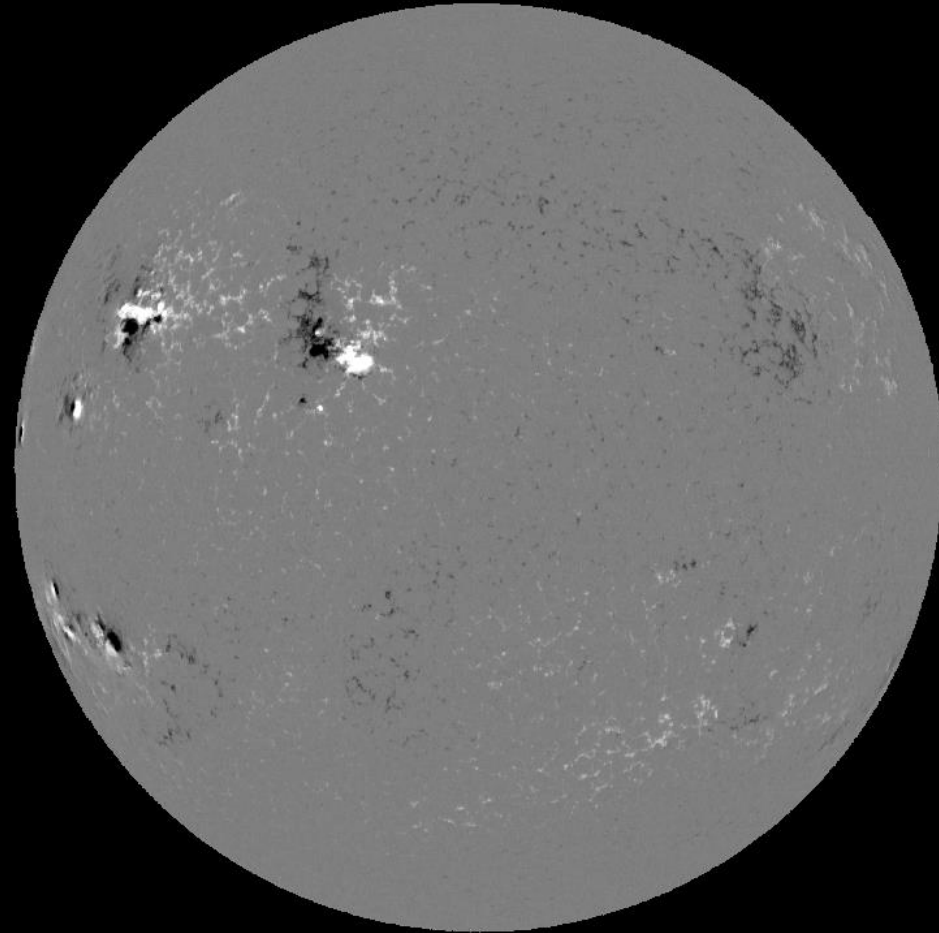


Geometry corrections



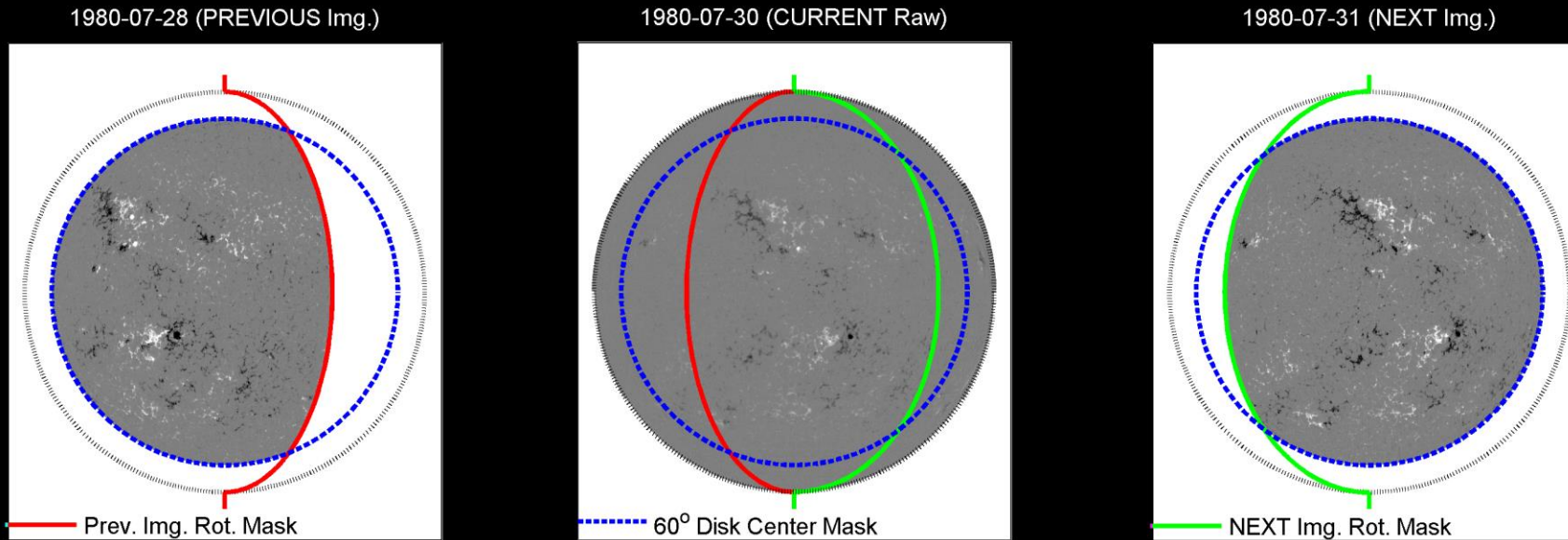
Raw

Geometry corrections

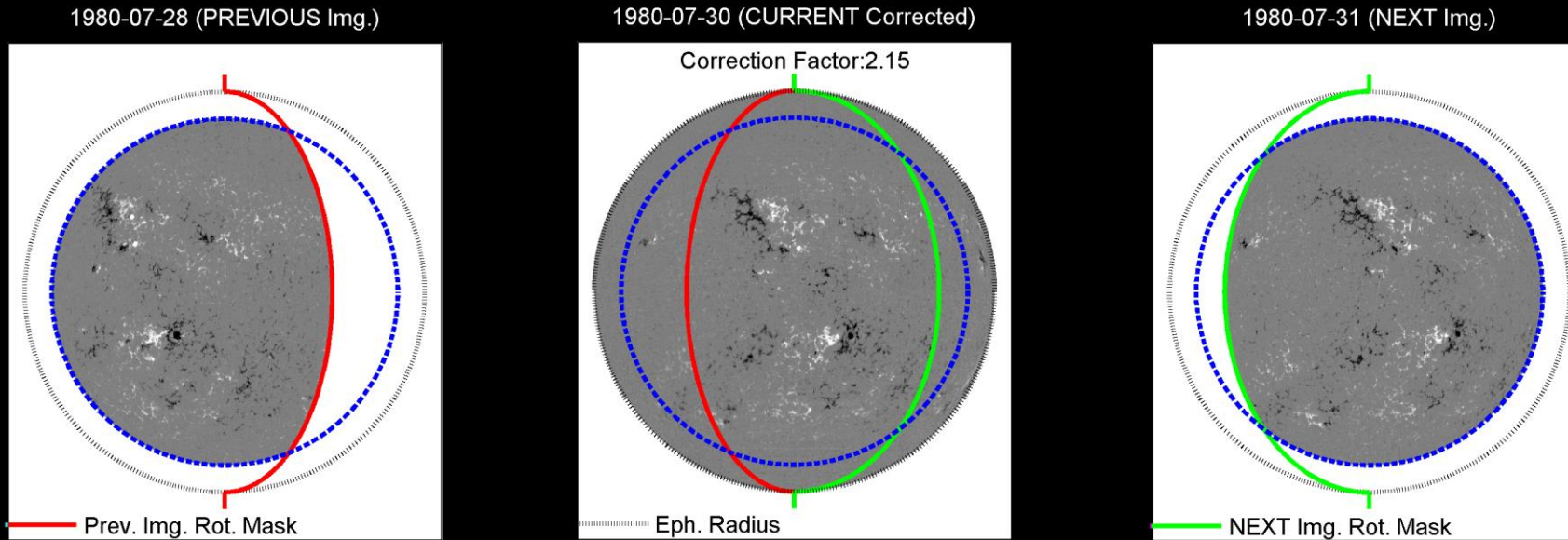


Fixed

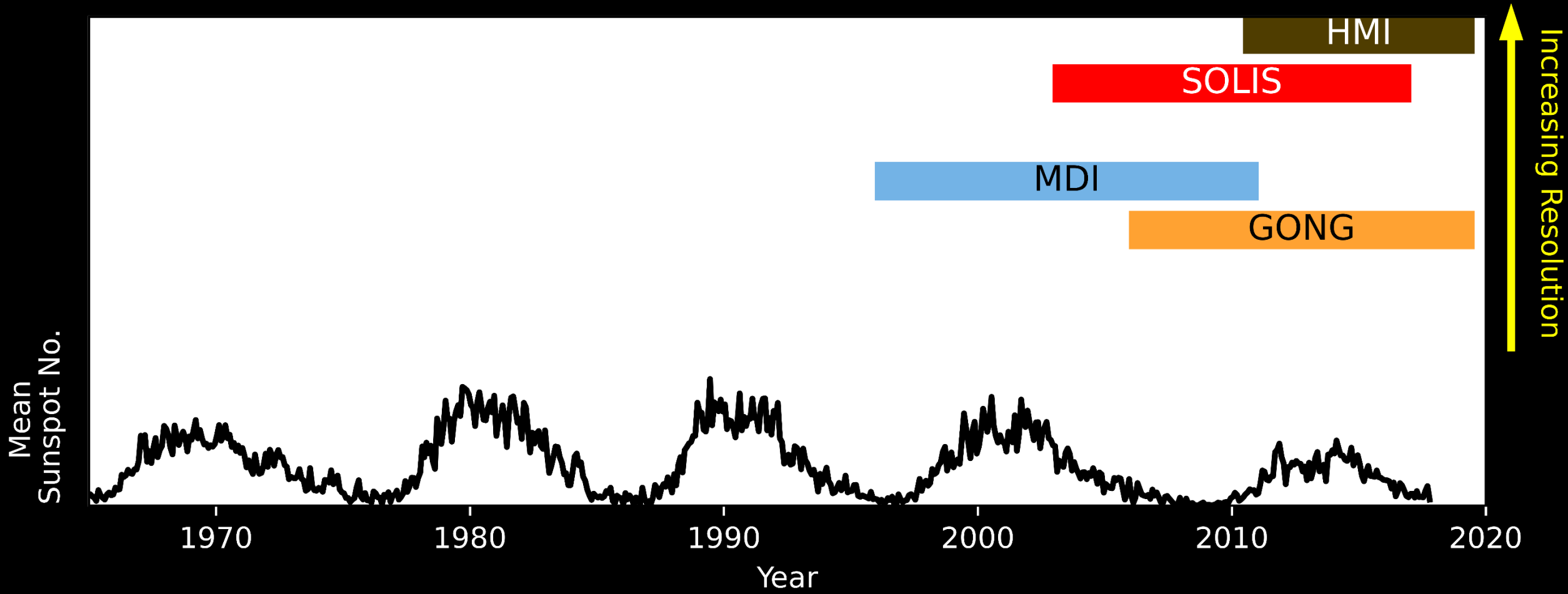
Gain discrepancies



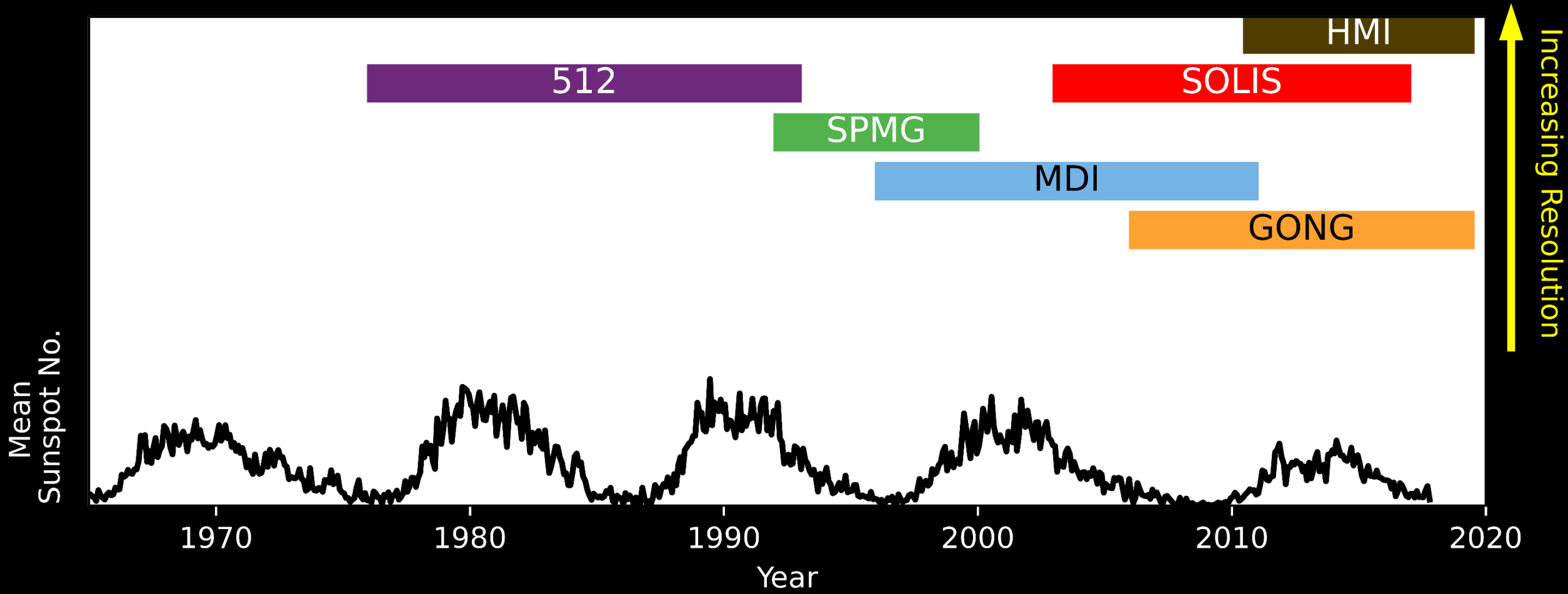
Gain discrepancies



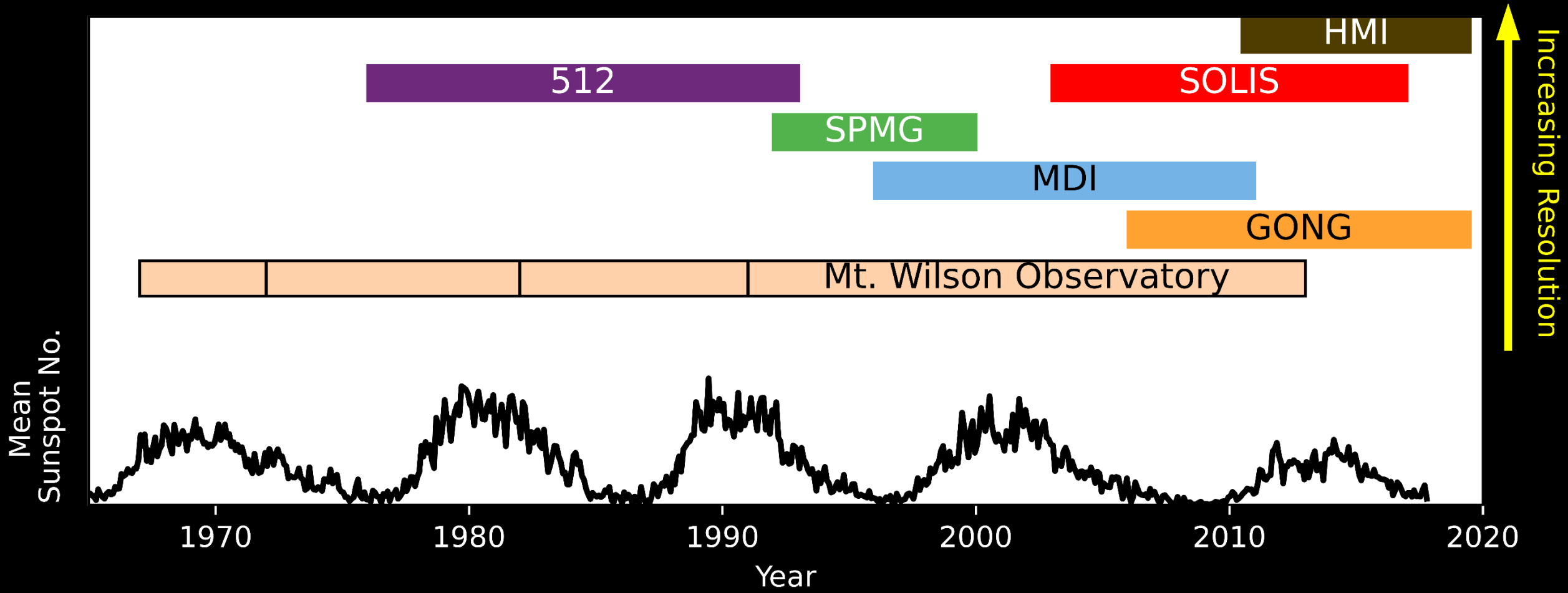
This gives us increased long-term coverage



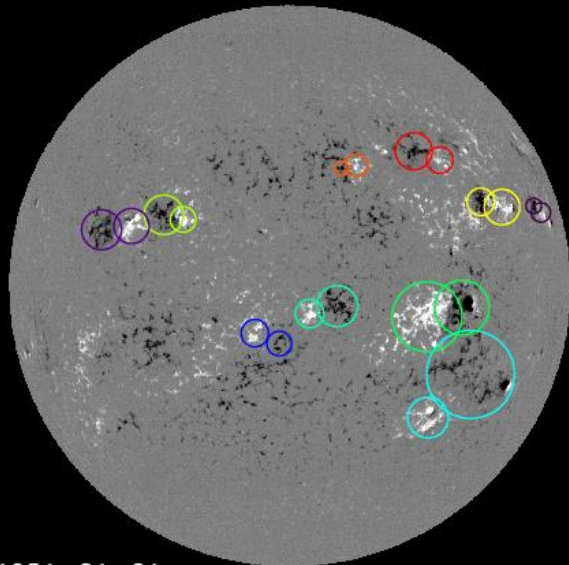
This gives us increased long-term coverage



Also added a mirror of the Mount Wilson magnetograms

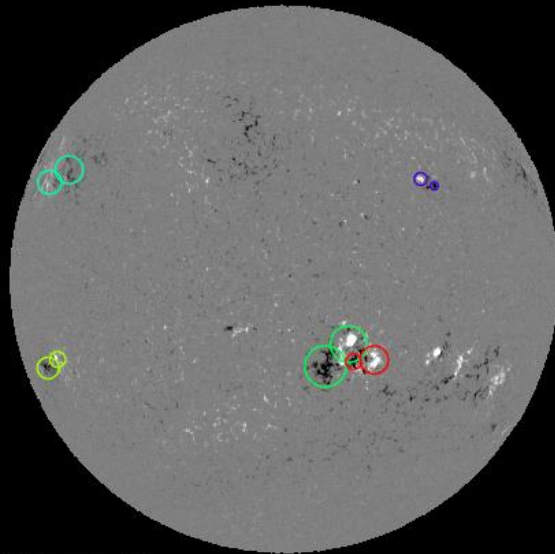


Cycle 21



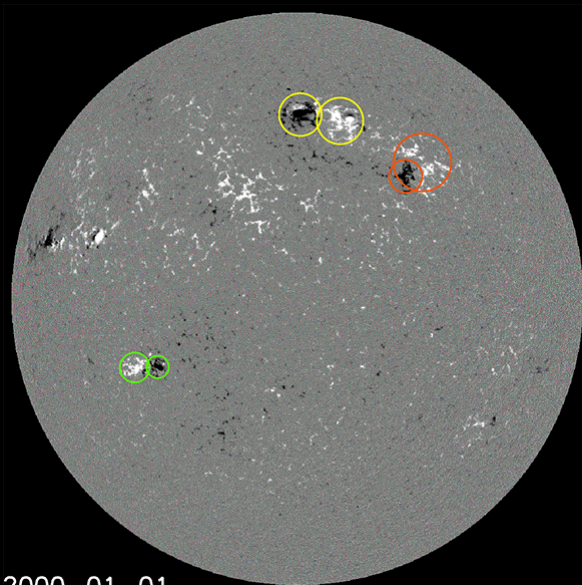
1981-01-01

Cycle 22



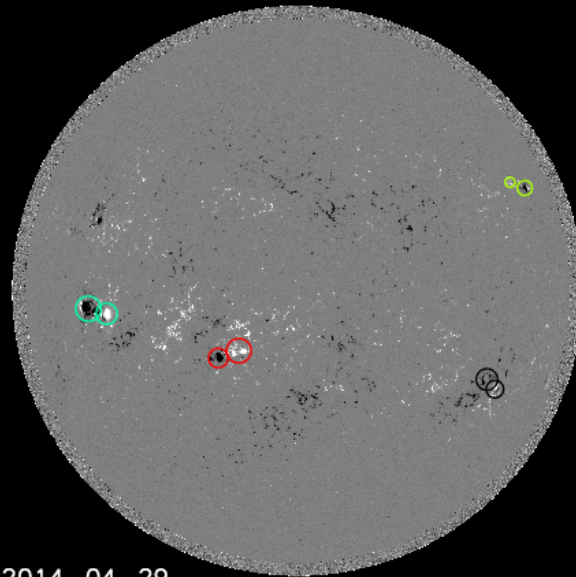
1988-05-01

Cycle 23



2000-01-01

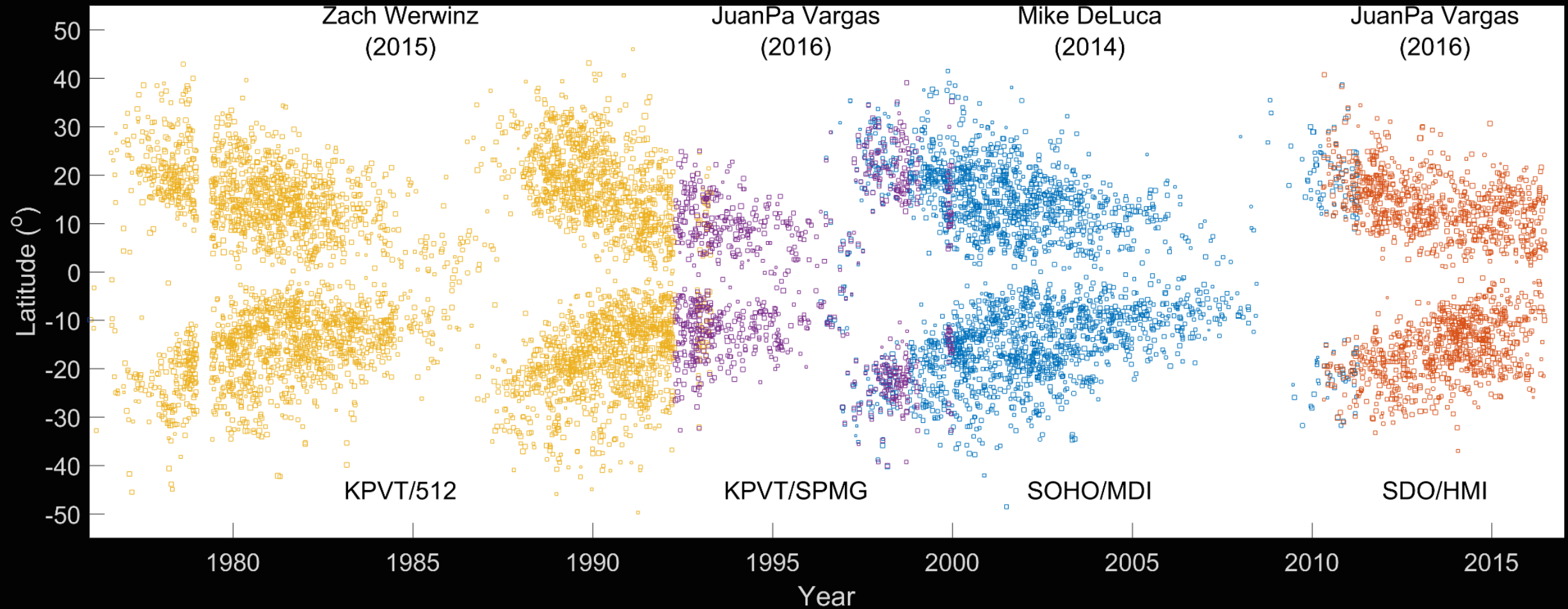
Cycle 24



2014-04-29

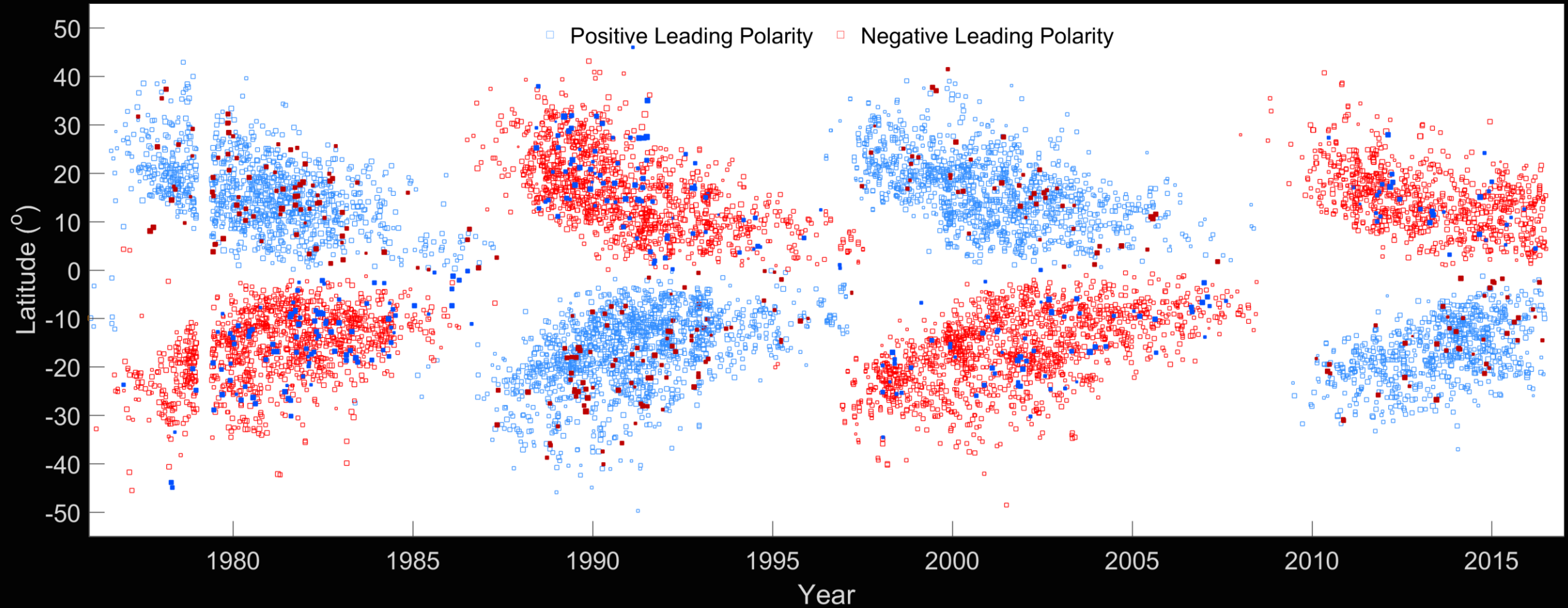
6,885 unique objects detected and tracked

(Muñoz-Jaramillo et al 2021)



6,885 unique objects detected and tracked

(Muñoz-Jaramillo et al 2021)



What comes next?

- Homogenized database of sunspot groups (1826-2023).
- Time dependent dataset of bipolar magnetic region evolution.
- Calibrated magnetograms (1969-2023).

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