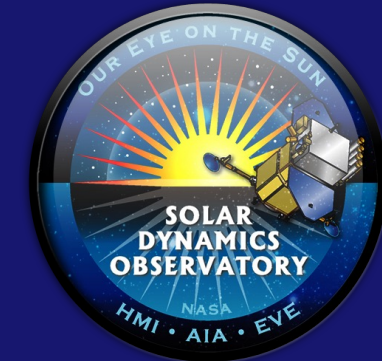


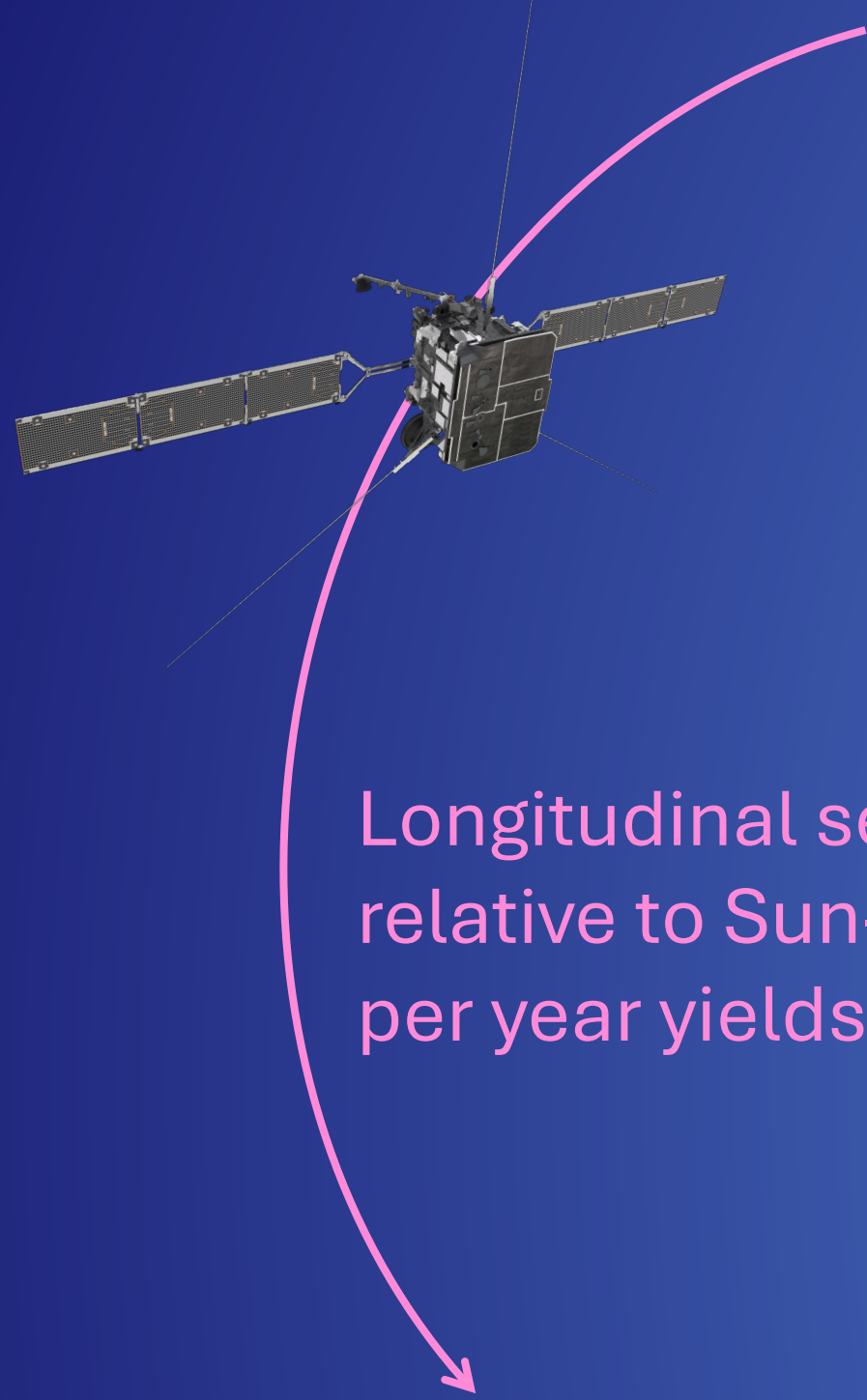


# Active region evolution from different viewpoints

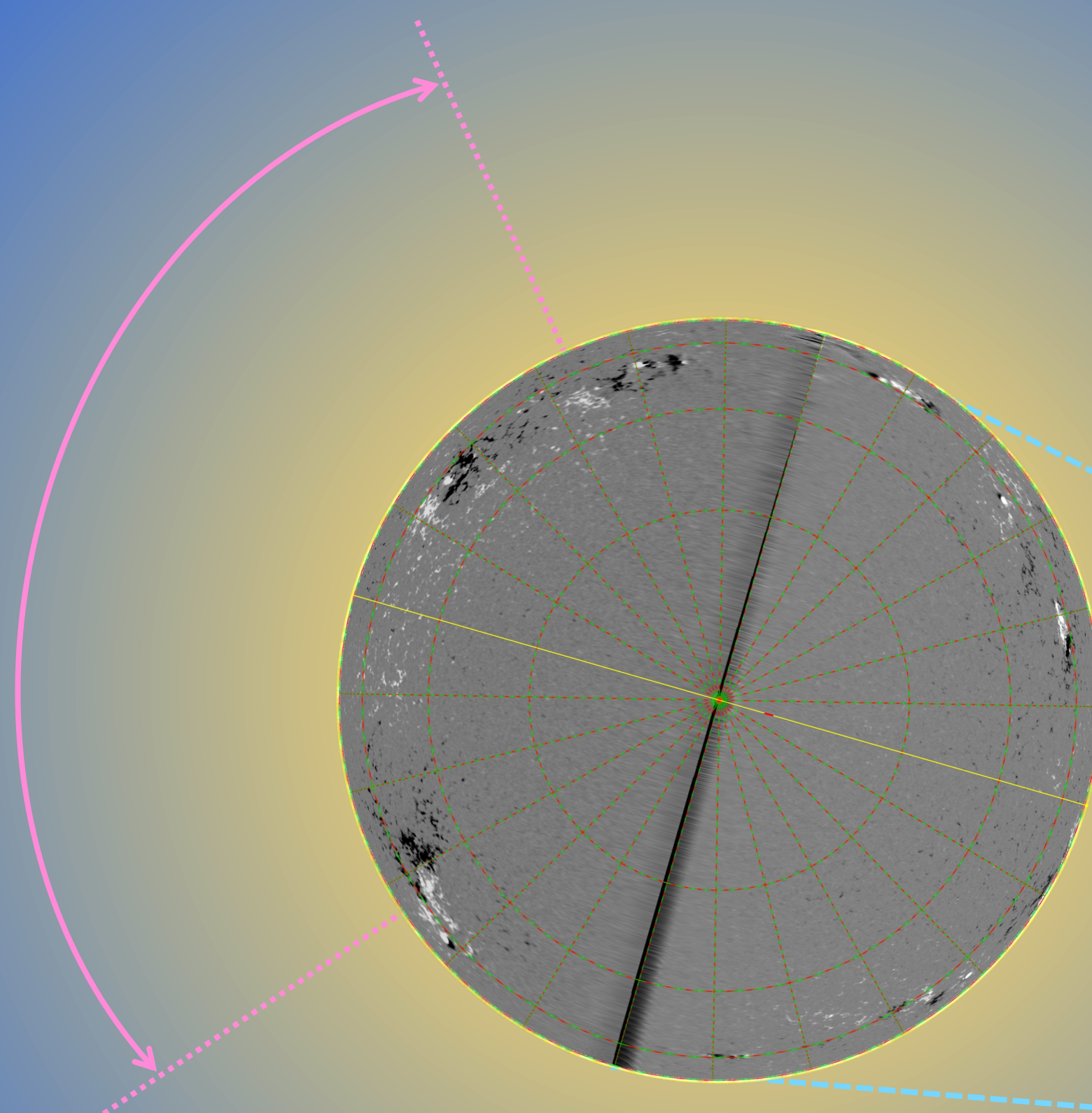
H. Strecker<sup>1,2\*</sup>, D. Orozco Suárez<sup>1,2</sup>, G. Valori<sup>3</sup>, A. Feller<sup>3</sup>, A. Ulyanov<sup>3</sup>, J. Hirzberger<sup>3</sup>, J. Blanco Rodríguez<sup>2,4</sup>, D. Calchetti<sup>3</sup>, S. K. Solanki<sup>3</sup>, J. Woch<sup>3</sup>, J.C. del Toro Iniesta<sup>1,2</sup>, and the SO/PHI Team



## Solar Orbiter<sup>[1]</sup>/Polarimetric and Helioseismic Imager<sup>[2]</sup> (SO/PHI)



Longitudinal separation angle  $> 130^\circ$  relative to Sun-Earth line for several months per year yields direct view of solar far side



Continuous observations of the solar disk from within the Sun-Earth line

- Both instruments provide with full disk line-of-sight magnetograms of the solar photosphere
- Comparison of co-observed active region data shows similar values for the line-of-sight magnetic field <sup>[3]</sup>

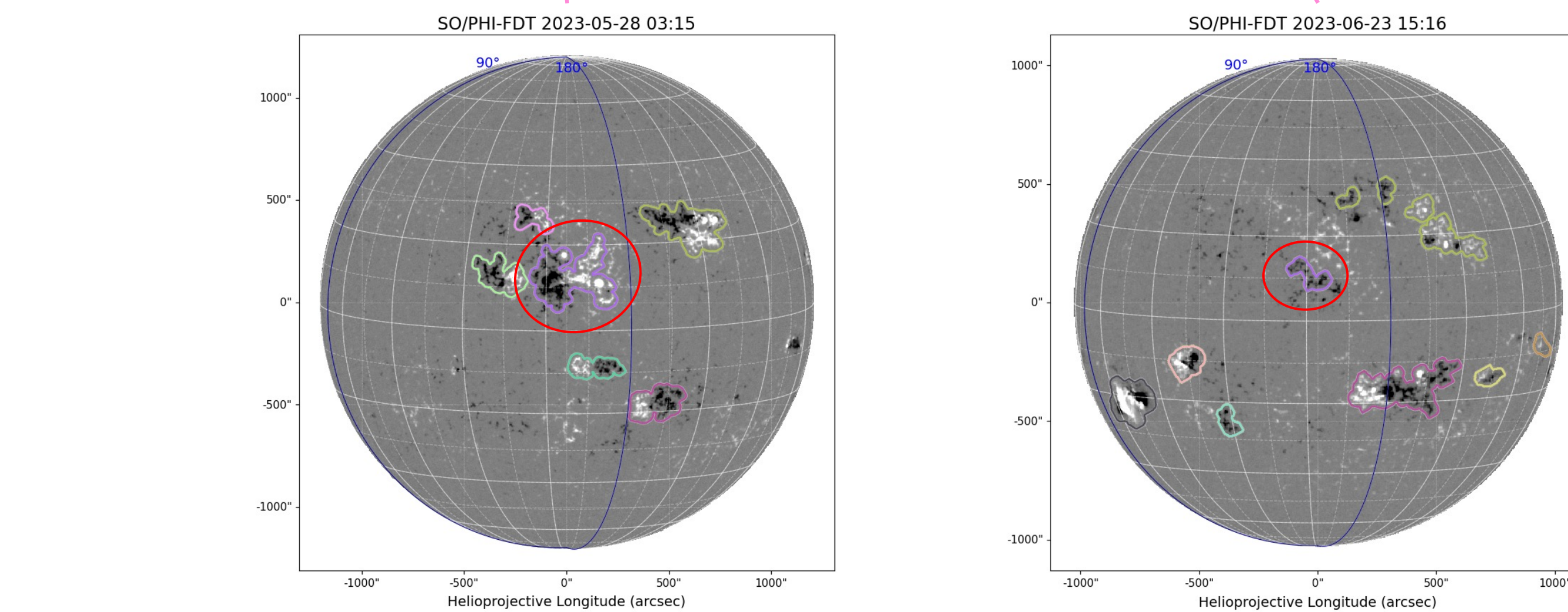
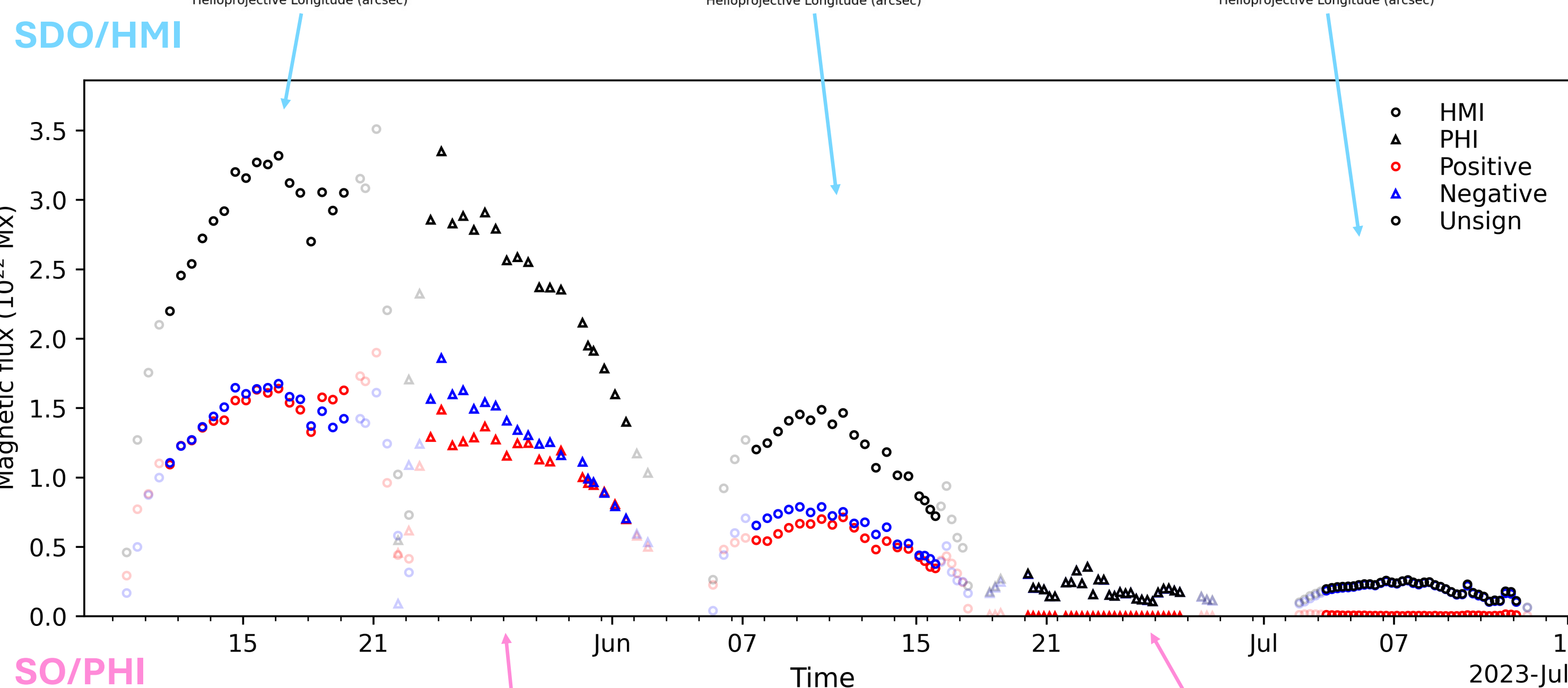
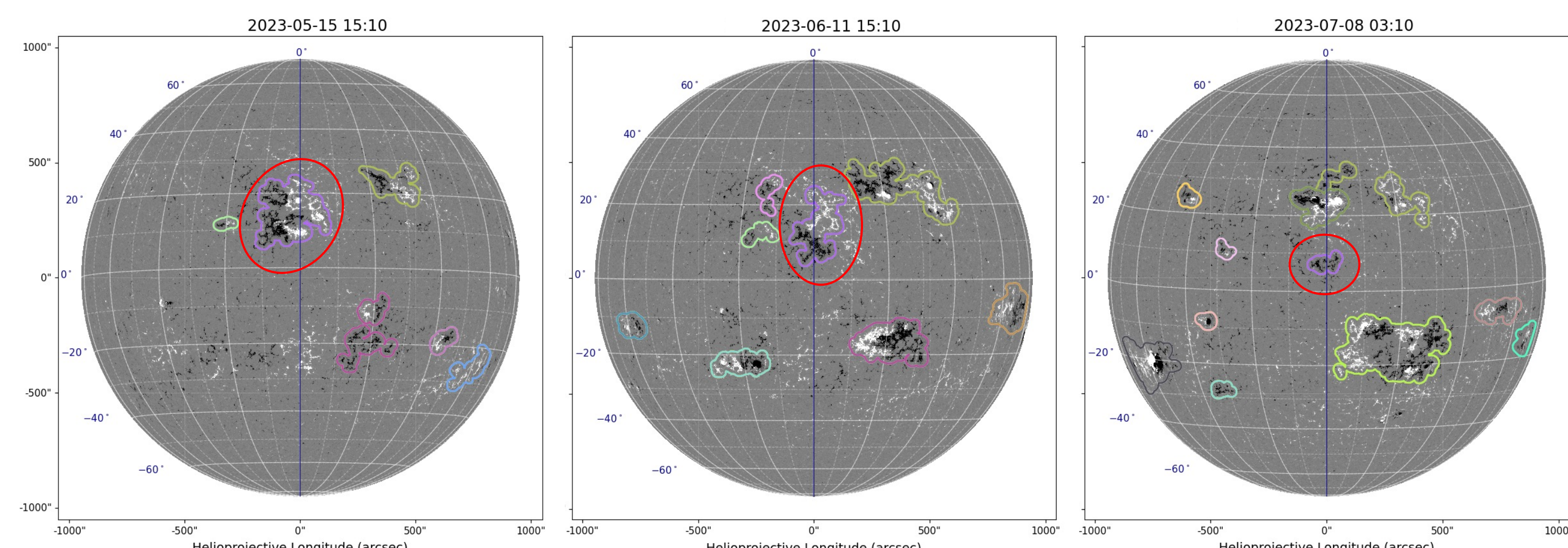
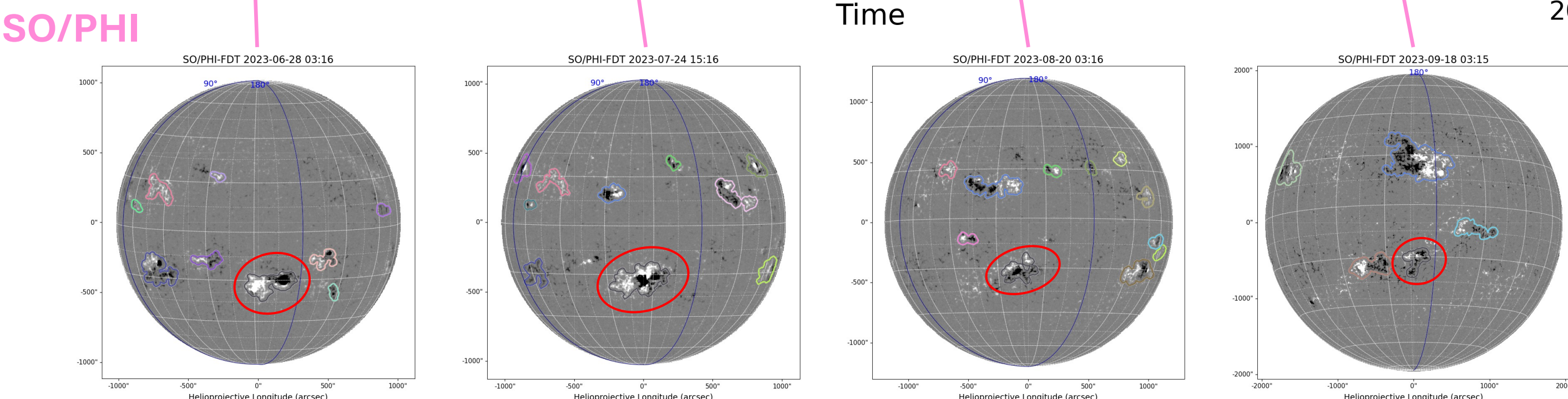
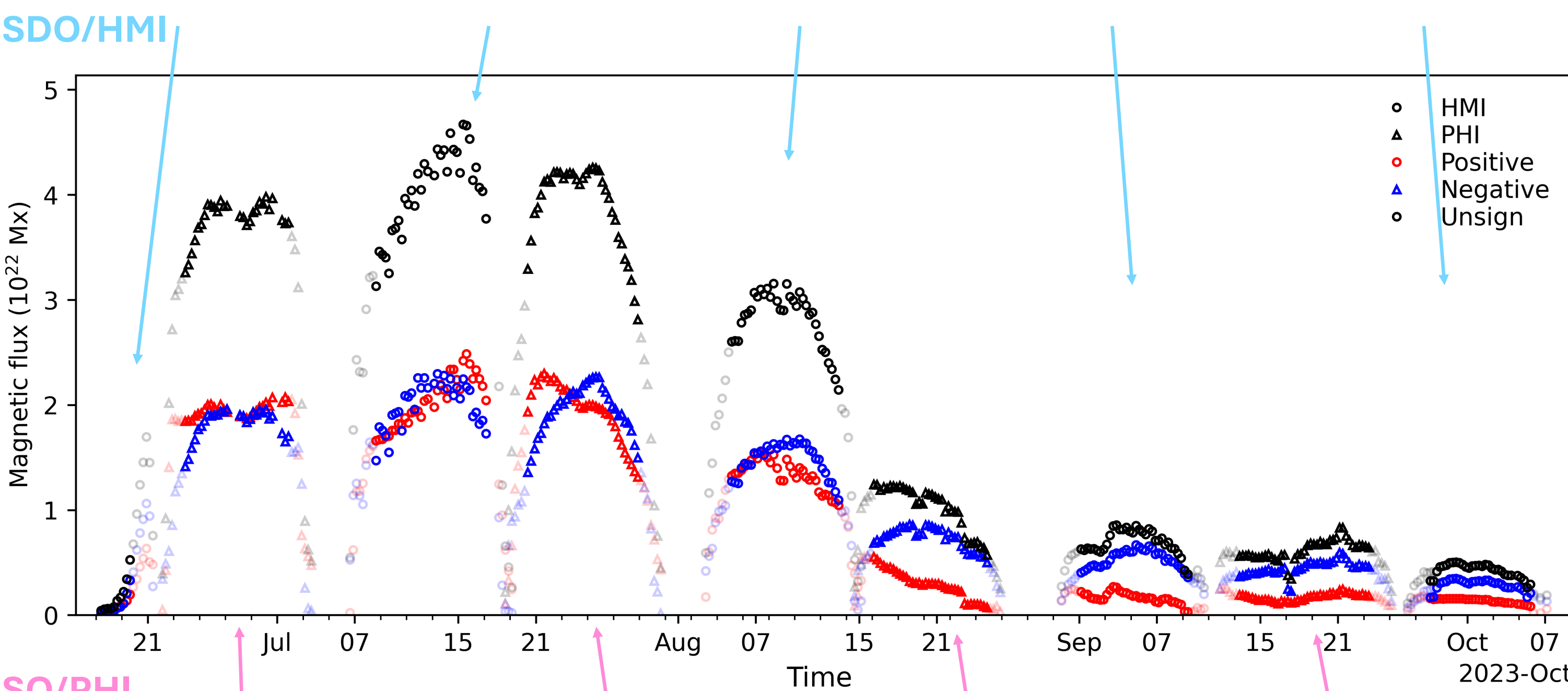
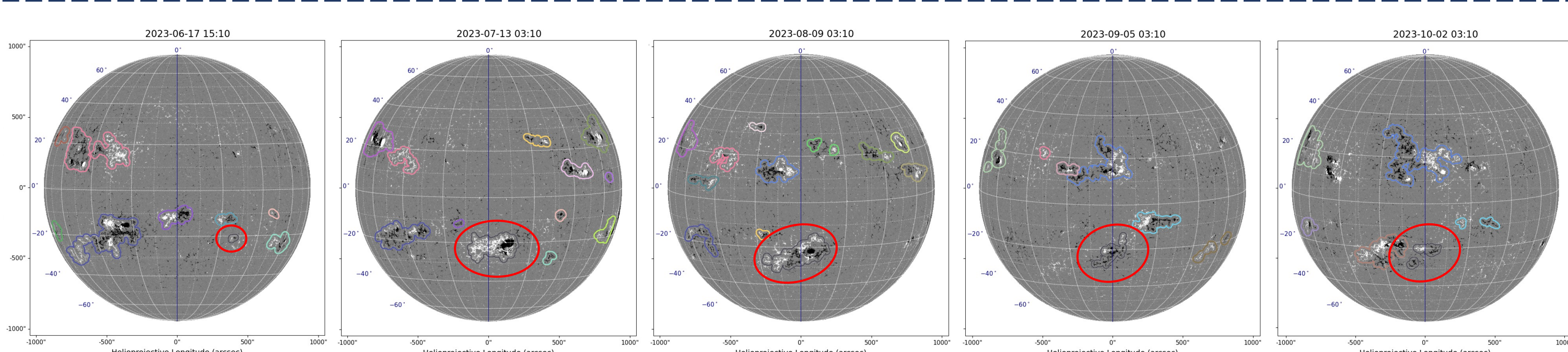
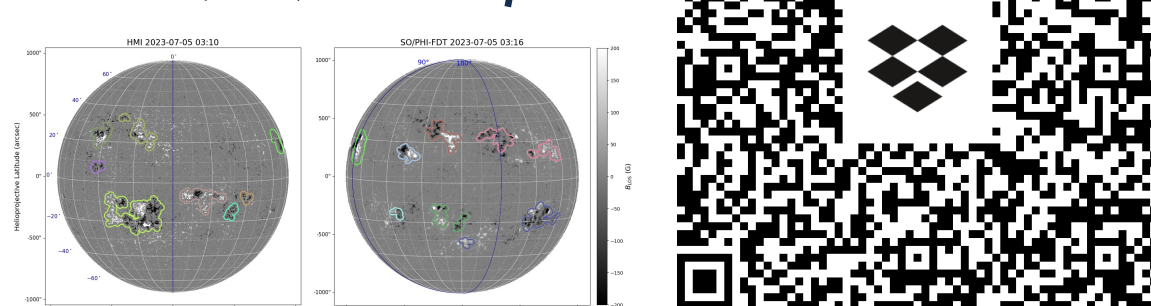
Solar Dynamics Observatory<sup>[3]</sup>/ Helioseismic and Magnetic Imager<sup>[4]</sup> (SDO/HMI)

## ACTIVE REGION TRACKING – EVOLUTION OF MAGNETIC FLUX

Semi-automatised tracking of active regions

- Same thresholds applied for all data
- Changing resolution in SO/PHI has been considered

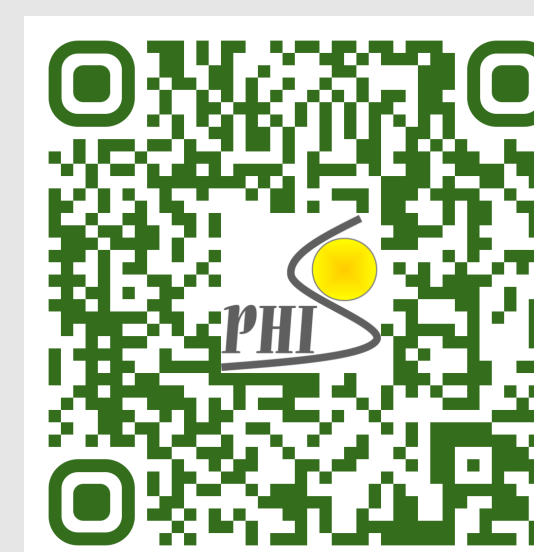
Movie of tracked regions in HMI and SO/PHI for 01/05 – 19/10/2023



## SUMMARY

- Combination of near-Earth side (SDO/HMI) and far side observations of solar photosphere enables almost uninterrupted study of magnetic flux evolution of magnetic regions over their full lifetime
- Combination with extreme ultraviolet instruments will allow to study the connection of magnetic fields of the regions with structure and dynamics in the overlying corona

More information about SO/PHI and its data:



## References

- [1] Müller et al. 2022, A&A, 642, A1
- [2] Solanki et al. 2020, A&A, 642, A11
- [3] Pesnell et al. 2012, Sol. Phys., 275, 3
- [4] Scherrer et al. 2012, Sol. Phys., 275, 207
- [5] Moreno Vacas et al. 2024, A&A, 658, A28

## Affiliations

- 1 - Instituto de Astrofísica de Andalucía (IAA-CSIC)
  - 2 - Spanish Space Solar Physics Consortium (S3PC)
  - 4 - Max Planck Institute for Solar System Research (MPS)
  - 5 - Universidad de Valencia (UV)
- \* streckerh@iaa.es

## Acknowledgements

Solar Orbiter is a space mission of international collaboration between ESA and NASA, operated by ESA. We are grateful to the ESA SOC and MOC teams for their support. The German contribution to SO/PHI is funded by the BMWi through DLR and by MPG central funds. The Spanish contribution is funded by AEI/MCIN/10.13039/501100011033/ (RTI2018-096886-C5, PID2021-125325OB-C5, CNS2023-144723) and ERDF "A way of making Europe"; "Center of Excellence Severo Ochoa" awarded to IAA-CSIC (CEX2021- 001131-S). The French contribution is funded by CNES. Data from SDO/HMI are courtesy of NASA/SDO and the AIA, EVE, and HMI science teams and are publicly available through the Joint Science Operations Center at the jsoc.stanford.edu.)

