

## SO/PHI-HRT, fifth data release

The fifth data release includes L2 SO/PHI-HRT datasets from

- Spring 2025, in particular for [LTP 19](#) (RSWs 19, 20, 21), version 2 (no version 1 released before)
- 2023, in particular [LTP 11](#) and [LTP 13](#) (RSWs 7 to 12), version 2

The details about the data reduction can be found in the previous readme ([fourth HRT data release](#)).

With respect to previous releases, the main difference in the reduction is the implementation of the RTE inversion. After a first run, the results are smoothed with a median filter and then used as initial guess for a second, and final, inversion. In spite of these corrections, small residuals of dust grains in the optical path are still visible. In a few cases, weak residual signatures of the prefilter and cavity map error remain at the edges of the FoV. Few SOOPs are also affected by higher noise and small artifacts due to a failure in the image stabilization system. More details can be found in the [HRT data Table](#).

At this point in time almost all, but not quite all of the Spring 2025 data is released to SOAR. The criteria for SOAR upload is that either data is properly calibrated, or it is not expected that the calibration will improve in the near future. Nevertheless, the data are in a state suitable for scientific exploitation. The Spring 2025 datasets uploaded to SOAR belong to the following SOOPs:

- RSW19: Full Disk Mosaic (EUI), Coronal He Abundance, AR Heating, Dark Halos (4 instances), Sunspot Oscillations, Major Flare (2 instances), Polar Rotation, RS-Burst, Supergranulation, Polar Observations, Fast Wind (3 instances)
- RSW 20: Polar Observations (2 instances), Major Flare (2 instances), RS-Burst, Fast Wind (2 instances)
- RSW 21: Polar Observations

The remaining data will be uploaded to SOAR as soon as better calibrations are attained. This includes the SOOP Full Disk Mosaic (SPICE) (RSW 21).

Regarding the SOOPs covered by the 2023 data, please refer to the [third HRT data release notes](#).

All data in the present release adopt the new RTE inversion strategy described above, and they are released as version 2 even if, as in the case of data from spring 2025, no previous version 1 was released.

All standard observables are released:

- *icnt*: continuum intensity computed by the RTE inversion;
- *vlos*: longitudinal velocity computed by the RTE inversion;
- *bmag*: magnetic field strength computed by the RTE inversion;
- *binc*: magnetic field inclination computed by the RTE inversion;
- *bazi*: ambiguous magnetic field azimuth computed by the RTE inversion;
- *blos*: longitudinal magnetic field computed from *bmag* and *binc* (note that *blos* is typically more robust than either *bmag* or *binc*);
- *stokes*: full Stokes vector (I, Q, U, V) measured in 5 points within the absorption line and in one point in the near continuum (measured continuum).

Unreconstructed Stokes vectors and other ancillary data, such as spatial PSF and disambiguation of the azimuth, are available on request.

If any publications are produced to which SO/PHI data contribute in any way, we would request you to cite the relevant instrument papers:

- Solanki, S. K., del Toro Iniesta, J. C., Woch, J., et al. 2020, A&A, 642, A11, DOI: [10.1051/0004-6361/201935325](https://doi.org/10.1051/0004-6361/201935325);
- Gandorfer, A. M., Grauf, B., Staub, J., et al. 2018, in Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, Vol. 10698, Space Tele-scopes and Instrumentation 2022: Optical, Infrared, and Millimeter Wave, 1403–1415, DOI: [10.1117/12.2311816](https://doi.org/10.1117/12.2311816).

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We would appreciate receiving a copy of any publication you produce that profits from SO/PHI data at this email: [sophi\\_support \[at\] mps.mpg.de](mailto:sophi_support@mps.mpg.de)

We would be glad if you can report to us about any problem or issue encountered in using SO/PHI data. Please contact [sophi\\_support \[at\] mps.mpg.de](mailto:sophi_support@mps.mpg.de)

Further information is given at:

<https://www.mps.mpg.de/solar-physics/solar-orbiter-phi>