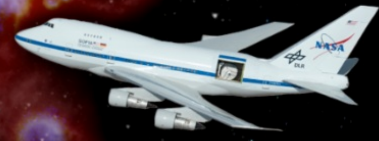


# SOFIA

## Science Newsletter



November 2022

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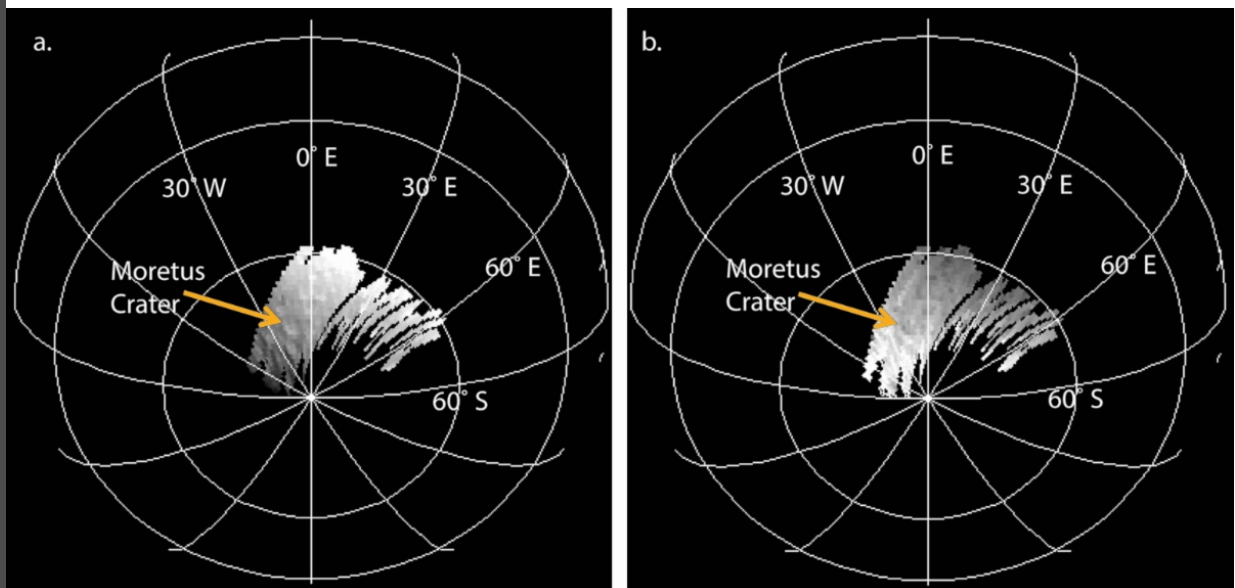
## Science Spotlight



### Mapping Water on the Lunar South Pole

Following the first ever detection of the water molecule ( $H_2O$ ) on the sunlit surface of the Moon, researchers using SOFIA have produced a regional map of molecular water in the South Pole region near Moretus crater. This map enables tests of various hypotheses for water formation. The measurements point to an inverse correlation with surface temperature, where colder regions have greater abundance. This finding suggests that lunar surface water is created from pre-existing surface hydroxyl (OH) subsequently trapped in glass created during impacts.

Further observations with SOFIA have created water maps of various regions on the Moon, including interesting geologic features such as craters and pyroclastic flows. Observations of multiple latitudes at multiple lunar times of day will constrain hypotheses about the origin, distribution, and evolution of lunar water. All corresponding calibrated data can be downloaded from the [IRSA SOFIA Archive](#) under project IDs 09\_0171 and 08\_0132. Read more [here](#) and [here](#).



Orthographically rectified images of average flux (a) and emission peak height (b). Credits: Honniball et al. 2022

# AGN Feedback Workshop

## 'Signatures of AGN Feedback' Workshop Summary

On October 20, 2022, more than 90 attendees gathered online for a focused workshop on "[Signatures of AGN Feedback: The Post-SOFIA Era](#)". Through 6 engaging invited talks ([all available online](#)), the event presented some of the most impressive SOFIA results relevant to AGN research, showing how SOFIA picked up where Spitzer and Herschel had left off. Of particular note, a talk by D. Fadda showed how the FIFI-LS instrument uncovered "anomalous arms" formed by gas shocked by jets from the central black hole, and the talk by E. Lopez-Rodriguez showed how HAWC+ polarization mapping revealed new links between magnetic field orientation and radio brightness. A list of archival public SOFIA data on AGN and hosts is available [here](#).

A lively discussion by 6 panelists from different background emphasized how the next frontier in IR observations will be addressed by collecting more data on fainter, more obscured, and more distant objects with the ultimate goal of obtaining statistical samples of dust-emitting objects, both in total and polarized infrared light, and studying emission line gas tracers of RL and RQ AGN across cosmic time. Read the [executive summary here](#).

## Observatory News

### SOFIA Support to the Community in 2023 and Beyond

As of October 1, SOFIA ended science flight operations, but support to the community will continue up until the end of SOFIA science operations in September 2023, and beyond. Here is a summary of what the SOFIA community can expect.

1. **Helpdesk:** SOFIA's helpdesk is still being supported by the SOFIA Science Center and will eventually transition to IRSA in 2023.
2. **Highlighting Scientific Results:** [SOFIA blog](#) stories are currently produced by the SOFIA Science Center, and eventually the Ames Office of Communications will take over this work in 2023.
3. **Website:** In 2023, we will be transferring most of the information from the [sofia.usra.edu](http://sofia.usra.edu) website over to the [IRSA website](#).
4. **Data Cycle System Server:** Access to the [DCS](#) server will eventually be restricted sometime in 2023. Observers may wish to download their proposals now, for their records, using the MyProposals feature.
5. **Grant Support:** The administration of grants and associated support will continue for the next 22 months.

## Good to Know

### SOFIA Archival Reprocessing

As part of the closeout of Science Operations, scientists at the SOFIA Science Center have begun efforts to reprocess all SOFIA data from Cycle 5 to Cycle 9 for EXES, FIFI-LS, FORCAST, and HAWC+. While the pipelines and calibration data have already been improved over time, and select data have been reprocessed, this will mark the first large-scale effort to achieve a uniform archive of the highest-quality versions of the data. Note in particular that FIFI-LS and FORCAST data will be reprocessed using a new method to

determine precipitable water vapor resulting in more accurate flux values. Archiving improved data products is equivalent to taking more data and improving signal to noise, so it has a significant added value to bring the observations toward their ultimate potential. All reprocessed data will be available from the [IRSA archive](#).

The reprocessing of the data will be accompanied by a systematic review and update of all calibration data (Cycles 1-9) which will be used in the reprocessing. Updated calibration values and files will become available as part of the public pipelines. New documentation is also being created to ensure clear communication to future archive and pipeline users. The reprocessing effort is scheduled to be completed by the end of FY23.

# Virtual Talks

## Join Science Talks Remotely: Tele-Talks

Tele-Talks are scientific presentations given via phone, with slides distributed ahead of time. The talks are held approximately twice a month on Wednesdays at 9:00 a.m. Pacific, noon Eastern. For information on how to participate, check the [SOFIA Tele-Talk webpage](#).

### Upcoming Tele-Talks

- December 7: Jessica Sutter (UC San Diego); Molecular Gas Ring in Sombrero Galaxy
- December 14: Lars Bonne (SOFIA Science Center); Dynamics and Mass Ejection in RCW36
- January 18: Enrique López-Rodríguez (KIPAC Stanford); Extragalactic Magnetism with SOFIA (SALSA Legacy Program)

Please direct questions and comments to the SOFIA Science Center help desk:  
[sofia\\_help@sofia.usra.edu](mailto:sofia_help@sofia.usra.edu).

