MIRO PI Report

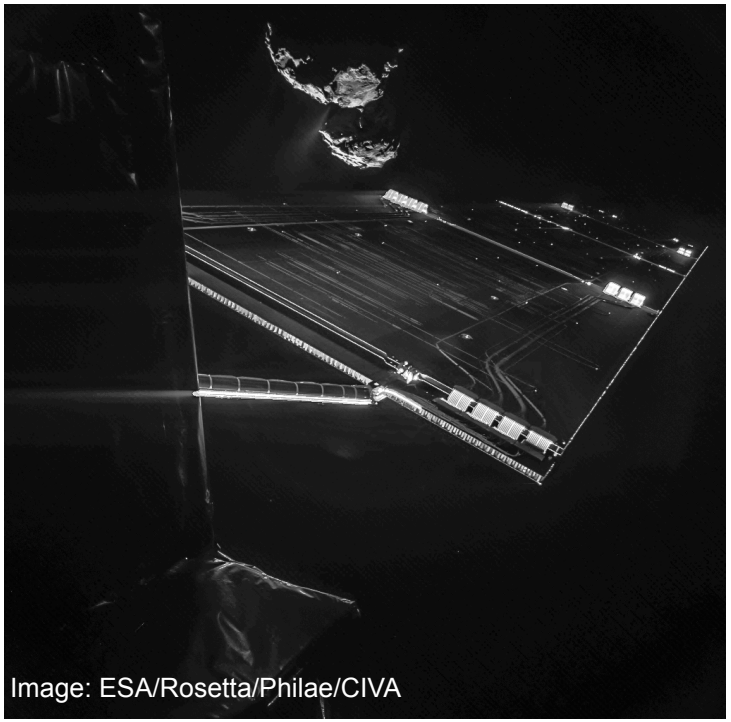


Image: ESA/Rosetta/Philae/CIVA

Doing science, archiving, and developing higher-level data products to ensure that knowledge from Rosetta is available to future generations.

November 2017

Mark Hofstadter for the MIRO Team

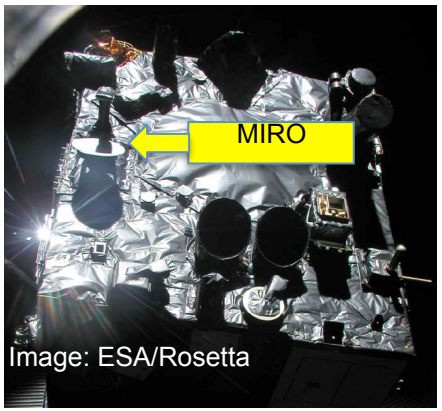


Image: ESA/Rosetta

MIRO Archive Products and How to Use Them

MIRO data are organized by mission phase (e.g. ESC-1) and data level.

Index of ftp://psa.esac.esa.int/pub/mirror/INTERNATIONAL-ROSETTA-MISSION/MIRO/

Up to higher level directory

Name	Size	Last Modified
RO-A-MIRO-2-AST1-STEINS-V1.0		6/29/11 12:00:00 AM
RO-A-MIRO-2-AST2-LUTETIA-V1.0		3/5/12 12:00:00 AM
RO-A-MIRO-3-AST1-STEINS-V1.0		6/29/11 12:00:00 AM
RO-A-MIRO-3-AST2-LUTETIA-V1.0		3/5/12 12:00:00 AM
RO-C-MIRO-2-CR2-9P-TEMPEL1-V1.0		7/14/10 12:00:00 AM

MIRO Archive Products and How to Use Them

Within each mission phase/level directory are the “usual” files....

Index of ftp://psa.esac.esa.int/pub/mirror/INTERNATIONAL-ROSETTA-MISSION/MIRO/RO-C-MIRO-3-PRL-67P-V2.0/

Up to higher level directory

Name	Size	Last Modified	
AAREADME.TXT	4 KB	10/2/17	11:22:00 PM
CATALOG		10/23/17	12:00:00 PM
DATA		10/23/17	12:01:00 PM
DOCUMENT		10/23/17	12:01:00 PM
ERRATA.TXT	1 KB	10/2/17	9:59:00 PM
INDEX		10/23/17	12:00:00 PM
LABEL		10/23/17	12:01:00 PM
VOLDESC.CAT	4 KB	10/20/17	2:38:00 PM

For science users, the two most important documents are the EAICD and the Users Manual Chapter 9

MIRO Archive Products and How to Use Them

Within a Level 3 directory are folders for calibrated continuum data, calibrated spectroscopic data, and geometry information.

A Level 2 directory contains raw continuum, raw spectroscopic, and housekeeping data.

Index of ftp://psa.esac.esa.int/pub/mirror/INTERNATIONAL-ROSETTA-MISSION/MIRO/RO-C-MIRO-3-PRL-67P-V2.0/DATA/

Up to higher level directory

Name	Size	Last Modified
CONTINUUM		10/23/17 12:01:00 PM
GEOMETRY		10/23/17 12:01:00 PM
SPECTROSCOPIC		10/23/17 12:01:00 PM

MIRO Archive Products and How to Use Them

Finally, in the lowest level directories, each file includes 7-days of data (whether science, housekeeping, or geometry).

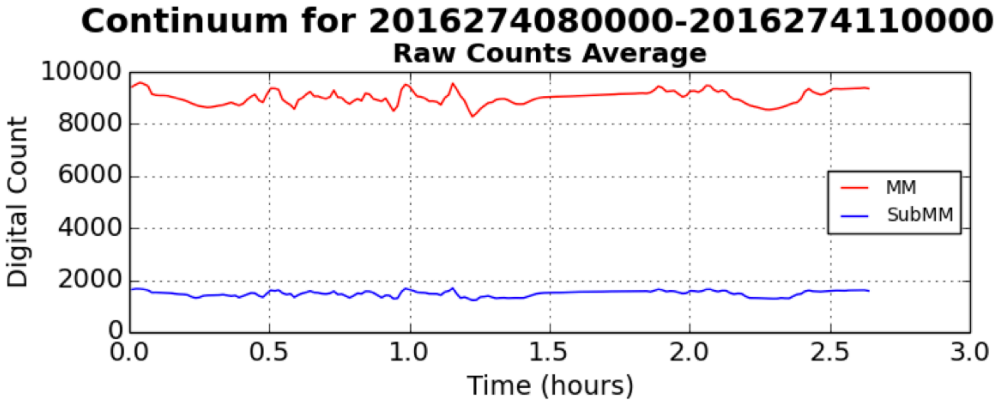
Index of ftp://psa.esac.esa.int/pub/mirror/INTERNATIONAL-ROSETTA-MISSION/MIRO/RO-C-MIRO-3-PRL-67P-V2.0/DATA/CONTINUUM/

Up to higher level directory

Name	Size	Last Modified
MIRO_3_MMCAL_2014112.DAT	3537 KB	10/13/17 10:28:00 AM
MIRO_3_MMCAL_2014112.LBL	5 KB	10/13/17 10:28:00 AM
MIRO_3_MMCAL_2014119.DAT	7002 KB	10/13/17 10:29:00 AM
MIRO_3_MMCAL_2014119.LBL	5 KB	10/13/17 10:31:00 AM
MIRO_3_MMCAL_2014147.DAT	55985 KB	10/13/17 10:30:00 AM
MIRO_3_MMCAL_2014147.LBL	5 KB	10/13/17 10:31:00 AM
MIRO_3_MMCAL_2014154.DAT	19974 KB	10/13/17 10:30:00 AM
MIRO_3_MMCAL_2014154.LBL	5 KB	10/13/17 10:29:00 AM
MIRO_3_MMCAL_2014161.DAT	89594 KB	10/13/17 10:30:00 AM
MIRO_3_MMCAL_2014161.LBL	5 KB	10/13/17 10:30:00 AM

MIRO Archive Products and How to Use Them

Data are time sequences. Here is a sample of continuum data....



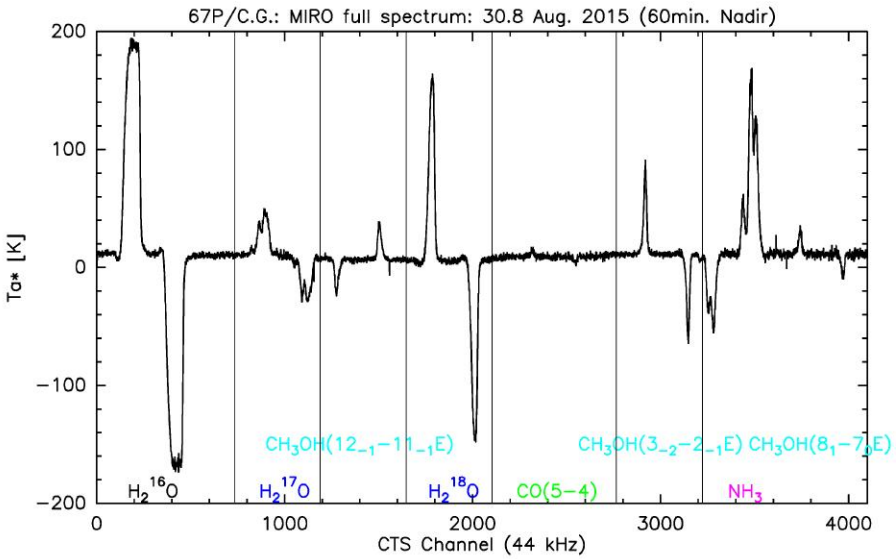
Level 2 continuum data up to impact. Calibrated data would look the same, with both average temperatures being near 160 K, and coldest temps near 80 K.

Squiggles are real variations in sub-surface brightness due to shadowing and slopes pointing towards or away from the Sun. I plotted radiances averaged to 10 seconds, but intrinsic resolution is 50 msec. (Noise level in this plot is about 5 counts, too small to see on this scale.)

These brightnesses can be inverted to estimate thermal and electrical properties from about 0.5 to 5 cm beneath the surface.

MIRO Archive Products and How to Use Them

And a sample of spectroscopic data....

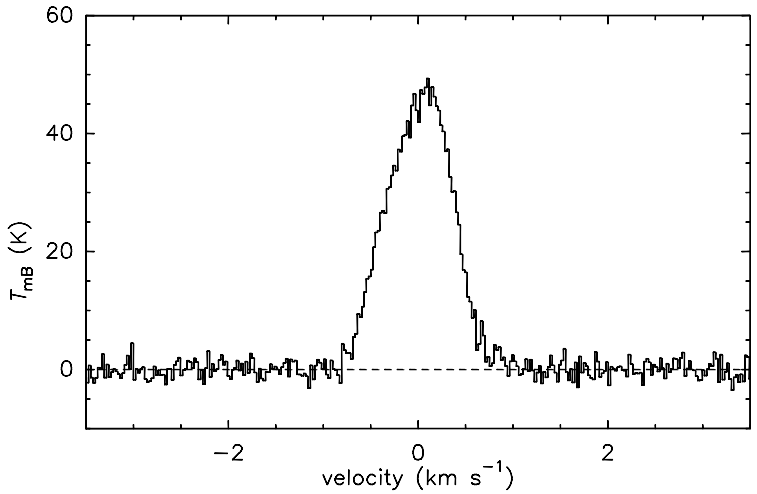


Level 3 spectrum (temperature vs. channel number). We observe 8 lines simultaneously, and due to a calibration technique (frequency switching), each line appears twice. Once as a positive and once as a negative. This is a 60 minute integration. Uncalibrated data would look similar, but the baseline around each pair of spectral lines would vary.

Note how week the CO line is---this was a surprise! These data can be used to constrain abundance, velocity, and temperature of each species.

MIRO Archive Products: The Future

Higher-level data products. We have committed to providing continuum data averaged to 1 second, and folded spectra.



The last water limb-sounding measurement (a 40-minute integration). This is a “folded” spectrum, where we combined the positive and negative water lines to reduce the noise level, and we used geometry information to convert channel number to a Doppler velocity of the gas.

We also intend to produce a list of events/observing times to make it easier to locate dates of interest, and we hope to produce two map products.