

SOLAR MESOPHERE EXPLORE
 VISIBLE SPECTROMETER RADIANCE DATA
 1982-1986

The visible spectrometer samples data at two wavelengths at a given time. The limb altitude radiance profiles from the visible spectrometer with identifying data are on the tapes. See Mount et. al., 1984 for additional information about the data.

The visible spectrometer was designed to observe limb radiances at two wavelengths simultaneously. There is a short channel radiance and a long channel radiance given for each merged spinset. Data exists for altitudes from 20 to 76 km. Several grating positions have been used, none is continuous throughout the mission. The wavelengths corresponding to the two channels are dependent on which grating position was used. Possible grating positions and the corresponding wavelengths are:

| <u>Grating position</u> | <u>long channel</u> | <u>short channel</u> |
|-------------------------|---------------------|----------------------|
| 333 | 431.84 nm | 428.75 nm |
| 344 | 435.59 nm | 432.50 nm |
| 364 | 442.38 nm | 439.31 nm |
| 363 | 442.04 nm | 438.92 nm |

Individual spin radiances were calibrated and had a background subtracted before merging. We actually merge the long channel and the ratio of the two channels, the short channel included on the tapes was reconstructed from those two profiles. Radiances are also adjusted for instrument polarization.

After calibrating, the spins (which are data collection rotations of the SME satellite) are merged into groups of up to six spins. Wildpoint and wild spin checking occurs before merging. In order to average together six spin radiance profiles, each profile was interpolated onto a standard altitude grid. This data was then averaged together. The latitude resolution of the merged profiles is about five degrees. These merged profiles are later used as input for the nitrogen dioxide inversion routine.

The radiance data from the visible spectrometer is written in standard ASCII labeled format with one orbit per file. Each orbit consists of 20 to 60 (approximate range) merged spin sets. Filenames are of the format VSxxxxx.NSS, where xxxxx is the orbit number. The data set consists of 23 tapes containing radiance data from Day 1, 1982 through Day 354, 1986. The following is a listing of tapes and orbit intervals contained on the tapes:

| <u>Tape Label</u> | <u>Orbit Interval</u> | <u>Number of Orbits on Tape</u> |
|-------------------|-----------------------|---------------------------------|
| VIS001 | 1316-1999 | 253 |
| VIS002 | 2000-2999 | 358 |
| VIS003 | 3003-3996 | 426 |
| VIS004 | 4000-4898 | 408 |
| VIS005 | 4901-5997 | 381 |
| VIS006 | 6001-6997 | 281 |
| VIS007 | 7002-7996 | 331 |
| VIS008 | 8001-8991 | 323 |
| VIS009 | 9001-9996 | 323 |
| VIS010 | 10001-10991 | 324 |
| VIS011 | 11000-11992 | 326 |
| VIS012 | 12002-12993 | 319 |
| VIS013 | 13001-13994 | 324 |
| VIS014 | 14002-15298 | 424 |
| VIS015 | 15306-16890 | 420 |
| VIS016 | 16903-18997 | 480 |
| VIS017 | 19000-20758 | 399 |
| VIS018 | 20800-22594 | 461 |
| VIS019 | 22606-23996 | 454 |
| VIS020 | 24000-25493 | 447 |
| VIS021 | 25501-26899 | 467 |
| VIS022 | 26900-27699 | 591 |
| VIS023 | 27700-28786 | 311 |

The ASCII format of the merged spin set data files follows:

FIRST RECORD IN EACH FILE:

| <u>Format</u> | <u>Description</u> |
|---------------|---|
| 1X,I5 | Orbit number |
| 1X,I4 | Year |
| 1X,I3 | Julian Day |
| 1X,F8.2 | Seconds into day (GMT) at start of orbit |
| 1X,F7.2 | Longitude of equatorial crossing |
| 23(1X,F5.2) | Altitude profile (note: The grid interval is not constant, it is 1.75 km in the lower part of the profile, and 3.5 km in the upper part.) |
| 1X,I2 | Number of profiles in this orbit |

MERGED SPIN RECORDS:

| <u>Format</u> | <u>Description</u> |
|---------------|-------------------------------------|
| 1X,I4 | Year |
| I3 | Julian Day |
| F8.2 | Seconds into day (GMT) |
| F6.2 | Latitude of merged spin set |
| F7.2 | Longitude of merged spin set |
| F5.2 | Solar zenith angle |
| I2 | Number of spins in merged set (1-6) |
| I3 | Grating position of merged set |
| 23F8.2 | Long channel radiances |
| 23F8.2 | Short channel radiances |

NOTES ABOUT THE DATA

1. An altitude shift has been applied to the data to put it on the best altitude grid

that we can determine. A good assumption is that the altitudes are correct within ± 1 km.

2. Missing radiance data is set to 0. Negative data is a consequence of the data reduction in that a background had to be calculated and then subtracted off. Negative values should only occur at high altitudes. If it does occur at lower altitudes, it would be best to ignore the profile.

3. The altitude scale is actually made up of 2 scales, a lower one with a spacing of 1.75 km and an upper one with a spacing of 3.5 km. This was done to make the NO₂ inversions easier.

4. A value of -1 for equatorial longitude indicates missing data.

NOTES ABOUT THE TAPE

The physical characteristics of the tapes are:

| | |
|-----------|---|
| Density | 1600 bytes per inch |
| Tracks | 9 |
| Blocksize | 408 bytes |
| Label | VISxxx, where xxx is the tape # in the series |

SME VISIBLE SPECTROMETER REFERENCES

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