

## Quality Designator:

- Provisional: all but RCCM
- Beta: RCCM

[MISR maturity level definitions](#)

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This statement applies to MISR Level 1 Products with a production date of February 5, 2002, or later until such a time as further improvements to MISR software or ancillary inputs are made. See the [Versioning Page](#) for an in-depth explanation of the differences between various MISR product versions. Quality statements covering earlier time periods may be accessed through [links](#) at the bottom of this page.

The MISR Level 1 software which generated these products is believed to be functioning quite well except where noted below. This statement lists known problems with Level 1 Products and clarifies issues which have confused some users.

### Geometric Parameters (a.k.a GP\_GMP, MIB2GEOP) (from MISR PGE7) (Provisional)

There are no known problems with the current release of PGE7 software. Preliminary analysis indicates that the software is meeting all of its requirements. Ongoing quality analysis is planned.

The Geometric Parameters exhibit one algorithmic quirk which has surprised some users. Solar zenith and azimuth angles near the swath edge occasionally appear to jump around. This inconsistency is the result of an intentional choice of algorithm whereby solar angles are computed at the mean time at which MISR cameras viewed the ground point in question. Adjacent points are not always visible to the same set of cameras. This can cause a bias in solar angle towards cameras which acquired that point.

### L1B2 Terrain (a.k.a. GRP\_TERRAIN\_GM, MI1B2T) (from MISR PGE1) (Provisional)

### L1B2 Ellipsoid (a.k.a. GRP\_ELLIPSOID\_GM, MI1B2E) (from MISR PGE1) (Provisional)

This portion of the list is lengthy, so the sub-headings are listed for quick reference.

- [RADIOMETRIC CALIBRATION](#)
- [GEORECTIFICATION and COREGISTRATION](#)
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- [Level 1A](#)
- [Level 1B1 including Local Mode](#)
- [RCCM \(Cloud Mask\)](#)

## RADIOMETRIC CALIBRATION

MISR Level 1 products generated with the current ARP release are generally accurate to the 4 percent level (one sigma confidence level). This uncertainty is increased at radiometric levels less than 2%, for high-contrast scenes and for a small number of degraded sensor regions which are identified by data quality indicators in the products. These exceptions and those inherent in data produced with older ARPs are described in greater detail in the [Calibration Page](#).

A bias of a few percent was recently discovered between the fore and aft cameras. The cause of the discrepancy was traced to the reflectance database used for the North calibration panel. These data have been updated using on-board goniometer measurements. ARP T012 is the first to make use of these processing upgrades, and to improve the camera-to-camera relative bias error.

Users should consider that the radiance reported for an individual pixel in one of the L1B2 products is obtained by resampling to the SOM map projection. Therefore an individual L1B2 pixel does not necessarily correspond directly to an observation made by a single camera-CCD pixel.

## GEORECTIFICATION and COREGISTRATION

MISR Level 1B2 products exhibit acceptable georectification and coregistration accuracy. In the nominal case, the expected mean geolocation error across all cameras is below 60 meters with the standard deviations ranging between 100 meters for the nadir view angle, up to 300 meters for the most oblique angles (i.e., the D fwd camera). Exceptions definitely exist, including a pointing problem with the D aft camera, errors caused by on-orbit maneuvers and those caused by instrument out-of-sync, which is described below. See the [Georectification Page](#) for more details.



Overall georectification accuracy and the ability to assess georectification accuracy will be improved somewhat in the future when MISR Level 1 software is enhanced to take advantage of navigation correction by image matching.

## EXCEPTIONS/ANOMALIES

- **GAPS** The raw MISR data contains occasional gaps. These gaps usually consist of a few lost lines. Straight lines of raw data are resampled to gentle curves in the SOM map projection. Radiances in the gap regions are filled in with pre-defined fill values. Gaps then usually look like narrow, curved, bright, horizontal stripes in the L1B2 image. There is at least one small gap in almost every swath. In rare cases, data gaps of many lines have been observed.
- **INSTRUMENT OUT-OF-SYNC** The MISR instrument tends to go out-of-sync momentarily if the data rate from the hardware exceeds the real-time flight computer's capacity to write data out. This condition can occur whenever a change of camera state is commanded. The resultant error is seen most often in the forward and nadir cameras near the beginning of the swath. Image lines acquired while the MISR instrument was out-of-sync may contain sporadic fill and/or repeats of previous lines. The resulting image contains a brief vertical smear across the swath. Normally, this phenomenon only lasts for a handful of lines. In order to avoid geolocation errors, fill values are inserted in the line time fields in these regions.
- **TERRAIN TOPOGRAPHIC OBSCURATION** The line-of-sight between an off-nadir camera and a ground point is sometimes blocked by a topographic feature, such as a mountain. In such cases, fill values are reported instead of radiances in the terrain product. Large patches of obscuration fill can be seen in the D cameras over mountainous regions.
- **TERRAIN OCEAN FILL** Blocks which encompass no land at all get entirely filled with ocean-fill values in the terrain product. Terrain algorithms are wasteful over ocean since height variation is negligible there. The Ellipsoid product already contains radiances for these blocks. If ocean blocks are required, blocks from the Ellipsoid product may be substituted.

## ELLIPSOID COLOR BROWSE

The L1A browse products have been replaced with a 2.2 km sub-sampled, jpeg-compressed version of the Ellipsoid Product. MISR Red, Green and Blue bands are used to create the color image, which is intentionally clipped and gamma-stretched in order to make cloud, ocean and land features visible. The jpeg compression is performed at 75% quality, which means that compression artifacts are occasionally visible.

### L1A CCD (a.k.a. FM\_SCI, MIL1A) (from MISR PGE1) (Provisional)

The MISR Level 1A product is a reformatted version of the raw L0 data packet stream from the spacecraft. In this format, the CCD Data Numbers (DNs) may be viewed as an unregistered image with data quality indicators occupying the two low-order bits. By design, L1A does not differ greatly from the raw data except that gaps are filled in with appropriate fill values.

### L1B1 (a.k.a. RP\_GM, MI1B1) (from MISR PGE1) (Provisional)

#### L1B1 Local Mode (a.k.a. RP\_LM, MI1B1LM) (from MISR PGE1) (Provisional)

The MISR Level 1B1 product has been radiometrically corrected, but it has not been registered. The quality of L1B1 radiances is equivalent to that of L1B2 radiances discussed above, except that L1B1 pixels correspond directly to instrument CCD detector samples. The instrument out-of-sync condition can temporarily corrupt the times reported with MISR L1B1 lines.

The L1B1 Local Mode product consists of the L1B1 output acquired when the MISR instrument is put into Local Mode in which all nine cameras view a scene at 275 m resolution in all four bands. The An camera L1B1 Local Mode product is entirely corrupted due to a software bug. This bug has not been scheduled for a high-priority fix because the An camera always acquires data at 275 m resolution in all four bands. Users may order the corresponding RP\_GM product to view a local mode site at "Local Mode" resolution.

### L1B3 (a.k.a. GRP\_RCCM, MIRCCM) (from MISR PGE1) (Beta Quality)

The two primary fields in the RCCM product are the Cloud Mask and the Glitter Mask.

The RCCM (Radiometric Camera-by-camera Cloud Mask) is one of three MISR clouds masks. The RCCM has been promoted to a Beta quality designation based upon visual inspection. Separate threshold data sets are used to determine the RCCM over ocean vs land. Over ocean, the RCCM algorithm makes use of static thresholds which have been tuned through case studies. Regular blunders in the RCCM over ocean are only apparent in the presence of thick aerosol, over ice-covered waters and over waters very near a coastline.

The RCCM over land is often useful but is in a less-reliable preliminary stage of maturity than is the RCCM over ocean.

- Static thresholds derived from AVHRR data are in use. These thresholds are not optimized for multi-angle data, and they will be optimized for the wrong season 75 percent of the time.
- The seasonal threshold update process which tracks bi-weekly changes in vegetation has not yet been initiated.
- Bright semi-arid and desert land is often designated cloudy when it is entirely clear.
- The RCCM may never distinguish clouds from snow and ice-covered land.

The Glitter Mask indicates regions of the data which are likely to exhibit sun glint. As of February 5, 2002, the sun glint cone angle was increased from 30 degrees to 40 degrees in order to mask out sun-glint contaminated pixels.

See also:



- [Statement dated December 03, 2001](#) for MISR Level 1 Products from December 03, 2001 to February 5, 2002;
- [Statement dated September 27, 2001](#) for MISR Level 1 Products from September 27, 2001 to December 03, 2001;
- [Statement dated March 30, 2001](#) for MISR Level 1 Products from March 30, 2001 to September 27, 2001;
- [Statement dated February 16, 2001](#) for MISR Level 1 Products from December 21, 2000 to March 30, 2001;
- [Statement dated August 24, 2000](#) for MISR Level 1 Products from August 1 to December 20, 2000;
- [Statement dated June 15, 2000](#) for MISR Level 1 Products from June 1 to July 31, 2000.

