

MISR Level 2 Aerosol and Land Versioning

Aerosol and Land Surface Products

Processing Status

ESDT	Product File Name Prefix	Current Quality Designations
MIL2ASAE	MISR_AM1_AS_AEROSOL	<p>Stage 3 Validated: AEROSOL - aerosol optical depth over heterogeneous surfaces and dark water, SURFACE - surface albedos and BRFs</p> <p>Stage 2 Validated: AEROSOL - aerosol Angstrom exponent, aerosol single-scattering albedo, AOD due to small, medium, large, spherical, non-spherical particles; LAND - BRF, HDRF, DHR, BHR, MRPV (BRFModParam), NDVI; LAI and FPAR (excluding needleleaf forest), BHRPAR, DHRPAR</p> <p>MISR maturity level definitions Quality Summary L2 AS Products</p>
MIL2ASLS	MISR_AM1_AS_LAND	

Ver. #	Production Start Date	Product Updates	Quality Transition
<p>Current</p> <p>F13_0023 (aerosol), F08_0023 (land)</p>	11/01/2017	<p>This is a major revision to aerosol and land surface products, including both product format and algorithm changes. Both aerosol and land surface product format is changed from HDF-EOS2/HDF4 to NetCDF4/HDF5. Stacked-block file structure is replaced by a conventional 2-D map grid. Field names in both aerosol and land surface products have been completely revamped. See the Aerosol Product DPS and Land Surface Product DPS for a description of product content.</p> <p>Many significant algorithm related changes have been made, which impact quality and performance of both aerosol and land surface retrievals. See the Aerosol Data Quality Statement and Land Surface Quality Statement for more information.</p> <p>The entire mission will be reprocessed to this version.</p>	<p>Stage 3 Validated: Aerosol_Optical_Depth, BHR, DHR, and FPAR</p> <p>Stage 2 Validated: Angstrom_Exponent_550_860nm, Absorption_Aerosol_Optical_Depth, Nonspherical_Aerosol_Optical_Depth, Small_Mode_Aerosol_Optical_Depth, Medium_Mode_Aerosol_Optical_Depth, and Large_Mode_Aerosol_Optical_Depth</p> <p>Stage 1 Validated: LAI,NDVI, mRPV parameters (TBD)</p>
<p>F12_0022 (aerosol), F07_0022 (land)</p>	12/01/2007	<p>Data Product Specification Rev Q (PDF).</p> <p>The entire mission is being reprocessed at this level.</p> <p>AEROSOL:</p> <p>Revised optical depth upper bound for the Dark Water algorithm. In prior versions, optical depth upper bound was determined using a minimum equivalent reflectance, selected from among all "clear" subregions, including subregions over both land and water. Beginning in this version, for Dark Water only, we choose a minimum equivalent reflectance from among only subregions over water. This prevents subregions over land from influencing the optical depth upper bound for the Dark Water algorithm.</p> <p>No change was made in the calculation of optical depth upper bound for the Heterogeneous Land algorithm.</p> <p>Removed histogram binning algorithm for calculating mean and standard deviation for single-scattering albedo and spherical/non-spherical particle property fractional amounts. Replaced the histogram binning algorithm with a simple mean and standard deviation of successful mixtures. This impacts the follows parameters:</p> <p>RegMeanSpectralSSA RegStDevSpectralSSA RegMeanSpectralOptDepthFraction (particle types 4 and 5 only) RegStDevSpectralOptDepthFraction (particle types 4 and 5 only)</p> <p>Revised calculation of mean and standard deviation of optical depth fraction to weight by optical depth. This applies to all particle types (i.e. small, medium, large, spherical, and non-spherical). This impacts the follows parameters:</p> <p>RegMeanSpectralOptDepthFraction (all types) RegStDevSpectralOptDepthFraction (all types)</p> <p>For best estimate single-scattering albedo and particle property fractional amounts, report the result for the single successful mixture with the lowest combined residual. Uncertainty estimates are no longer available for these parameters. The following parameters are impacted:</p> <p>RegBestEstimateSpectralSSA RegBestEstimateSpectralSSAUnc (not available; all fill value) RegBestEstimateSpectralOptDepthFraction RegBestEstimateSpectralOptDepthFractionUnc (not available; all fill value) RegBestEstimateNumberFraction RegBestEstimateNumberFractionUnc (not available; all fill value) RegBestEstimateVolumeFraction RegBestEstimateVolumeFractionUnc (not available; all fill value)</p> <p>Revised all "LowestResid" parameters to exclude mixtures which are not successful. That is, the lowest residual mixture is selected from among successful mixtures only, rather than all mixtures.</p> <p>Added surface radiance contribution to RegLowestResidMixtureEqRefl reported for Heterogeneous Land algorithm. Prior versions included only the path radiance.</p> <p>Fixed minor bug in calculation of 70.4 km resolution optical depth parameters.</p> <p>Added parameter "RegParticlePropertyQA" to aerosol product. This parameter is set to "bad" (1) where the green band optical depth is less than 0.15.</p> <p>Reorganized grouping of fields within the HDF-EOS file structure. The following new groupings are added: RegParamsPerMixture, RegParamsAlgDiagnostics, RegParamsEqRefl, RegParamsGeometry, and RegParamsEnvironmental.</p> <p>Removed the following fields from the aerosol product:</p>	<p>AEROSOL:</p> <p>Stage 3 Validated: Aerosol optical depths, Surface albedos and BRFs</p> <p>Stage 2 Validated: Aerosol Angstrom exponent, aerosol single-scattering albedo, aerosol particle size and shape fractional amounts</p>

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		<p>RegWgtMeanSpectralOptDepth RegWgtStDevSpectralOptDepth RegLowestResidCombinedResidMax RegMeanAngstromExponent RegStDevAngstromExponent RegMeanNumberFraction RegStDevNumberFraction RegMeanVolumeFraction RegStDevVolumeFraction RegSpectralSSAHistogramCounts RegSpectralSSAHistogramMeans RegSpectralNonsphericalOptDepthFractionHistogramCounts RegSpectralNonsphericalOptDepthFractionHistogramMeans RegNonsphericalNumberFractionHistogramCounts RegNonsphericalNumberFractionHistogramMeans RegNonsphericalVolumeFractionHistogramCounts RegNonsphericalVolumeFractionHistogramMeans</p> <p>LAND:</p> <p>Added parameter "LandQA" to land surface product. This parameter is set to "bad" (1) where optical depth is greater than 0.3.</p> <p>Ancillary file changes:</p> <p>Added angstrom exponents and spectral phase functions to ACP_MIXTURE file. New fields are "Angstrom exponent" and "Mixture Spectral Phase Functions".</p> <p>New ancillary files:</p> <p>MISR_AM1_TASC_<month>_<year>_F02_04.hdf (starting November 01 2009) MISR_AM1_AS_SCI_CONFIG_F12_0020.txt MISR_AM1_ACP_MIXTURE_F06_0021.hdf</p>	
F11_0021 (aerosol), F06_0021 (land)	06/01/2007	<p>Data Product Specification Rev P (PDF).</p> <p>Beginning with this version, MISR Level 2 products are generated in two stages, designated "FIRSTLOOK" and "FINAL". See the MISR Level 2 Aerosol/Surface Products Quality Statement for details about FIRSTLOOK and FINAL processing.</p> <p>AEROSOL:</p> <p>Revised Dark Water algorithm to use a common subregion location across all channels. Revised calculation of mean angstrom exponent to use the mean optical depth of successful mixtures rather than calculating a mean of angstrom exponent for each individual mixture. The revised angstrom exponent and its uncertainty are reported in RegBestEstimateAngstromExponent and RegBestEstimateAngstromExponentUnc. Revised calculation of optical depth upper bound over water such that it uses the maximum scaled optical depth in each channel rather than the minimum. Increased albedo_thresh_land, used in calculating optical depth upper bound over land, from an effective value of 0.003183 to 0.015. Changed Het algorithm parameter "first_eigenvalue_for_eofs" from 1 to 2. Added flag values "cloudy other channel" (14) and "too bright other channel" (15), in RetrAppMask. Use more up-to-date snow/ice and surface windspeed information from the new TASC dataset which is updated monthly. Aerosol FIRSTLOOK products (MIL2ASAF, MIL2ASLF) use TASC from the same month of the prior year. The FINAL aerosol products (MIL2ASAE, MIL2ASLS) use TASC generated for the current month in the current year. Revised SMART dataset to use a maximum windspeed of 7.5 (rather than 10) meters per second. Added SubrUsed field to aerosol product 1.1 km grid, indicating which subregion locations were used in the retrieval. The following parameters are no longer reported (set to fill value): RegWgtMeanSpectralOptDepth RegWgtStDevSpectralOptDepth RegMeanAngstromExponent RegStDevAngstromExponent RegLowestResidAngstromExponent</p> <p>New ancillary files:</p> <p>MISR_AM1_AS_SCI_CONFIG_F11_0019.txt MISR_AM1_SMART*_F02_0010.hdf MISR_AM1_TASC_<month>_<year>_F02_03.hdf</p> <p>New output product names for FIRSTLOOK products:</p> <p>MISR_AM1_AS_AEROSOL_FIRSTLOOK_P<path>_O<orbit>_F11_0021.hdf MISR_AM1_AS_LAND_FIRSTLOOK_P<path>_O<orbit>_F06_0021.hdf</p> <p>FINAL products retain the original product names:</p> <p>MISR_AM1_AS_AEROSOL_P<path>_O<orbit>_F11_0021.hdf MISR_AM1_AS_LAND_P<path>_O<orbit>_F06_0021.hdf</p>	
F10_0020 (aerosol), F06_0020 (land)	08/1/2006	<p>Data Product Specification Rev O (PDF).</p> <p>AEROSOL:</p>	

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		<p>Use higher quality "AngularSignatureCloudMask" rather than "FeatureRefASCM" for cloud screening in polar regions. Fix dark water suitability logic to require all channels used in the retrieval to have at least 32 clear subregions. Update ozone correction coefficients in the blue, green and red bands as follows:</p> <table border="1" data-bbox="415 147 920 262"> <thead> <tr> <th>band</th> <th>previous value</th> <th>new value</th> </tr> </thead> <tbody> <tr> <td>blue</td> <td>4.26E-6</td> <td>5.67E-6</td> </tr> <tr> <td>green</td> <td>1.05E-4</td> <td>1.04E-4</td> </tr> <tr> <td>red</td> <td>5.09E-5</td> <td>4.89E-5</td> </tr> <tr> <td>nir</td> <td>3.94E-6</td> <td>3.94E-6 (unchanged)</td> </tr> </tbody> </table> <p>Add brightness test to aerosol retrieval applicability logic. This should eliminate many cloud retrieval blunders. Disable use of optically-thick algorithm. This will reduce coverage over dark water and should also help to eliminate some cloud retrieval blunders. Revise polar (snow/ice) cloud screening logic to include RCCM input. This should help to eliminate some cloud retrieval blunders. Retrieval coverage could increase or decrease depending on the RCCM. Removed the following obsolete/unused fields from aerosol product: RegSfcRetrOptDepthUnc, OptDepthDWCalcPerBand, OptDepthOTACalcPerBand, ChisqAbsCalcPerBand, RelHumidProfile, RelHumidProfileSrc, StratAerFlag, StratAerOptDepth, StratAerOptDepthSrc, CirrFlag, CirrOptDepth, CirrOptDepthSrc Added the following fields to the Aerosol product: RegLamSurfEqRefl (currently not used), WaterLeavEqReflExp (currently not used), RegSurfTypeFlag</p> <p>New ancillary files:</p> <p>MISR_AM1_AS_SCI_CONFIG_F10_0018.txt</p>	band	previous value	new value	blue	4.26E-6	5.67E-6	green	1.05E-4	1.04E-4	red	5.09E-5	4.89E-5	nir	3.94E-6	3.94E-6 (unchanged)	
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blue	4.26E-6	5.67E-6																
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red	5.09E-5	4.89E-5																
nir	3.94E-6	3.94E-6 (unchanged)																
F09_0019 (aerosol), F06_0019 (land)	02/21/2006	<p>Version number is incremented due to bug fixes in the Level-2 TC Stereo and Classifiers products, which impact the Level-2 Aerosol / Surface cloud screening algorithm.</p> <p>Analysis of the effect of these changes, in the aerosol and land surface retrievals, indicates no significant impact to the overall science data quality.</p>																
F09_0018 (aerosol), F06_0018 (land)	12/1/2005	<p>Data Product Specification Rev N (PDF).</p> <p>AEROSOL:</p> <p>Updated component particle fractional amounts in ACP mixture file. Changed cloud screening logic, for polar scenes only, such that ASCM value "ClearLC", and SDCM value "NearSurfaceLC" are both considered cloudy, rather than clear.</p> <p>New ancillary files:</p> <p>MISR_AM1_ACP_MIXTURE_F05_0020.hdf MISR_AM1_AS_SCI_CONFIG_F09_0017.txt</p>	<p>LAND:</p> <p>Stage 1 Validated: MRPV (BRFModParam), NDVI; LAI and FPAR (excluding needleleaf forest)</p>															
F09_0017 (aerosol), F06_0017 (land)	5/13/2005	<p>Data Product Specification Rev M (PDF).</p> <p>AEROSOL:</p> <p>The cloud screening logic is updated to improve discrimination between clouds and snow/ice in polar regions. Input to the aerosol retrieval is now limited to the view area of the nadir camera. This eliminates some cloud screening problems at the swath edges. Reporting of RetrAppMask and RegClassInd is expanded to include locations where no retrieval is attempted. Coverage of BestEstimate fields is improved by using a 3x3 regional averaging algorithm to fill gaps where retrievals are missing. The BestEstimateQA flag value 2 is reported where 3x3 regional averaging was used. Renamed "BestFit" to "LowestResid" in aerosol product field names. Use new histogram based algorithm for calculating single-scatter albedo (SSA). This affects values calculated for the following fields: RegMeanSpectralSSA, RegStDevSpectralSSA, RegBestEstimateSpectralSSA, RegBestEstimateSpectralSSAUnc Use new histogram based algorithm for calculating spherical/nonspherical fractional amounts. This affects values calculated for particle types 4 (spherical) and 5 (nonspherical) for the following fields: RegMeanSpectralOptDepthFraction, RegStDevSpectralOptDepthFraction, RegMeanNumberFraction, RegStDevNumberFraction, RegMeanVolumeFraction, RegStDevVolumeFraction, RegBestEstimateSpectralOptDepthFraction, RegBestEstimateSpectralOptDepthFractionUnc, RegBestEstimateNumberFraction, RegBestEstimateNumberFractionUnc, RegBestEstimateVolumeFraction, RegBestEstimateVolumeFractionUnc Added new "HistogramCounts" and "HistogramMeans" fields for single-scattering albedo (SSA); and nonspherical fractions, including optical depth fraction, number fraction, and volume fraction. Removed the following median particle property fields: RegMedianAngstromExponent, RegMedianSpectralSSA, RegMedianSpectralOptDepthFraction, RegMedianNumberFraction, RegMedianVolumeFraction.</p> <p>LAND:</p> <p>Fixed major bug in MRPV retrieval code, affecting calculation of the following parameters: BRFModParam1, BRFModParam2, and BRFModParam3. See the L2 AS Products Quality Summary for more information. Input to the surface retrieval is now limited to the view area of the nadir camera. This eliminates some undesirable edge artifacts in the surface retrievals. The following geometric parameter fields are added to the land surface product: SolZenAng, ViewZenAng, RelViewCamAziAng, ScatterAng, and GlitterAng.</p> <p>New ancillary files:</p> <p>MISR_AM1_CART_F01_0002.hdf</p>																

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F08_0016 (aerosol), F05_0016 (land)	11/28/2004	<p>Data Product Specification Rev L (PDF).</p> <p>AEROSOL:</p> <p>Mixture equivalent reflectance (RegBestFitMixtureEqRefI) is now reported. Previously this field was present, but contained only fill value. The content of the APOP and mixture files is now copied into the aerosol product in new Vgroups named "Component Particles Information" and "Mixture Information". Included with this information are new metadata attributes containing text format tables that provide a summary of the component particle properties and mixture properties. Fixed minor bug in the calculation of subregional variability (SubrVar), occurring only at locations where ellipsoid or terrain data quality indicator (RDQI) is 1, which is very rare.</p> <p>LAND:</p> <p>HDRF uncertainty is now reported for each camera and band, rather than averaged over cameras. A new field LandHDRFUnc is added. The old field LandHDRFUncCamAvg is removed. Fixed bug in calculation of BHR uncertainty (LandBHRRelUnc), occurring only at locations where fewer than nine cameras are available. BHR uncertainty is unchanged at locations where all nine cameras are available.</p> <p>New ancillary files:</p> <p>MISR_AM1_ACP_APOP_F05_0014.hdf MISR_AM1_ACP_MIXTURE_F05_0019.hdf</p>	<p>LAND:</p> <p>Stage 1 Validated: surface radiative parameters: BRF, HDRF, DHR, and BHR</p>
F07_0015 (aerosol), F04_0015 (land)	02/04/2004	<p>Data Product Specification Rev K (PDF).</p> <p>AEROSOL:</p> <p>Additional parameters - aerosol product: single-scattering albedo parameters; aerosol particle size and shape fractional amounts reported by spectral optical depth, by number, and by volume; median Angstrom exponent over a region; best estimates for spectral optical depth, Angstrom exponent, single-scattering albedo, and aerosol particle size and shape fractions; new QA field, RegBestEstimateQA, reporting how best estimates were calculated. Fix minor bug in computation of RegStDevAngstromExponent.</p> <p>LAND:</p> <p>Fix bug in LAIBestEstimateQA so that bad sun/view geometry is reported as 4 instead of 253.</p> <p>New ancillary files:</p> <p>MISR_AM1_ACP_APOP_F04_0005.hdf MISR_AM1_ACP_MIXTURE_F04_0007.hdf</p>	<p>AEROSOL:</p> <p>Beta: aerosol single-scattering albedo, aerosol particle size and shape fractional amounts</p>
F07_0014 (aerosol), F04_0014 (land)	12/08/2003	<p><i>Versions F07_0014 and F04_0014 were removed from the archive because they contained radiometric errors.</i> Do not use!</p>	
F06_0013 (aerosol), F04_0013 (land)	8/13/2003	<p>Data Product Specification Rev J (PDF).</p> <p>AEROSOL:</p> <p>Added Angstrom exponent fields Reorganize parameters in science configuration file to improve readability. Add An camera acquisition time to per-block metadata. Add product version number attribute to ECS core metadata.</p> <p>LAND:</p> <p>Additional fields: biome type, biome and LAI best estimate fields, flag legend vdatas FPAR, BHRPAR and DHRPAR fields changed from regional to subregional resolution, and update fields in land surface QA file accordingly. Fix bug in reporting of LAI saturation condition, and change type of LAIDelta1 and LAIDelta2 from integer to float. Change criterion for selecting biome type for FPAR calculation: use biome with smallest LAI coefficient of variation (= LAIDelta2 /LAIMean2) instead of LAIDelta2. Add An camera acquisition time to per-block metadata. Add product version number attribute to ECS core metadata.</p> <p>New ancillary files:</p> <p>MISR_AM1_AS_SCI_CONFIG_F08_0015.txt</p>	<p>AEROSOL:</p> <p>Beta: aerosol Angstrom exponent</p> <p>LAND:</p> <p>Provisional: BHRPAR and DHRPAR</p>
F05_0012 (aerosol), F03_0012 (land)	1/26/2003	<p>Data Product Specification Rev I (PDF).</p> <p>AEROSOL:</p> <p>Add stricter constraint to aerosol retrievals over heterogeneous surfaces.</p> <p>LAND:</p> <p>Fix bug which caused some FPAR values to be reported with anomalously high values.</p>	<p>AEROSOL:</p> <p>Stage 2 Validated: aerosol optical depth over heterogeneous surfaces and dark water</p>

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		<p>New ancillary files:</p> <p>MISR_AM1_AS_SCI_CONFIG_F07_0014.txt</p>	
F05_0011 (aerosol), F03_0011 (land)	11/27/2002	<p>Data Product Specification Rev H (PDF). Many updates incorporated into aerosol and land surface products. For details, see Release Description L2 AS V2.2_i6.</p> <p>New ancillary files:</p> <p>MISR_AM1_AS_SCI_CONFIG_F06_0011.txt</p>	AEROSOL and LAND: Provisional: LAI and FPAR
F04_0010 (aerosol), F02_0010 (land)	11/12/2002	<p>Data Product Specification Rev G (PDF).</p> <p>AEROSOL:</p> <p>Add Level 1 orbit-QA flag to product.</p> <p>LAND:</p> <p>Add Level 1 orbit-QA flag to product.</p>	
F03_0009 (aerosol), F01_0009 (land)	09/25/2002	<p>Data Product Specification Rev F (PDF).</p> <p>New ancillary files:</p> <p>MISR_AM1_AS_SCI_CONFIG_F05_0009.txt</p>	AEROSOL and LAND: Beta: LAI and FPAR parameters
F03_0008 (aerosol), F01_0008 (land)	06/26/2002	<p>Data Product Specification Rev F (PDF).</p> <p>AEROSOL:</p> <p>The calculation of optical uncertainty over heterogeneous surfaces was modified. The calculation of chisquare-geometric was modified. Determination of a region's suitability for the algorithm to retrieve aerosols over heterogeneous surfaces was changed: instead of using a surface contrast threshold, a new test is used which is based on a weighted mean equivalent reflectance threshold. A regional angular correlation screening test was added to aerosol retrievals over land. Success of aerosol retrievals over land is now dependent upon the spread in optical depths retrieved per band. Minor field name changes were implemented in the aerosol QA file and the aerosol flag legends vdata.</p> <p>LAND:</p> <p>Two parameters (chisquare-smooth and HDRF uncertainty) were modified to remove their dependency upon the ARP.</p> <p>New ancillary files:</p> <p>MISR_AM1_AS_SCI_CONFIG_F05_0007.txt MISR_AM1_CART_F01_0001.hdf</p>	<p>AEROSOL:</p> <p>Beta: Aerosol parameters retrieved using algorithm for homogeneous surfaces. Provisional: All aerosol parameters except those retrieved using algorithm for homogeneous surfaces.</p> <p>LAND:</p> <p>Beta: Land surface radiation parameters for PAR spectral regions. Provisional: All land surface radiation parameters except those for PAR spectral regions.</p>
F03_0007 (aerosol), F01_0007 (land)	04/15/2002	<p>Data Product Specification Rev E (PDF). Major upgrade to Level 2 aerosol product, incorporating several changes and additions. For details, see Release Description L2 AS V2.2.</p> <p>New ancillary files:</p> <p>MISR_AM1_ACP_MIXTURE_F03_0006.hdf MISR_AM1_ACP_APOP_F03_0004.hdf MISR_AM1_AS_SCI_CONFIG_F04_0006.txt</p>	
F02_0006 (aerosol), F01_0006 (land)	09/27/2001	<p>Data Product Specification Rev D (PDF). Major upgrade to Level 2 aerosol product, incorporating several changes and additions. For details, see Release Description L2 AS V2.1.4.</p> <p>New ancillary files:</p> <p>MISR_AM1_AS_SCI_CONFIG_F03_0003.txt</p>	
F01_0005 (aerosol & land)	06/14/2001	Increase accuracy of numerical constants involving pi, in order to fix numerical error occurring over international dateline crossing.	
F01_0004 (aerosol & land)	03/30/2001	<p>AEROSOL:</p> <p>Replace illegal value (0) found in AerCompModId field of aerosol product with valid fill value (253).</p> <p>LAND:</p>	

Ver. #	Production Start Date	Product Updates	Quality Transition
		Fix bug affecting BRF fields in land surface product so that correct fill values (253 and 65533) are used instead of incorrect values (126 and 0).	
Baseline: F01_0003 (aerosol)	02/16/2001	<p>Initial baseline for all Level 2 Aerosol/Surface products available for public release.</p> <p>New ancillary files:</p> <p>MISR_AM1_ACP_APOP_F02_0002.hdf MISR_AM1_ACP_MIXTURE_F02_0003.hdf MISR_AM1_AGP_Pxxx_F01_24.hdf MISR_AM1_ARP_INFLTCAL_T006_F02_0001.hdf MISR_AM1_ARP_CONFIG_F02_0002.hdf MISR_AM1_ARP_PRFLTCAL_F02_0004.hdf MISR_AM1_ARP_PRFLTCHAR_F02_0002.hdf</p>	<p>AEROSOL and LAND:</p> <p>Beta: all aerosol parameters, all land surface radiation parameters</p>