

CERES Edition3 Production Processing Summary

1.0 CERES Edition3 Data Record

The CERES Edition3 data record for the single satellite products, BDS, ES8, ES4, ES9, SSF, and SFC, begins at Terra launch, March 2000. The data record for the Edition3 merged satellite products, SYN1deg-3Hour, SYN1deg-M3Hour, and SYN1deg-Month, begins with the Aqua launch, July 2002.

2.0 Input Data

The primary input data sets used for CERES Edition3 processing are identified in Table 1.

Table 1. Edition3 Input Data Sets

Input Data Set	Input Data Set Version		Dates
Instrument Gains	Edition 3		Full Edition3 data record
Spectral Response Functions	Scene Information based on Edition2 SSF		Launch through 6/10
	Scene Information based on Edition1-CV SSF		7/10 forward
Cloud Properties	Terra	Edition2B SSF Cloud Property Values Edition3 IES MODIS Collection4 Clouds GMAO GEOS4	Launch (3/00) through 7/06
		Edition2F SSF Cloud Property Values Edition3 IES MODIS Collection5 Clouds GMAO GEOS4	7/06 through 12/07
		Edition2G SSF Cloud Property Values Edition3 IES MODIS Collection5 Clouds GMAO G5-CERES	12/07 through 6/10
		Edition1-CV values generated by frozen Edition2G software Edition1-CV IES MODIS Collection5 Clouds GMAO G5-CERES	7/10 forward
	Aqua	Edition2B SSF Cloud Property Values Edition3 IES MODIS Collection4 Clouds GMAO GEOS4	Launch (7/02) through 4/06
		Edition2C SSF Cloud Property Values Edition3 IES MODIS Collection5 Clouds, GMAO GEOS4	1/06 5/06 through 12/07
		Edition2D SSF Cloud Property Values Edition3 IES MODIS Collection5 Clouds GMAO G5-CERES	12/07 through 6/10

Table 1. Edition3 Input Data Sets

Input Data Set	Input Data Set Version	Dates
	Edition1-CV values generated by frozen Edition2D software Edition1-CV IES MODIS Collection5 Clouds GMAO G5-CERES	7/10 forward
MOA	Reuse of archived Edition2 values:	
	GEOS4	3/00 through 12/07
	CERES-G5	12/07 forward
GGEO	Edition2A	7/02 through 2/10
	GGEO files for months beginning with November 2005 were processed at the SCF and delivered to the ASDC with the filenaming convention: CER_GGEO_Composite_CALIB_000000.yyyymm	

3.0 CERES Edition3 Output Data

Not all of the CERES output products produced for Edition2 are produced for Edition3. In addition, the Edition3 version of selected output products contain data only for the instruments designated as in preferred cross track mode.

The generation of the ERBE-like products are a lower priority and are scheduled for production after the 2011 CERES Senior Review.

Table 2 lists the data dates for the CERES Edition3 data products on an instrument basis, along with processing status.

Figure 1 depicts the Edition3 processing flow from launch through June 2010, for which Edition2 SSF files are used as input for Edition3 Inversion processing. Figure 2 illustrates the flow for dates beyond June 2010, for which Edition1-CV SSF files are used as input to Edition3 Inversion processing.

3.1 Use of Cross Track Data Only for SFC Product and Impact on SSF Processing

Unlike the Edition2 SFC data sets, only data for the preferred cross track instrument will be produced for the Edition3 SFC products. For Terra, the preferred cross track instrument alternates between FM1 and FM2 prior to March 2006. From March 2006 forward, FM1 is consistently the preferred Terra cross track instrument. Similarly for Aqua, the preferred cross track instrument alternates up through March 2005, but the FM3 instrument is consistently the preferred cross track from April 2005 forward.

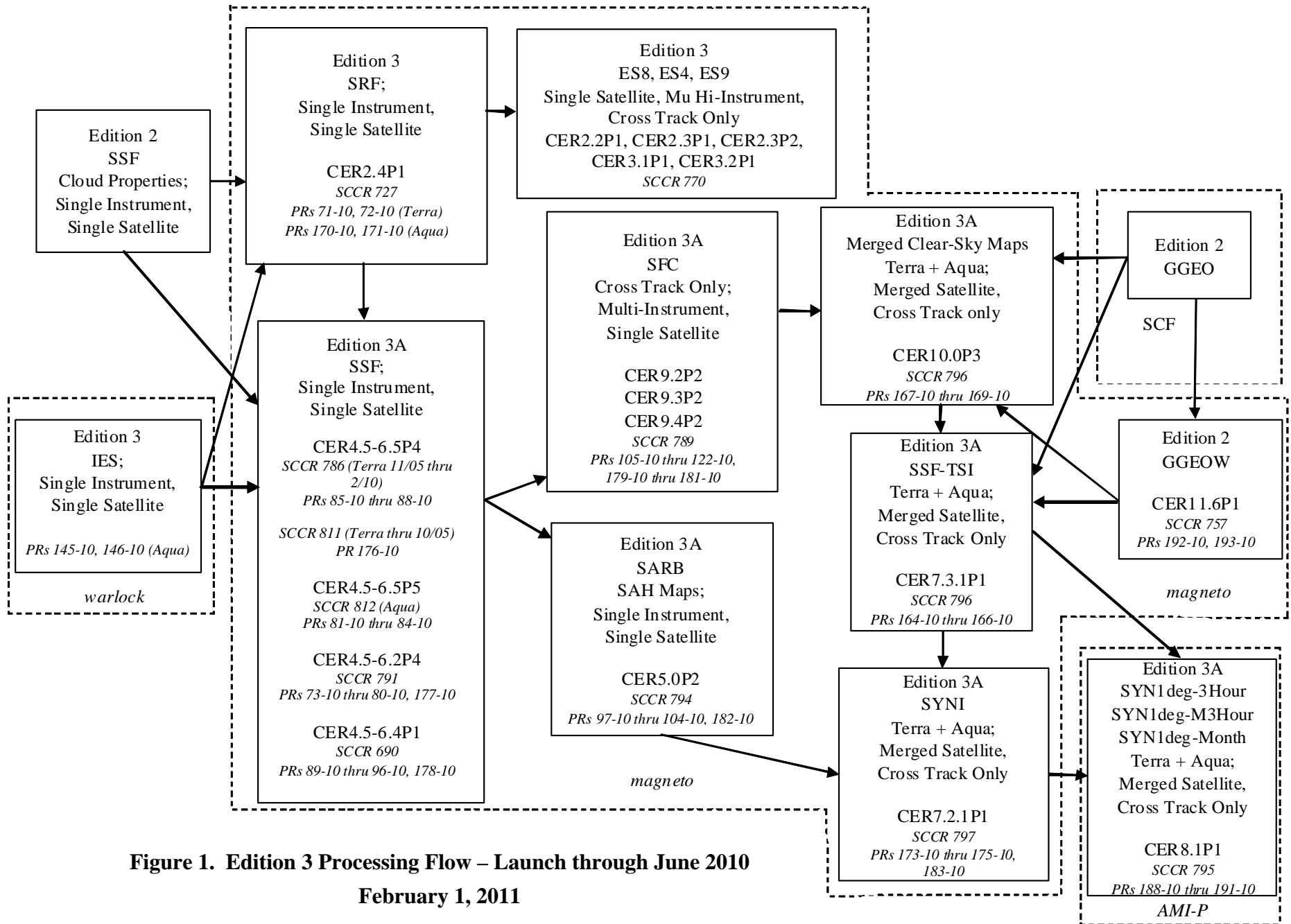
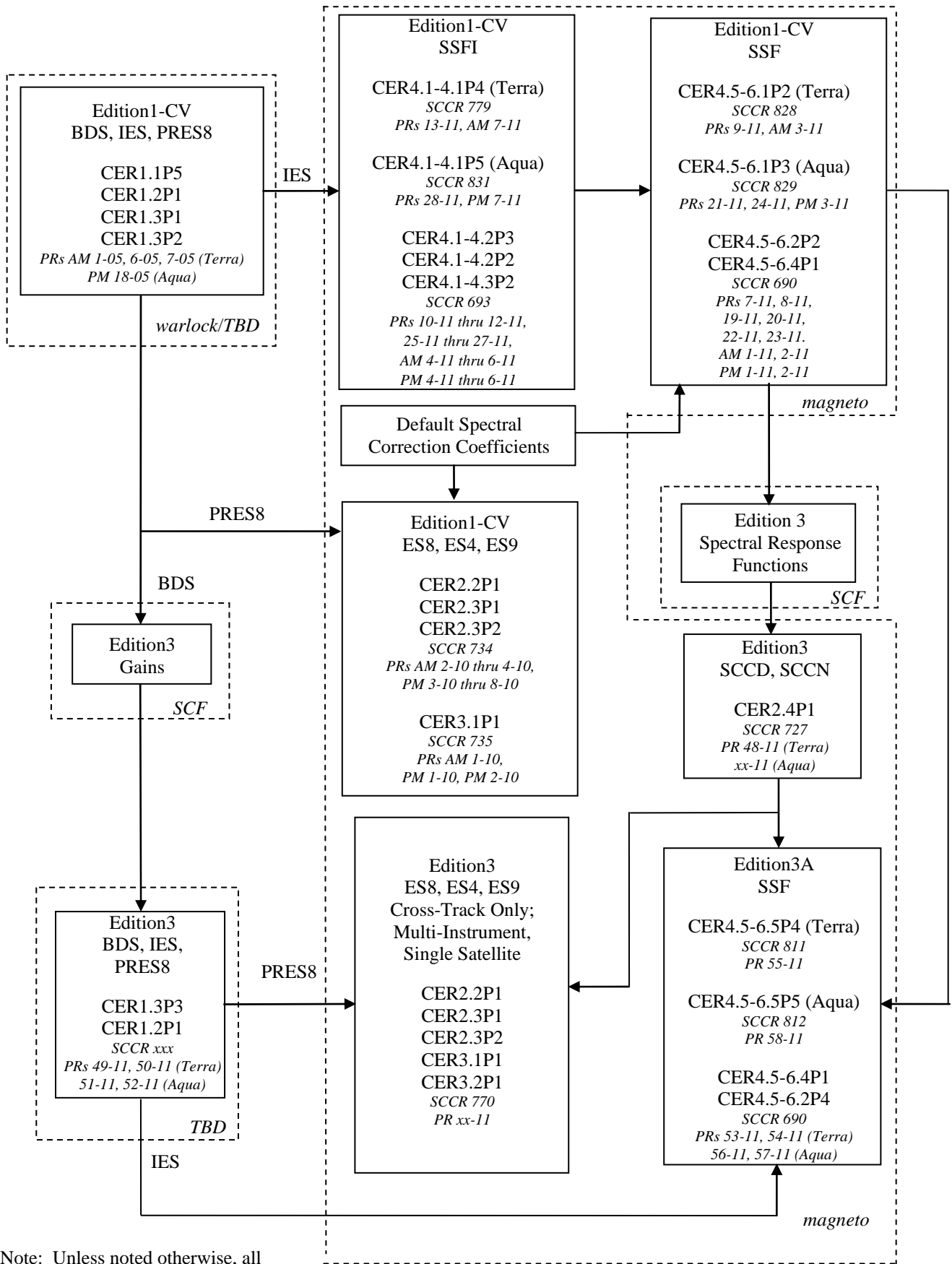


Figure 1. Edition 3 Processing Flow – Launch through June 2010

February 1, 2011



Note: Unless noted otherwise, all processing in this diagram is for single satellite, single instrument

Figure 2.

While SSF data will eventually be produced for all four instruments through March 1, 2010, only the FM1 data from March 2006 and FM3 data from April 2005 will be processed initially in order to reduce the number of input files that must be staged in the production environment and thus expedite production processing. For dates prior to these and later than March 2010, the SSF product will be produced for both instruments from both satellites. The remaining months for FM2 and FM4 after these dates will be processed after the 2011 CERES Senior Review.

3.2 Production of Overlap Months

To explain any possible discontinuities whenever an algorithm update occurred for a major input data set, one data month is processed through the CERES software twice. The selected month is processed once with input data produced with the original algorithms, and again with input data produced using the updated algorithms. This approach allows for a comparison of the two versions that isolates the impacts of the change to the input data.

July 2006 for Terra and January 2006 for Aqua are overlap months, processed once with MODIS Collection 4 cloud properties and again with MODIS Collection 5 properties. December 2007 for both Terra and Aqua is another overlap month, processed once with MOA files produced from GMAO's GEOS4 data set, and again with MOA files produced from GMAO's G5-CERES data set.

3.3 Production of Overlap Days

While overlap months are processed for major changes to the processing system, such as the changes in input data discussed in Section 3.2, overlap days are processed for more minor changes to the processing system. While changes to the algorithms that would result in discontinuities in the data record are not permitted within a data set, occasional modifications to the production software are necessary to enable successful processing under certain conditions. Whenever this occurs, the CC number portion of the filename is modified to indicate a change has occurred. The CC numbers for Edition3 processing are discussed in Section 4.2.

Processing for a month of the CERES SFC product requires input data for the last 12 hours of the previous month and the first 12 hours of the succeeding month. All input data for a month of SFC processing needs to be generated with a consistent set of input data as well as generated by the same version of software. To ensure that these conditions are met whenever a change is necessary to produce the input data, overlap days are processed once with the original software, and then again with the updated software.

Table 2. CERES Edition3 Output Products, Data Record, and Processing Status

Subsystem	Output Products	CERES Instrument Processed	Dates Processed	Processing Status
Instrument	Edition3 BDS, IES	FM1, FM2	2/28/2000 forward	In Progress
		FM3, FM4	6/18/2002 forward	In Progress
ERBE-like	Edition3 SCCD/SCCN	FM1, FM2	3/00 forward	In Progress
		FM3	7/02 forward	In Progress
		FM4	7/02 – 3/05	Complete
ERBE-like	Edition3 ES8, ES4, ES9	Terra *	2/28/2000 forward	Beginning 10/2011
		Aqua *	6/18/2002 forward	Beginning 10/2011
Inversion	Edition3A SSF	FM1	2/28/2000 forward	In Progress
			6/30/2010 forward	In Progress
		FM2	3/2000 – 3/2006	In Progress
			3/2/2006 – 7/1/2010	Beginning 12/2011
		FM3	7/2/2002 forward	In Progress
		FM4	7/2/2002 – 3/30/2005	In Progress
4/1/2005 forward	Beginning 12/2011			
Inst. SARB	Edition3A Surface Albedo History (SAH) Map	FM1	3/2000 forward	In Progress
		FM2	3/2000 – 2/2006	In Progress
			3/2006 forward	Beginning 12/2011
		FM3	7/2002 forward	In Progress
		FM4	7/2002 – 3/2005	In Progress
6/2010 forward	Beginning 12/2011			
TISA Grid	Edition3A SFC	Terra *	2/28/2000 forward	In Progress
		Aqua *	6/18/2002 forward	In Progress
TISA Avg	Edition3A TSI	Merged *	7/2002 forward	In Pre-Op Testing
Syn SARB	Edition3A SYNI	Merged *	7/2002 forward	In Pre-Op Testing
TISA Avg	Edition3A SYN1deg-3Hour SYN1deg-M3Hour SYN1deg-Month	Merged *	7/2002 forward	In Pre-Op Testing

* Uses only data from the instrument designated as being in preferred cross track mode

4.0 Output Product Naming Conventions

4.1 Production Strategy and Sampling Strategy

The Edition3 output production and sampling strategies will remain constant throughout the Edition3 data record. These strategy values are listed in Table 3.

Table 3. CERES Edition3 Production and Sampling Strategies

Product Name	Production Strategies	Sampling Strategies
BDS, IES	Edition3 Ed3-NoSW (FM4 after 3/30/2005)	Terra-FM1, Terra-FM2 Aqua-FM3, Aqua-FM4
SCCD/SCCN	Edition3 Ed3-NoSW (FM4 after 3/30/2005)	Terra-FM1, Terra-FM2 Aqua-FM3, Aqua-FM4
ES8	Edition3 Ed3-NoSW (FM4 after 3/30/2005)	Terra, Aqua
ES4, ES9 (single satellite)	Edition3	Terra, Aqua
ES4, ES9 (multi-satellite)	Edition3	FM1+FM3
SSF	Edition3A	Terra-FM1-MODIS, Terra-FM2-MODIS Aqua-FM3-MODIS, Aqua-FM4-MODIS
SFC	Edition3A	Terra-MODIS, Aqua-MODIS
TSI	Edition3A	Terra-Aqua-MODIS
SYNI	Edition3A	Terra-Aqua-MODIS
SYN1deg-3Hour SYN1deg-M3Hour SYN1deg-Month	Edition3A	Terra-Aqua-MODIS

4.2 Configuration Codes

4.2.1 Association Between Launch through June 2010 Edition2 Production Strategies and Edition3 Configuration Codes for SSF and Subsequent Level 3 Products

The corresponding Edition2 SSF products for Terra defined the output Production Strategy as Edition2B from launch through July 2006, as Edition2F for May 2006 through December 2007, and as Edition2G for December 2007 (overlap month) through June 2010. For Aqua the Production Strategy definitions were Edition2B from launch through April 2006, as Edition2C for May 2005 through December 2007, and as Edition2D for December 2007 (overlap month) through June 2010. For Edition3, the output Production Strategy is expected to remain as Edition3A from launch forward. To denote when the changes occurred in the input data that drove the differences in the Edition2 Production Strategies, the first three digits of the output CC number are modified instead. “300” corresponds to Edition2B, “301” corresponds to Edition2F

(Terra) and Edition2C (Aqua), and “302” corresponds to Edition2G (Terra) and Edition2D (Aqua).

4.2.2 Association Between July 2010 Edition1-CV and Edition3A Configuration Codes for SSF and Subsequent Level 3 Products

The Edition3 Spectral Response Functions require scene information obtained from the Edition2 SSF product. As production of the Edition2 SSF product for public distribution beyond June 2010 is not expected, an alternative approach was developed. With this alternative approach, the SSF product is generated using the Edition2 software with Edition1-CV IES data as input, resulting in the Edition1-CV SSF product. The Edition1-CV SSF product provides the necessary scene information for Edition3 spectral response function development.

The first three digits of the CC number for CERES products produced from July 2010 forward is set to “303” to indicate a change in the input data used to produce the spectral response function.

4.2.3 Impact on CC Numbers Due to Software Modifications Identified After Production Processing Began

4.2.3.1 Terra SSF, SFC, and SAH

After Edition3A SSF processing began for Terra, a software modification to the Terra Inversion Main-Processor was identified that was necessary to process the data from launch through October 2005. Terra data from November 2005 through March 1, 2010 (preferred crosstrack) were not impacted, and thus those data were processed with the software already promoted to production under SCCR 786 with CC numbers 300300, 301300 and 302300. The modified software was delivered under SCCR 811, necessitating a bump in the last three digits of the output CC number. The Terra data from launch through October 2005 under SCCR 811 were therefore processed with the CC number 300301. Terra data from the non-preferred crosstrack instrument, for which processing was deferred, will also be produced with the software delivered under SCCR 811. The output CC numbers for the SFC and SAH products are consistent with the input SSF CC number.

As no Edition3A Aqua SSF products were produced yet when the need for this modification was identified, the need for bumping the last three digits of the CC number to “301” did not exist for the Aqua products. The CC numbers for the merged satellite products, TSI, SYNI, and SYN/AVG/ZAVG, are consistent with those of the Aqua products.

4.2.3.2 Aqua Spectral Response Functions

The Terra Edition3 Spectral Correction Coefficients were produced before the Aqua coefficients. Before the Aqua coefficients were produced, the need for a modification to the ERBE-like software was identified and modified software for PGE CER 2.4P1 was delivered under SCCR 806. As no Aqua coefficients had been produced at this point, and the Terra coefficients were not affected, it was decided to not bump the output CC number even though the software used for Aqua processing differed from that used for Terra processing.

Table 4 provide the CERES Edition3 output configuration codes for each product, as well as the associated data dates, producing PGEs, SCCR number, and PR numbers.

Table 4. CERES Edition3 Output Product CC Numbers

Product Names	Satellite	CC Number	Dates	PGEs	SCCR	PRs
BDS, IES	Terra	032034	2/28/2000 – 3/1/2010	1.3P3, 1.2P1	627	64-09 65-09 127-09 128-09
			3/2/2010 – 12/1/2010	1.3P3, 1.2P1	627	49-11 50-11
			12/2/2010 – 11/1/2011	1.3P3, 1.2P1	627	77-11, 78-11
	Aqua	032034	6/18/2002 – 3/1/2010	1.3P3, 1.2P1	627	145-10 146-10
			3/2/2010 – 12/1/2010	1.3P3, 1.2P1	627	51-11 52-11
			12/2/2010 – 11/1/2011	1.3P3, 1.2P1	627	79-11, 80-11
SCCD, SCCN	Terra	300300	3/2000 – 2/2010	2.4P1	727	71-10 72-10
			3/2010 – 11/2010	2.4P1	727	48-11
			12/2010	2.4P1	727	86-11
	Aqua	300300	7/2002 – 2/2010	2.4P1	806	170-10 171-10 184-10
			3/2010 – 12/2010	2.4P1	727	76-11
ES8, ES4, ES9	Terra	300300	3/2000 – 12/2010	2.2P1, 2.3P1, 2.3P2 3.1P1	770	
	Aqua	300300	3/2000 – 12/2010	2.2P1, 2.3P1, 2.3P2 3.1P1	770	
	Merged (FM1+FM3)	300300	7/2002 – 12/2010	3.2P1	770	
SSF, SFC, SAH	Terra	300301	3/1/2000 – 11/1/2005	4.5-6.5P4	811	176-10
				4.5-6.2P4	791	177-10

Table 4. CERES Edition3 Output Product CC Numbers

Product Names	Satellite	CC Number	Dates	PGEs	SCCR	PRs
SSF, SFC, SAH			3/2000 – 10/2005	9.2P2	789	181-10
				4.5-6.4P1	690	178-10
				9.3P2	789	180-10
				9.4P2	789	179-10
				5.0P2	794	182-10
		300300	10/31/2005 – 8/1/2006	4.5-6.5P4	786	87-10 88-10
				4.5-6.2P4	791	79-10 80-10
				9.2P2	789	122-10
			11/2005 – 7/2006	4.5-6.4P1	690	95-10 96-10
				9.3P2	789	121-10
				9.4P2	789	120-10
				5.0P2	794	103-10 104-10
				301300	6/30/2006 – 1/1/2008	4.5-6.5P4
		4.5-6.2P4	791			78-10
		9.2P2	789			119-10
			7/2006 – 12/2007	4.5-6.4P1	690	94-10
				9.3P2	789	118-10
				9.4P2	789	117-10
				5.0P2	794	102-10
		301301	1/1/2006 – 1/31/2006 4/30/2006 - 7/1/2006	4.5-6.5P4	811	166-11
				4.5-6.2P4	791	165-11
				9.2P2	789	163-11
			1/2006 5/2006 - 6/2006	4.5-6.4P1	690	164-11
				9.3P2	789	162-11
		9.4P2		789	161-11	
		302300	11/30/2007 – 3/1/2010	4.5-6.5P4	786	85-10
				4.5-6.2P4	791	77-10
				9.2P2	789	116-10
			12/2007 – 2/2010	4.5-6.4P1	690	93-10
				9.3P2	789	115-10
9.4P2	789			114-10		

Table 4. CERES Edition3 Output Product CC Numbers

Product Names	Satellite	CC Number	Dates	PGEs	SCCR	PRs	
(Continued)		302301	1/2008 – 2/2010	5.0P2	794	101-10	
			2/28/2010 – 7/1/2010	4.5-6.5P4	811	38-11	
				4.5-6.2P4	791	37-11	
		9.2P2		789	44-11		
		3/2010 – 6/2010	4.5-6.4P1	690	36-11		
			9.3P2	789	43-11		
			9.4P2	789	42-11		
			5.0P2	794	67-11		
		303301	6/30/2010 – 12/1/2010	4.5-6.5P4	811	55-11	
				4.5-6.2P4	791	54-11	
				9.2P2	789	61-11	
			7/2010 – 11/2010	4.5-6.4P1	690	53-11	
				9.3P2	789	60-11	
				9.4P2	789	59-11	
				5.0P2	794	65-11	
			12/2/2010 – 1/1/2010	4.5-6.5P4	811	75-11	
				4.5-6.2P4	791	74-11	
				9.2P2	789	72-11	
			12/2010	4.5-6.4P1	690	73-11	
				9.3P2	789	71-11	
		9.4P2		789	70-11		
		5.0P2		794	69-11		
		Aqua Aqua (Continued)	300300	7/2/2002 – 5/1/2006	4.5-6.5P5	812	83-10 84-10
					4.5-6.2P4	791	75-10 76-10
	9.2P1				789	113-10	
	7/2002 – 4/2006			4.5-6.4P1	690	91-10 92-10	
				9.3P2	789	112-10	
				9.4P2	789	111-10	
	7/2002 – 4/2006		5.0P2	794	99-10 100-10		
	301300		1/1/2006 -1/31/2006 4/30/2006 – 1/1/2008	4.5-6.5P5	812	82-10	
				4.5-6.2P4	791	74-10	

Table 4. CERES Edition3 Output Product CC Numbers

Product Names	Satellite	CC Number	Dates	PGEs	SCCR	PRs
			1/2006 5/2006 – 12/2007	9.2P2	789	110-10
				4.5-6.4P1	690	90-10
				9.3P2	789	109-10
				9.4P2	789	108-10
				5.0P2	794	98-10
		302300	11/30/2007 – 3/1/2010	4.5-6.5P5	812	81-10
				4.5-6.2P4	791	73-10
				9.2P2	789	107-10
		302300	12/2007 – 2/2010	4.5-6.4P1	690	89-10
				9.3P2	789	106-10
				9.4P2	789	105-10
				5.0P2	794	97-10
		303300	6/30/2010 – 1/1/2011	4.5-6.5P5	812	58-11
				4.5-6.2P4	791	57-11
				9.2P2	789	64-11
			303300	7/2010 – 12/2010	4.5-6.4P1	690
9.3P2	789				63-11	
9.4P2	789				62-11	
TSI SYNI SYN1deg-3Hour SYN1deg-M3Hour SYN1deg-Month	Terra+Aqua	300300	7/2002 – 4/2006	7.3.1P1	796	166-10
				10.0P3		169-10
				7.2.1P1	797	175-10 183-10
				8.1P1	795	191-10
		301300	1/2006 5/2006 – 12/2007	7.3.1P1	796	165-10
				10.0P3		168-10
				7.2.1P1	797	174-10
				8.1P1	795	189-10 190-10
		302300	12/2007 – 6/2010	7.3.1P1	796	164-10 167-11
				10.0P3		167-10 168-11
				7.2.1P1	797	173-10
				8.1P1	795	188-10

Table 4. CERES Edition3 Output Product CC Numbers

Product Names	Satellite	CC Number	Dates	PGEs	SCCR	PRs
		303300	7/2010 – 12/2010	7.3.1P1	796	83-11
				10.0P3		84-11
				7.2.1P1	797	82-11
				8.1P1	795	81-11

5.0 Processing Platforms

Multiple computing platforms were used in the production of the CERES Edition3 data products. The products and their processing platforms are identified in Table 5.

Table 5. Processing Platforms for CERES Edition3 Data Products

Product Name	Processing Platform
BDS, IES	SGI - <i>warlock</i>
SCCD, SCCN	IBM P4 - <i>magneto</i>
ES8, ES4, ES9	IBM P6 - <i>AMI</i>
SSF	IBM P4 - <i>magneto</i>
SFC	IBM P4 - <i>magneto</i>
SAH	IBM P4 - <i>magneto</i>
TSI	IBM P4 - <i>magneto</i>
SYNI	IBM P4 - <i>magneto</i>
SYN1deg-3Hour, SYN1deg-M3Hour, SYN1deg-Month	IBM P6 - <i>AMI</i>