

SSM/I Basefiles

(the pursuit of a FCDR)

*Jay Hnilo, Wesley Berg,
Chris Kummerow and Matt Sapiano*

Why are we doing this?

- 1) Format readability, self describing format and machine independent
 - 1) This means a network Common Data Form (netCDF) format.
We will use netcdf 3.0.
- 2) Granularization of all files by ascending node.
 - 1) Remove duplication of data
 - 2) Will make empty granules for missing data
 - 3) We will establish a uniform data structure. facilitating ease of processing
- 3) Added the Ephemeris for each and every scan time
 - 1) Critical for later work on geo-location issues
- 4) Put forth a Modular Stewardship Code (presently written in C) to translate Basefiles to FCDR and will be made publicly available

Our thoughts on the methodology

Step 1

Original TDR files



NC1 (temp file)

- Using the TLE files we added a new Ephemeris calculation

Step 2

NC1 (temp file)



Basefiles

- We granularize the files by the ascending node

Step 3

Basefiles

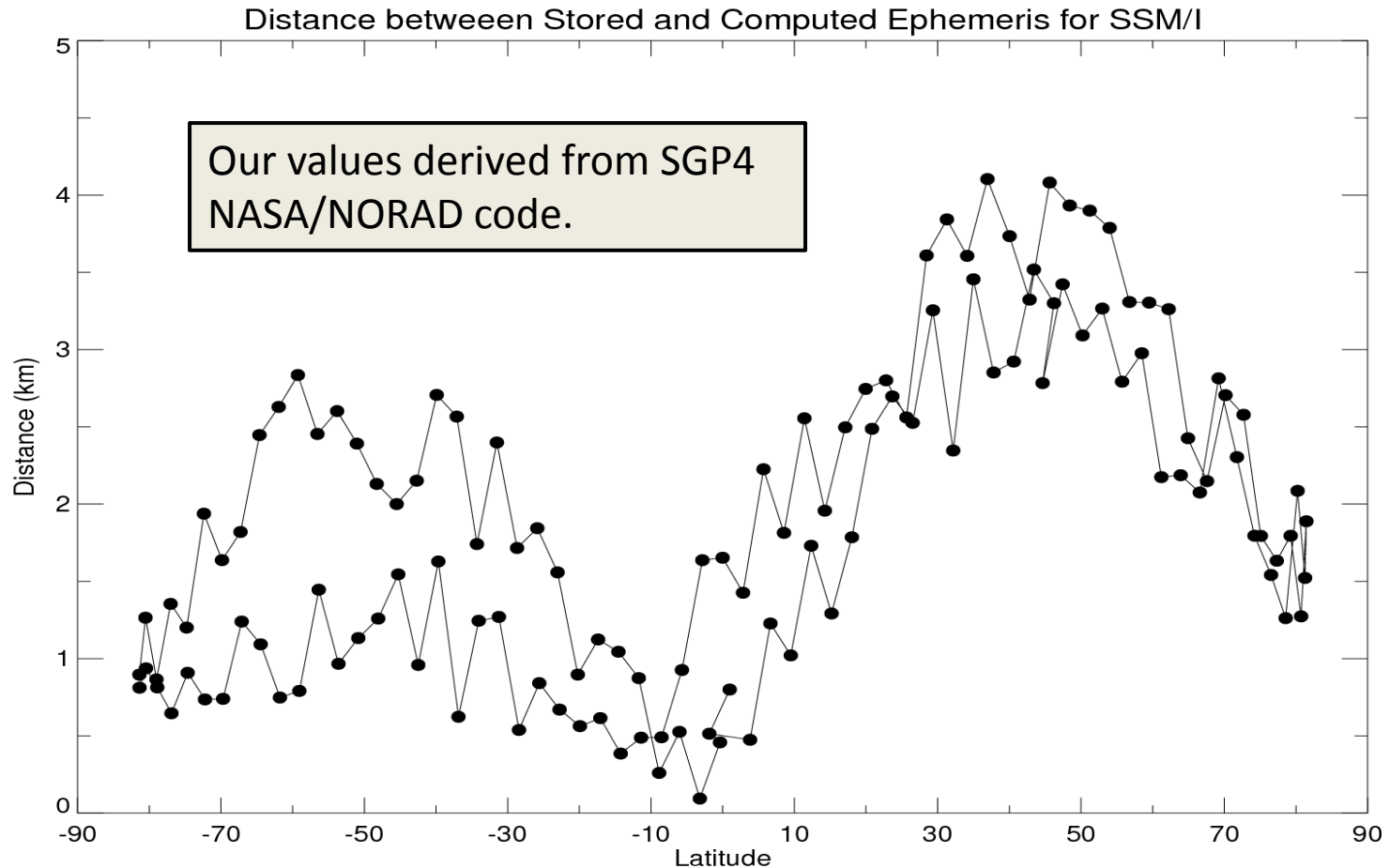


FCDR files

- We are working on the processing and inter-calibration

Functional

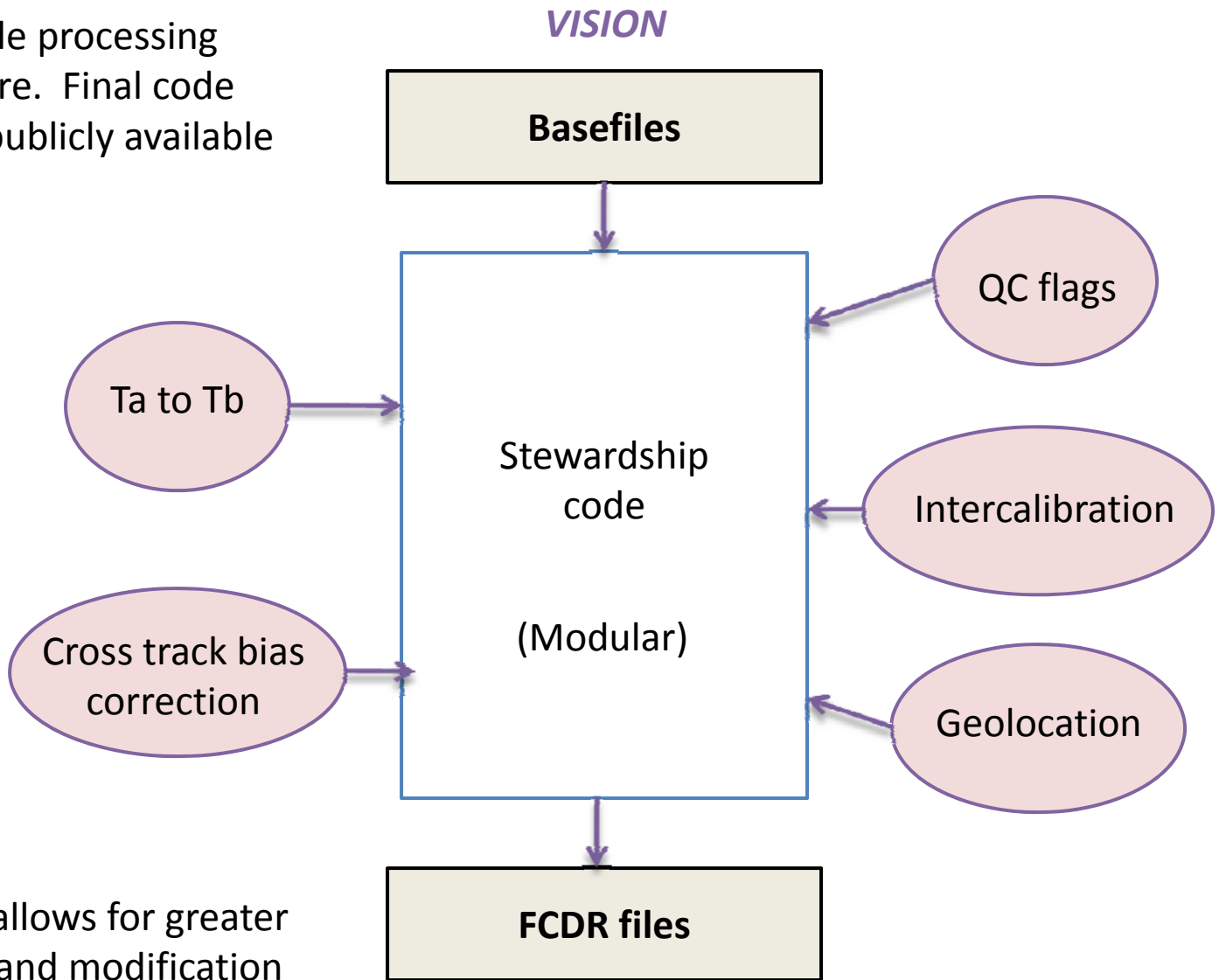
In development



- Understanding the reasons for these differences is critical for resolving observed pixel geolocation errors.
- We are working with NASA scientists to resolve these differences and generate a definitive result.

- The basefile processing code structure. Final code will be made publicly available

Programming Language is C



This structure allows for greater user flexibility and modification

netcdf F15.1A.BASE.20060901.0031.34722 {
dimensions:

```
pixel_lores = 64 ;  
pixel_hires = 128 ;  
nscan_hires = 3214 ;  
nscan_lores = 1607 ;  
a_single_value = 1 ;  
load_arr_dim = 5 ;  
time_arr_dim = 6 ;
```



Filename

Dimensions

variables:

```
int satellite_ID(a_single_value) ;  
    satellite_ID:description = "satellite ID from TDR file" ;  
double ttime0(a_single_value) ;  
    ttime0:long_name = "Ephem offset from 1/1/87 till beg. day" ;  
double ttime(a_single_value) ;  
    ttime:long_name = "Offset from 1/1/87 till beg. current day" ;  
float bst0(nscan_lores) ;  
    bst0:long_name = " B-scan start time (sec) scaled by 1000" ;  
float est0(nscan_lores) ;  
    est0:long_name = " Ephem start time (sec) scaled by 1000" ;  
int lscan(nscan_lores) ;  
    lscan:long_name = "Previous scan number (from ScanHdr1)" ;  
int scann(nscan_lores) ;  
    scann:long_name = "Scan number (from ScanHdr1)" ;  
double xtime(nscan_lores) ;  
    xtime:long_name = "Begining start time as seconds since 0z 1 Jan 1987" ;  
double atime(a_single_value) ;  
    atime:long_name = "Time of ascending node crossing" ;  
int Beginning_Data_Time_array(time_arr_dim) ;  
    Beginning_Data_Time_array:description = "time stored as [0]=yyyy,[1]=mm,[2]=dd,[3]=hr,[4]=min,[5]=sec" ;  
    Beginning_Data_Time_array:value = 20060901003129. ;  
int Ending_Data_Time_array(time_arr_dim) ;  
    Ending_Data_Time_array:description = "time stored as [0]=yyyy,[1]=mm,[2]=dd,[3]=hr,[4]=min,[5]=sec" ;  
    Ending_Data_Time_array:value = 20060901021305. ;  
int Ascending_Data_Time_array(time_arr_dim) ;  
    Ascending_Data_Time_array:description = "time stored as ["
```

A dump of the header for a Basefile

Structure:
Satellite specific items
times
navigation
TA
calibration measures

- ~ 80 variables
- We have preserved all the original TDR data.

Dimensions:

nscan_lores
nscan_hires
pixel_lores
pixel_hires



Dimensions

A proposed structure of the header and data
for the FCDR file:

Dimensions, Satellite Info, times, navigation , QC and TB

MetaData:

Filename:
Satellite:
Sensor:
Granule (i.e. orbit) number
Table of quality flag codes
Date Created
Start Date/Time
End Date/Time
Missing Data Value
Software processing version
Contact Info

Data:

int*2	Time[nscan_lores][7]	Year, Month, Day, Hour, Min, Sec, Msec
float	FracOrbit[nscan]	Fractional orbit number
float	SCLat[nscan_lores]	Spacecraft Latitude
float	SCLon[nscan_lores]	Spacecraft Longitude
float	SCAlt[nscan_lores]	Spacecraft Altitude
int*1	QualityFlag_lores[nscan_lores][pixel_lores]	Pixel quality flag lores
int*1	QualityFlag_hires[nscan_hires][pixel_hires]	Pixel quality flag hires
float	EIA_lores[nscan_lores][pixel_lores]	Earth incidence angle (degrees) lores
float	EIA_hires[nscan_hires][pixel_hires]	Earth incidence angle (degrees) hires
float	Lat_lores[nscan_lores][pixel_lores]	Pixel Latitude_lores
float	Lon_lores[nscan_lores][pixel_lores]	Pixel Longitude_lores
float	Lat_hires[nscan_hires][pixel_hires]	Pixel Latitude_hires
float	Lon_hires[nscan_hires][pixel_hires]	Pixel Longitude_hires
float	TB_lores[nscan_lores][pixel_lores]	Low frequency channel TBs structure
float	TB_hires[nscan_hires][pixel_hires]	High frequency channel TBs structure

QC Flag handling and clarifications within metadata.

QC:

int*1	QualityFlag_lores[nscan_lores][pixel_lores]	Pixel quality flag lores
Int*1	QualityFlag_hires[nscan_hires][pixel_hires]	Pixel quality flag hires

Global Attributes:

QualityFlag_Comments: 0=Good Data, 1-99=minor issues, 100-255=major issues
QualityFlag_lores=0, Good data
QualityFlag_lores=1, Sun_Glint
QualityFlag_hires=100, 85V Nonphysical Values,

QC flags will be at the pixel resolution

Summary:

- We have made progress on the processing of the original TDR files to netcdf and generated preliminary Basefiles (for community review).
- We are formulating the code and metadata data structure for the final FCDR . All input is appreciated.
- We have put out a version of the Basefiles on CSU's anonymous ftp server.

ftp rain.atmos.colostate.edu

cd /pub/sds/

ftp> ls

```
-rw-r--r-- 1 10907 100 12402332 Mar 17 14:47 F15.1A.BASE.20060901.0031.34722.nc
-rw-r--r-- 1 10907 100 12402332 Mar 17 14:47 F15.1A.BASE.20060901.0213.34723.nc
-rw-r--r-- 1 10907 100 12402332 Mar 17 14:47 F15.1A.BASE.20060901.0355.34724.nc
-rw-r--r-- 1 10907 100 12402332 Mar 17 14:47 F15.1A.BASE.20060901.0536.34725.nc
-rw-r--r-- 1 10907 100 12402332 Mar 17 14:47 F15.1A.BASE.20060901.0718.34726.nc
-rw-r--r-- 1 10907 100 12402332 Mar 17 14:47 F15.1A.BASE.20060901.0900.34727.nc
-rw-r--r-- 1 10907 100 12402332 Mar 17 14:47 F15.1A.BASE.20060901.1041.34728.nc
-rw-r--r-- 1 10907 100 12402332 Mar 17 14:47 F15.1A.BASE.20060901.1223.34729.nc
-rw-r--r-- 1 10907 100 12402332 Mar 17 14:47 F15.1A.BASE.20060901.1405.34730.nc
```