

PALSAR product lists for K&C

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May 20-24, 2003

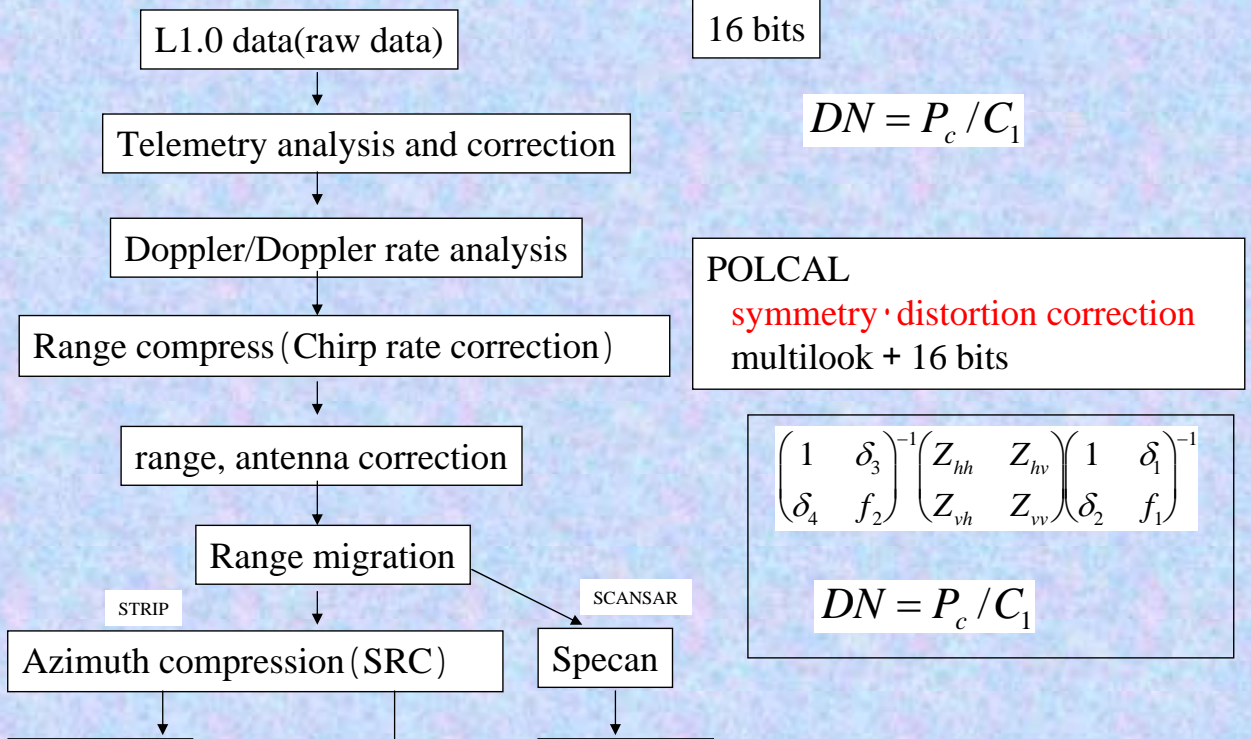
PALSAR Modes

Mode	High Resolution		Direct Downlink	SCANSAR	Polarimery
	Single Polarization	Dual Polarization			
Frequency	L band (1270MHz)				
Chirp Bandwidth	28MHz	14MHz	14MHz	14/28MHz	14MHz
Polarization	<u>HH</u> or VV	<u>HH/HV</u> or <u>VV/VH</u>	HH or VV	<u>HH</u> or VV	HH/HV + VV/VH
Incidence Angle	8-60deg (typ 39deg)	8-60deg (typ 39deg)	8-60deg (typ 39deg)	18-43deg	8-30deg (typ 24deg)
Range Resolution	7-44m 10m@39deg	14-88m 20m@39deg	14-88m 20m@39deg	100m (Multi-look)	24-89m 30m@24deg
Swath Width	40-70km	40-70km	40-70km	250-350km	20-65km
Bit Length	5 bits	5 bits	3/5 bits	5 bits	3/5 bits
Data Rate	240Mbps	240Mbps	120Mbps	120/240Mbps	240Mbps

level	FBS (28 MHz, 27μs)	FBD(14MHz, 27μs)	SCAN(14MHz, 27μs)	POL(14MHz, 16μs)	Contents
0					raw compressed data
1.0	ND	ND	ND	ND	raw data + orbit + telemetry
1.1			×		SLC, calibrated, IEEE, orbit data, telemetry
1.5					calibrated, 16bit data, orbit, telemetry

Note : All the data are path format, o means distributed, x means not distributed
 ND: not decided yet.

4 . Process flow



•SCALE

$$\begin{pmatrix} V_I \\ V_Q \end{pmatrix} = \frac{1}{\sqrt{G_{AGC}(T)} \cdot G_{STC}(t) \{1 - S_a(t, T)\} \sqrt{P_t}} \cdot \begin{pmatrix} I - \bar{I} \\ Q - \bar{Q} \end{pmatrix}$$

•Correction

$$(I_R, Q_R) = \frac{R \sqrt{\sin \theta_{inci}}}{G_{ele}(\phi_{off}, beam)} \times (I_R, Q_R)$$

•POWER

$$P'_C \cong \alpha \left(\frac{G_{ele}^2}{R^2 \sin \theta} + \frac{\beta}{\alpha} \cdot R \right)$$

•POL mode

$$\mathbf{S} = \mathbf{R}^{-1} \cdot \mathbf{U} \cdot \mathbf{T}^{-1}$$

Noise is not subtracted.

Accuracy Target : Error : < 1 dB, location error < 100m

level 1.5 path products for mosaic

- N x N x m look image (N=4 or 8, m=4 (azimuth averaging number))
- pixel spacing (40 m x 52 m (N=4), 80 m x 104 m(N=8))
- Image is generated after m-look high resolution image is generated.
- Slant range/Ground range (pixel spacing selective)
- Mecator, LCC, PS, UTM
- 16 bits/pixel, short Endean, sigma-zero
- Amplitude (calibrated)(AGC, STC, range, antenna pattern)
- factor_m(lat, lon, incidence, off nadir, more information included)
- problems :(foreshortening, to-be-corrected using DEM)
- Size : JERS-1 (736 x ~10000), PALSAR(~1000x~10000)
- SRC : not applied when N=8, and applied when N=4.
- Processing time :4 hrs/path/CPU

High-resolution



Averaging

~3000km

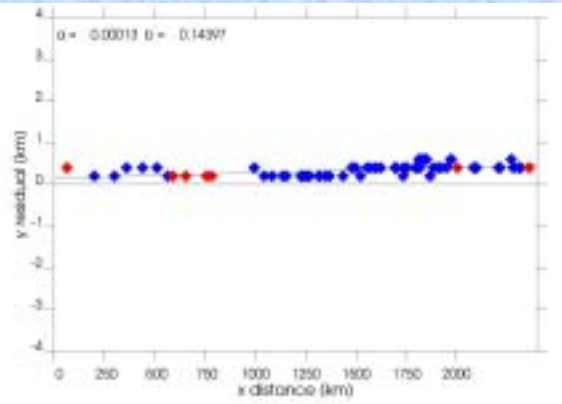
sar_Q16.dat_64_HH : amplitude image of HH pol.

sar_Q16.dat_64_HV : amplitude image of HV pol.

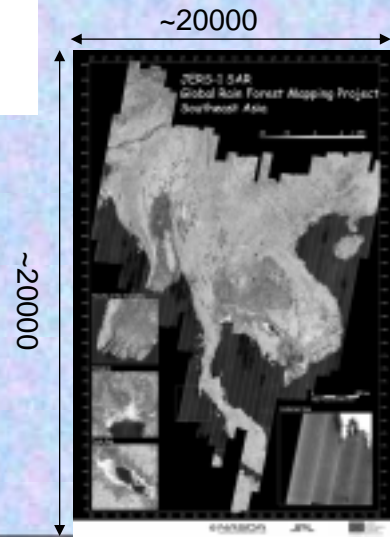
SLC data

images:

- Pixel spacing (200m, 100m, 50m at the equator)
- Foreshortening (Existing now)
- Future modification (Ortho corrected using DEM, merging two more paths acquired on different observation dates)
- Map : Mercator (possible to include LSS, Polar stereo)
- Semi-automatic mosaicking (final manual tuning is necessary)
- Output (mean, variance for texture)
- 16 bits/pixel, short Endean, sigma-zero value
- geometric information (left, upper coordinates)
- size : ~20000 x ~20000 pixels



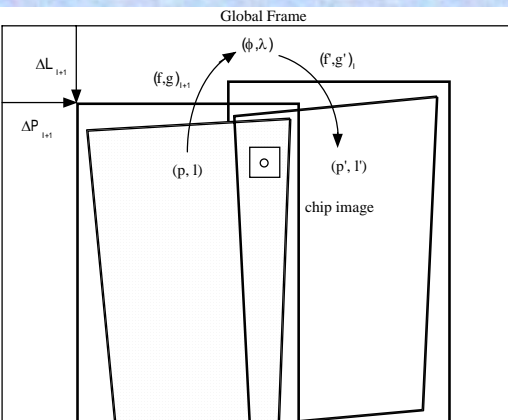
Error N/S direction
500m(p-p)/2400km



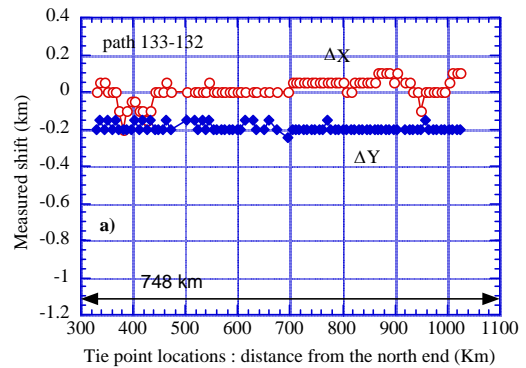
Mosaicking (co-registration)

- Convert Slant range image -> Mercator coordinate
- Measure between two image shifts in X and Y.

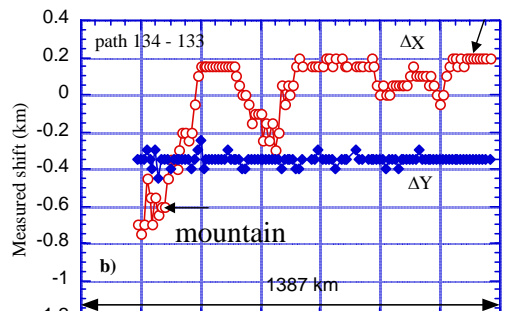
$$\Delta \bar{X}_l = \sum_{i=0}^{l-1} \delta X_i, \Delta \bar{Y}_l = \sum_{i=0}^{l-1} \delta Y_i$$



flat area

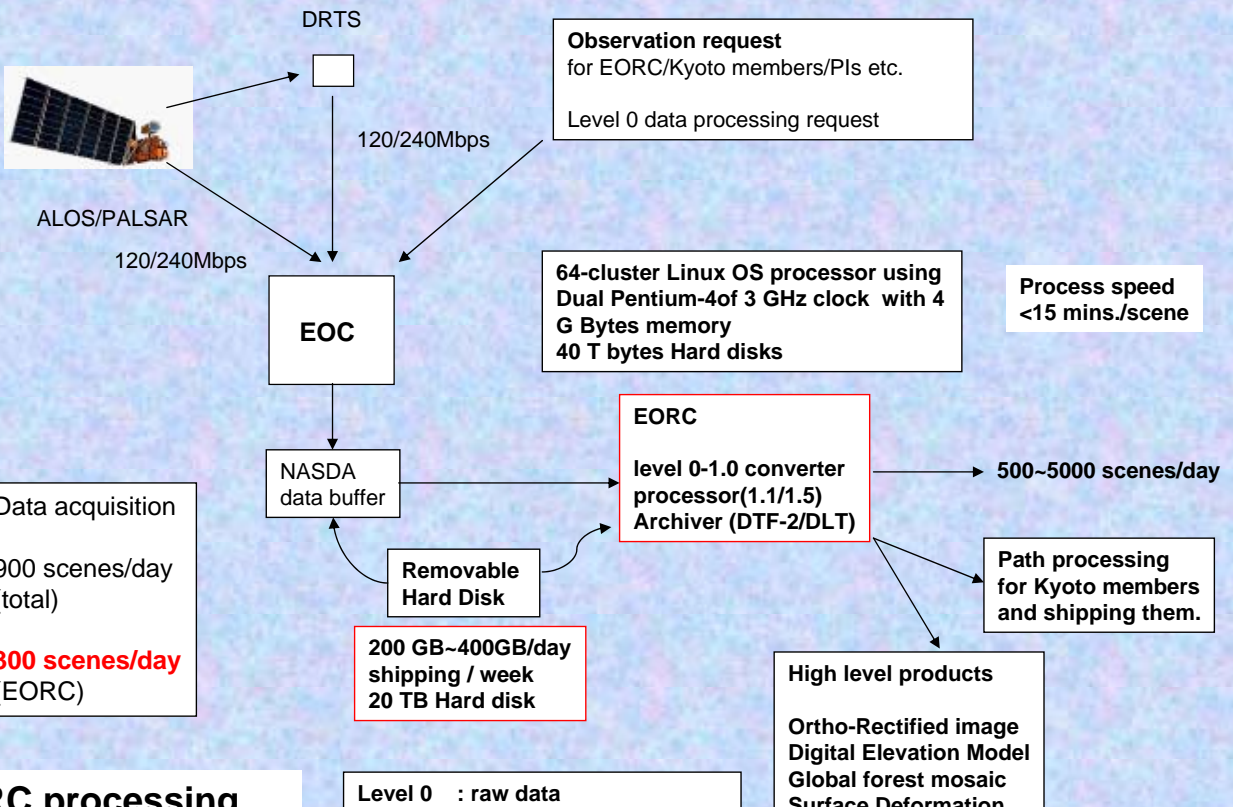


mountain+flat area flat area



- 1 look image
- pixel spacing (vg/prf (~4) m x 4.68 m (28MHz), 9.38 m(14MHz))
- Slant range
- 32 bits I-Q, IEEE, short Endean
- calibrated(AGC, STC, range, antenna pattern)(Amplitude of this mage is proportional to level. 1.5 products), sigma-zero
- facter_m(lat, lon, incidence, off nadir, more information included)
- SRC : applied
- Calibration : polarimetric calibration (to be conducted)

sar_comp1.dat_HH : SLC image of HH pol.
 sar_comp1.dat_HV : SLC image of HV pol.
 sar_comp1.dat_VH : SLC image of VH pol.
 sar_comp1.dat_VV : SLC image of VV pol.
 facter_m.dat : scene information
 gparameters : coordinate information



Simulated point target data are generated and used for image quality.

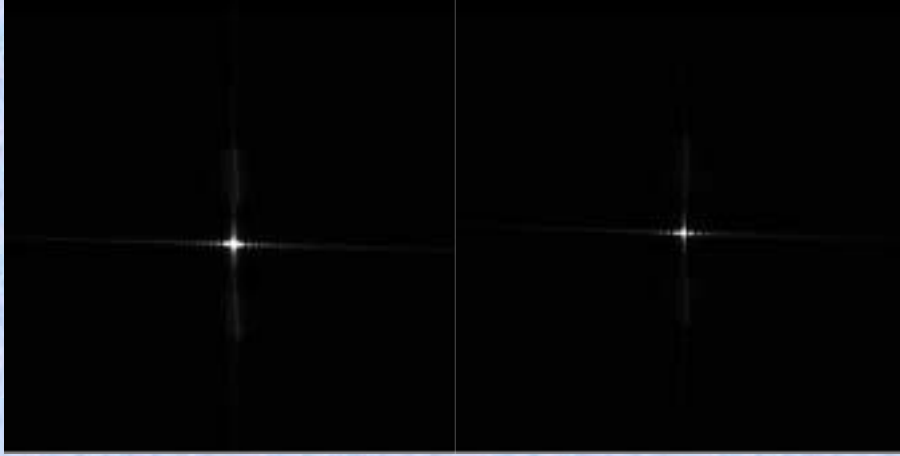
7 th beam with 28 MHz

Non-Yaw steer

Non-Yaw steer

SCANSAR
processing

Beam illumination

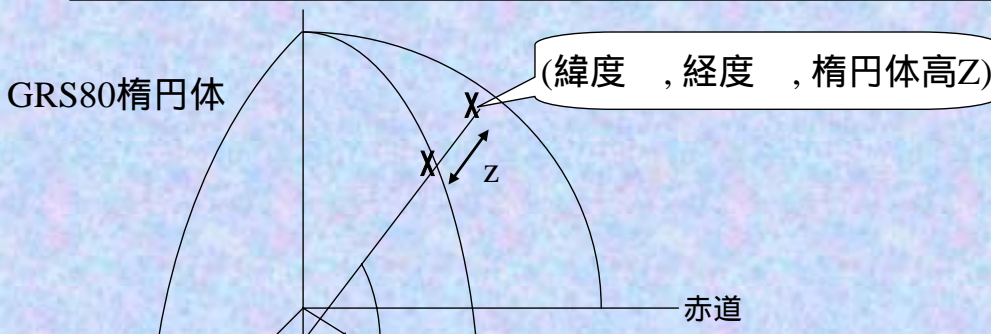


RD

RD+SRC

Standard products : reference

Earth ellipsoid	ITRF97: International Terrestrial Reference Frame 97 座標系 楕円体: GRS80 (長半径: 6,378,137m, 扁平率: 1/298.257222101)
Location	Geodetic latitude, longitude,
明るさの表現	ラジアンス (W/sr/m ² /μm) Normalized radara cross section(dB)



Faraday rotation:
Improvement of geometric accuracy using star tracker.