

*The ALOS Kyoto & Carbon Initiative -  
- a 10-minute overview*

*Ake Rosenqvist  
Joint Research Centre  
Inst. for Environment and Sustainability*

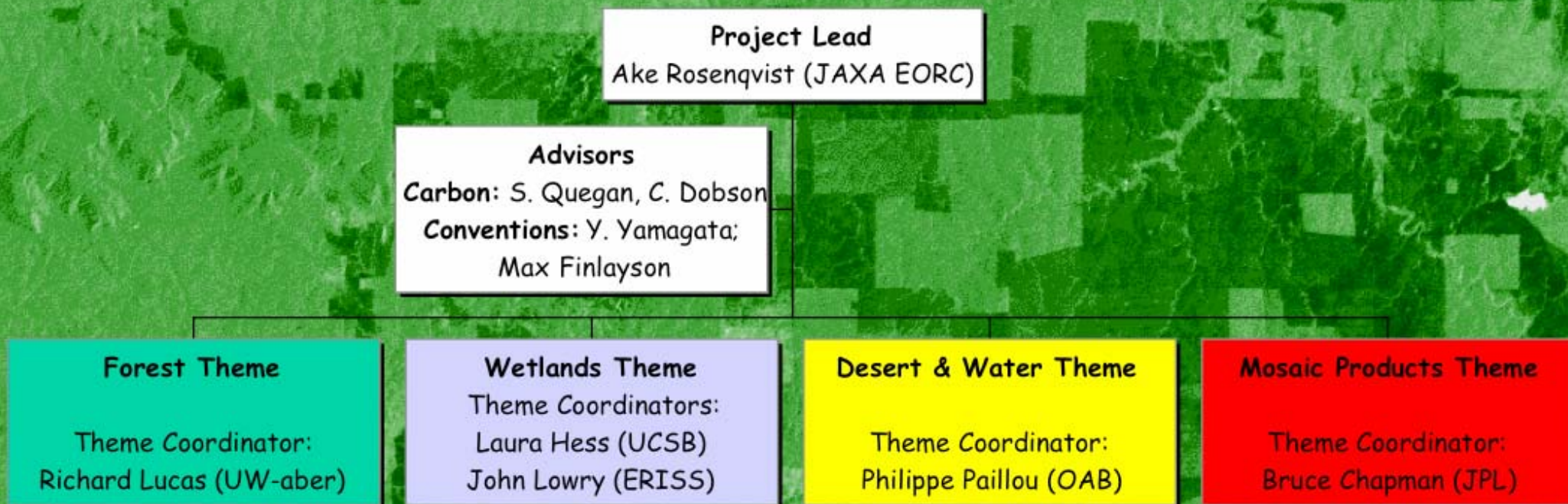
*<ake.rosenqvist@jrc.it>*

Support information needs posed by the "3 C's":

- ❖ The terrestrial **C**arbon cycle science community (CO<sub>2</sub> & CH<sub>4</sub> sources and sinks);
- ❖ Multinational Environmental **C**onventions and Declarations:
  - ❖ UNFCCC Kyoto Protocol (Forest and Land Cover Change);
  - ❖ Ramsar Convention and CBD (wetland characteristics and disturbances);
  - ❖ UN Millenium Declaration & UNCCD (water supply and desertification)
- ❖ Environmental **C**onservation



# K&C Project organization



## Theme Coordinators:

- Coordinate, focus and align products within and between the Themes.
- Assure synergy with TCO and convention information needs
- Authors of Theme chapter in the K&C Science Plan.

## Product Leaders:

- Responsible for the generation of data- or information products.

## Carbon & Convention Advisors:

- Advice Theme Coordinators and Product Leaders on:
  - carbon cycle science (TCO) information needs;
  - convention information requirements;
  - conservation issues.



## The Forest Theme

---

### Theme Coordination:

- Richard Lucas - U-Wales Aberystwyth, U.K.

### Advisors:

- Y. Yamagata - IPCC, Japan UNFCCC delegation
- Craig Dobson - NASA HQ
- Shaun Quegan - GTOS/TCO (U-Sheffield)

### Product Leaders:

- Thuy Le Toan - CESBIO, France
- Christiane Schmullius (Maurizio Santoro) - U-Jena, Germany
- Shaun Quegan - U-Sheffield, U.K.
- Gianfranco De Grandi - JRC, E.U.
- Johan Fransson (Leif Eriksson) - SLU, Sweden
- Richard Lucas - U-Wales Aberystwyth, U.K.
- Dalton Valeriano (Raimundo Filho)- INPE, Brazil
- Dirk Hoekman - Borneo Orangutang Salvation Found., Indonesia
- Alberto Moreira (Papahanassoii & Hajnsek)- DLR, Germany
- Paul Siqueira - U. Massachusetts, USA,

## The Wetlands Theme

---

### Theme Coordination:

- Laura Hess - UCSB, USA
- John Lowry - ERISS, Australia

### Advisors:

- Max Finlayson - Ramsar STRP/Wetlands International
- Shaun Quegan - GTOS/TCO (U-Sheffield)

### Product Leaders:

- Laura Hess - UCSB, USA
- Richard Lucas - U. Wales Aberystwyth, U.K.
- Tony Milne - Horizon, Australia
- Maycira Costa - U-Victoria, Canada
- Kevin Telmer - U-Victoria, Canada
- Dirk Hoekman - BOSF, Indonesia
- Kyle McDonald - JPL, USA
- Bill Salas - AGS, USA
- Max Finlayson (Lisa Rebelo) - Int'l Water Management Inst.
- Ake Rosenqvist - JRC, E.U.

## Desert & Water Theme

Theme Coordination: Philippe Paillou - OAB, France

Product Leaders:

- Philippe Paillou - U. Bordeaux, France
- Francesco Holecz (Paolo Pasquali) - sarmap, Switzerland

## Mosaic Products Theme

Theme Coordination: Bruce Chapman - JPL, USA

Product Leaders:

- Bruce Chapman - JPL, USA
- Masanobu Shimada - JAXA EORC, Japan
- Philippe Paillou - OAB, France
- Gianfranco De Grandi (Ake Rosenqvist) - JRC, E.U.

## 1. Methodology development - Year 1-3

- Development of algorithms and methods required to support the specific information requirements identified (e.g. annual biomass change, wetland flooding extents, irrigated rice spatial distribution, etc.);

## 2. Regional "prototype" demonstration - Year 1-3

- Operational demonstration of the methodology to a "large" geographical region - regional/semi-continental scale. Delivery of prototype product within 3 years of the ALOS launch (i.e. January 2009!).

## 3. Continental/global-scale extrapolation - Year 4+

- Regional/continental-scale application of the methods and work approaches developed to other, or larger, geographical regions.

# *The PALSAR Systematic Observation Strategy*



## *The ALOS Systematic Observation Strategy - Factors considered*

---

### **Spatial consistency over regional scales**

- Semi-continental wall-to-wall coverage

### **Temporal consistency over regional scales**

- Acquisitions within a short time window (1-2 cycles)

### **Accurate timing**

- Regional seasonality drives window selection

### **Consistent sensor configuration**

- Limitation of the PALSAR operational modes

### **"Long-term" repetition continuity**

- Semi-annual repetition to EOL (assessment and revision after 3 years).

- 1: Reduction of the number of operational modes (132 → 4)
- 2: Designation of a specific sensor mode to each 46-day cycle.
- 3: Separation of conflicting requests into ascending and descending operations.

## Ascending passes

(global-scale, semi-annual monitoring)

- Fine-res, HH @ 34.3°
- Fine-res, HH+HV @ 34.3°
- Quad-pol @ 21.5° (R/D)

## Descending passes

(regional-scale, every-cycle monitoring)

- ScanSAR HH 5-beam
- (Fine-res, HH @ 34.3° )

Cycle #	Start date	PALSAR	
		Ascending	Descending
1	24-Jan-06	Commissioning	Commissioning
2	4-Mar-06		
3	19-Apr-06	Cal / Val	Cal / Val
4	4-Jun-06		
5	20-Jul-06		
6	4-Sep-06		
7	20-Oct-06	Any mode	ScanSAR HH
8	5-Dec-06	HH 34.3°	ScanSAR HH
9	20-Jan-07	HH 34.3°	ScanSAR HH
10	7-Mar-07	POL 21.5°	ScanSAR HH
11	22-Apr-07	POL 21.5°	ScanSAR HH
12	7-Jun-07	HH+HV 34.3°	ScanSAR HH
13	23-Jul-07	HH+HV 34.3°	ScanSAR HH
14	7-Sep-07	HH+HV 34.3°	ScanSAR HH
15	23-Oct-07	Any mode	ScanSAR HH
16	8-Dec-07	HH 34.3°	ScanSAR HH
17	23-Jan-08	HH 34.3°	ScanSAR HH
18	9-Mar-08	HH 34.3°	ScanSAR HH
19	24-Apr-08	HH+HV 34.3°	ScanSAR HH
20	9-Jun-08	HH+HV 34.3°	ScanSAR HH
21	25-Jul-08	HH+HV 34.3°	ScanSAR HH
22	9-Sep-08	HH+HV 34.3°	ScanSAR HH
23	25-Oct-08	Any mode	ScanSAR HH
24	10-Dec-08	HH 34.3°	ScanSAR HH
25	25-Jan-09	HH 34.3°	ScanSAR HH
26	12-Mar-09	POL 21.5°	ScanSAR HH
27	27-Apr-09	POL 21.5°	ScanSAR HH
28	12-Jun-09	HH+HV 34.3°	ScanSAR HH
29	28-Jul-09	HH+HV 34.3°	ScanSAR HH
30	12-Sep-09	HH+HV 34.3°	ScanSAR HH





# ALOS Acquisition Strategy PALSAR Ascending (Year 1-3)

Year		2005												2006												2007												2008												2009				
Month		12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5											
Satellite cycle		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5																				
Siberia NW	A1																																																					
Siberia N-central	A2																																																					
Siberia NE	A3																																																					
Kanchatka	A4																																																					
Siberia SW	A5																																																					
Siberia S-central	A6																																																					
Siberia SE	A7																																																					
Caspian Sea	A8																																																					
Central Asia	A9																																																					
Himalayas	A10																																																					
China East	A11																																																					
Korea	A12																																																					
Japan	A20-35																																																					
India	B1																																																					
Peninsular SE-Asia	B2																																																					
Insular SE-Asia	B3																																																					
PNG	C1																																																					
Australia N&E	C2																																																					
Australia arid	C3																																																					
Australia S&E	C4																																																					
New Zealand	C5																																																					
Greenland	D1																																																					
Iceland	D2																																																					
Europe N	D3																																																					
Europe SW	D4																																																					
Europe central	D5																																																					
Europe E	D6																																																					
Middle East	D7																																																					
Arabia	D8																																																					
Morocco	E1																																																					
Sahara W	E2																																																					
Sahara E	E3																																																					
W. Africa	E4																																																					
C. Africa W	E5																																																					
C. Africa E	E6																																																					
Somalia	E7																																																					
Botswana	E8																																																					
S. Africa	E9																																																					
Madagascar	E10																																																					
QE Islands	F1																																																					
Alaska	F2																																																					
Canada NW	F3																																																					
Canada SW	F4																																																					
Canada SE	F5																																																					
US W	F6																																																					
US E	F7																																																					
Central America	F8																																																					
Caribbean Islands	F9																																																					
Amazon Basin	G1																																																					
Brazil East	G2																																																					
S. America Mid	G3																																																					
S. America South	G4																																																					
Antarctica	H1-4																																																					

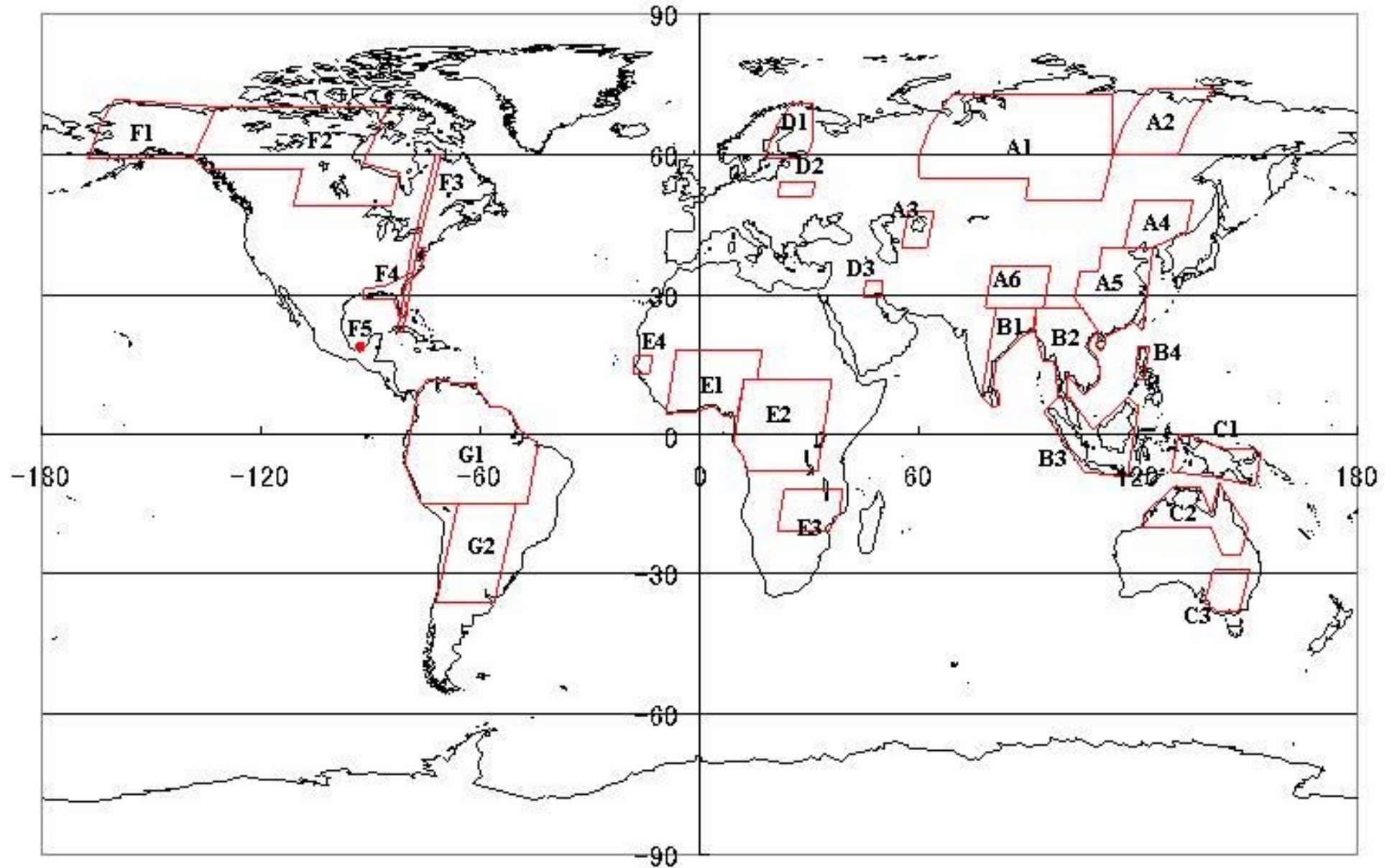
- HH 34.3°
- HH + HV 34.3°
- Quad-pol 21.5°



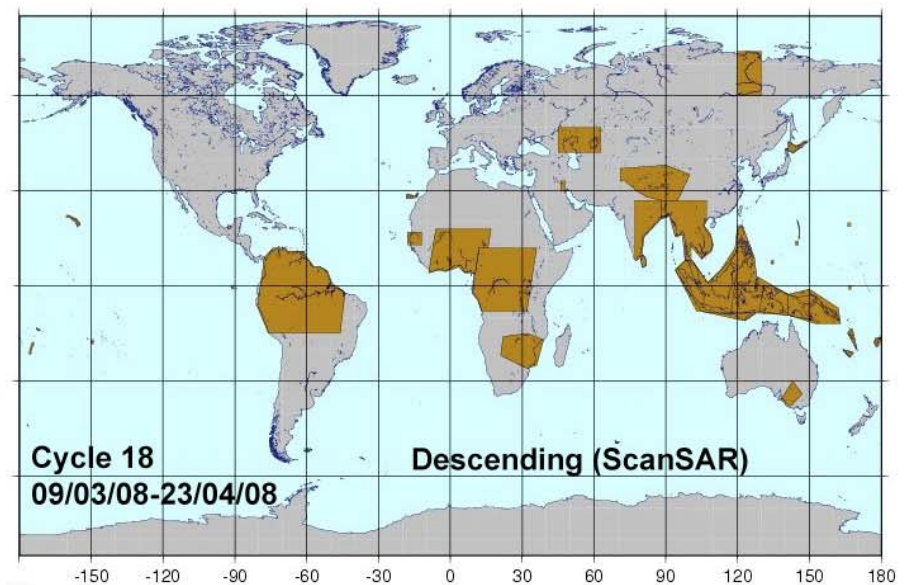
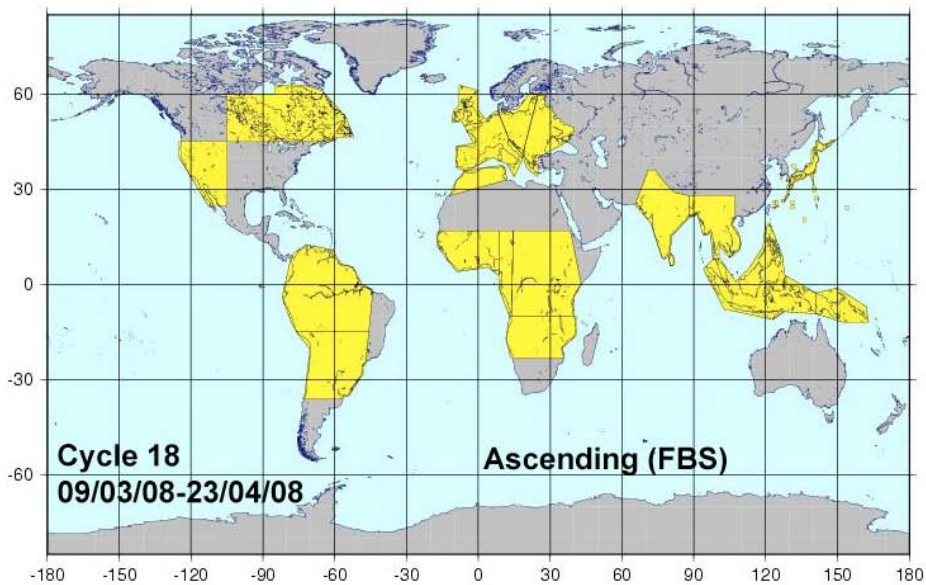
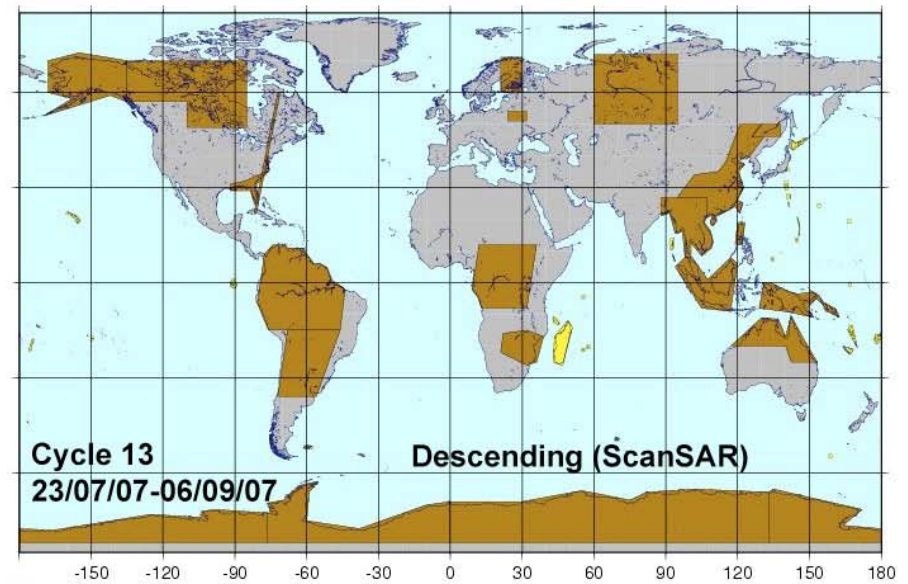
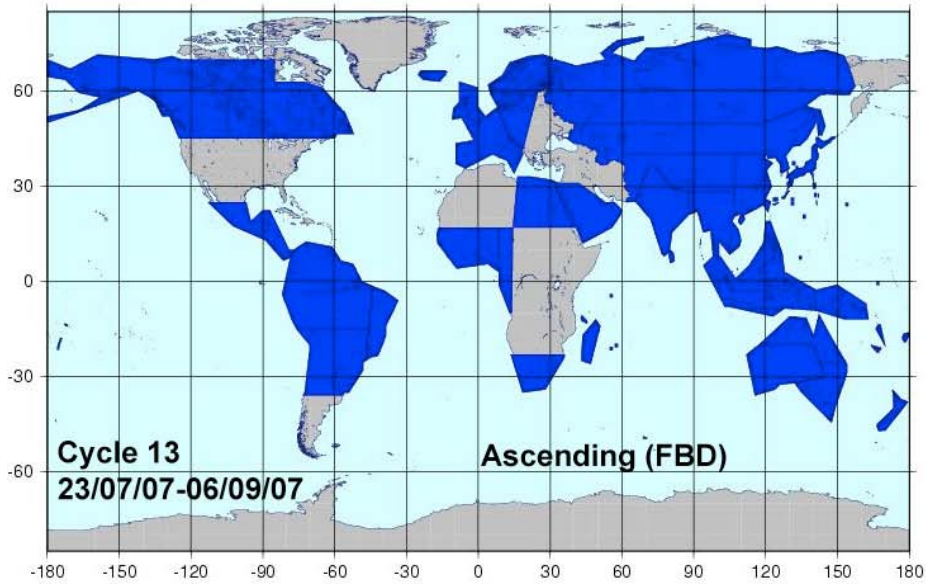


# ALOS Acquisition Strategy

## PALSAR Wetlands



# ALOS Acquisition Strategy





### PALSAR (ascending)

- Default mode: Dual-pol (HH+HV, 20m)
- 2-3 Global coverages annually
  - Summer/dry season (34.3° HH+HV);
  - Winter/rainy season (34.3° HH)
- Global InSAR coverage (34° ) every 2 yrs
- Pol-InSAR campaigns every 2 years
- Geo-sites 3-4 asc obs/year

### PALSAR (descending)

- Default mode: ScanSAR (5-beam HH)
- 1 Global ScanSAR coverage annually
- Intensive wetlands & CH<sub>4</sub> monitoring
  - 46-day repeat during a full annual cycle (13 months)
- Geo-sites 2 desc obs/3 years

### PRISM & AVNIR-2 (descending)

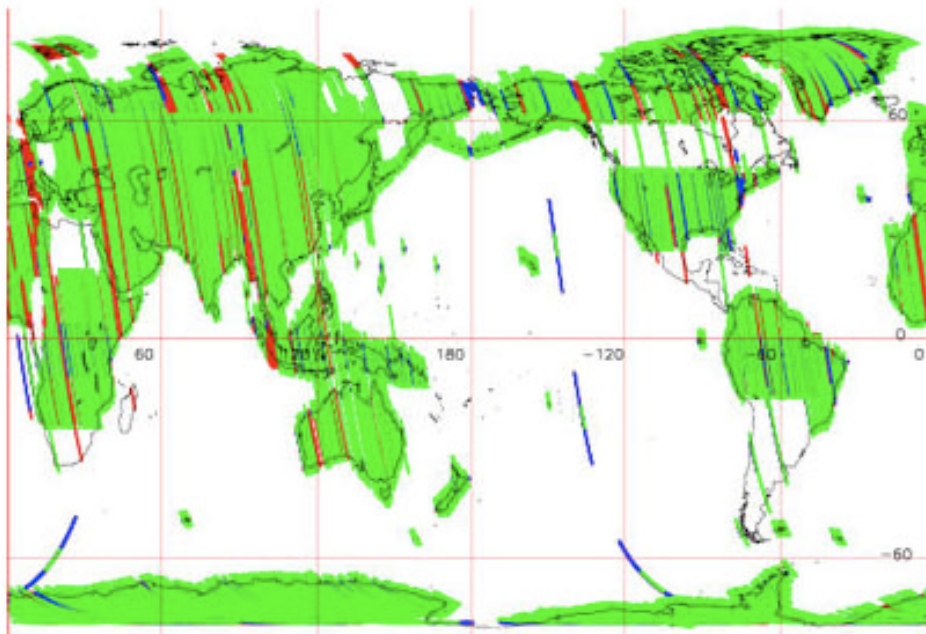
- 1 Global coverage annually as base mapping
- PRISM: Triplet stereo, 2.5 m
- AVNIR-2: Nadir view
- AVNIR/PALSAR synergy (34.3° ) over selected areas.



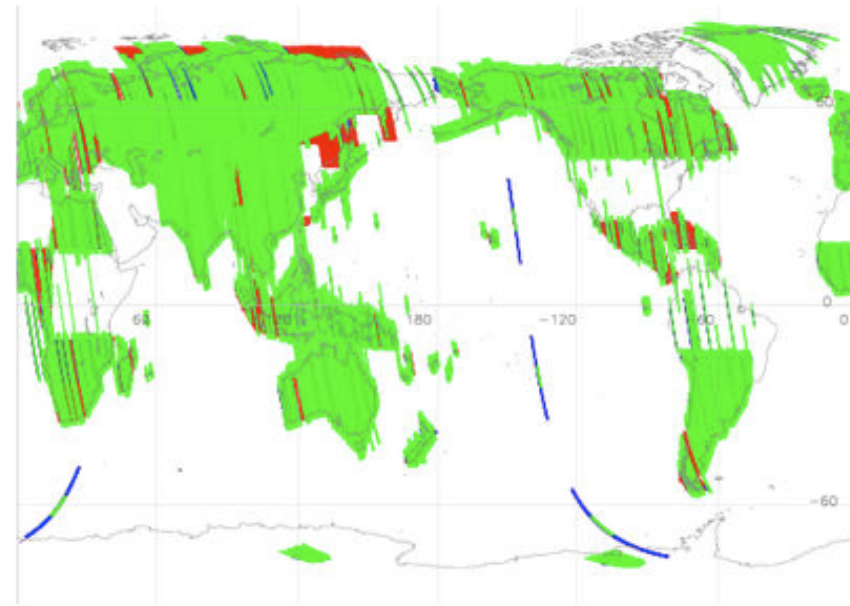
## *Operational results from cycles 8-10*

(Cycle 11 ended on June 6. Observation results available later this week)

			Cycle8(2006/12/5~2007/1/19)				Cycle9(2007/1/20~2007/3/6)			
			req[id]	req[scene]	obs[scene]	obs rate[%]	req[id]	req[scene]	obs[scene]	obs rate[%]
PALSAR	Asce	全体	3359	60096	29488	49	2394	44967	36447	81
	Desce		683	3662	810	22	1286	6476	3490	54
		ScanSAR_Wetlands	154	882	317	36	757	4336	2074	48
PRISM	Desce	3方向視	1557	46221	26294	57	2031	47410	36040	76
		直下		15407	8765	57		15803	12013	76
AVNIR-2		Desce	1100	15954	11690	73	613	14339	11713	81

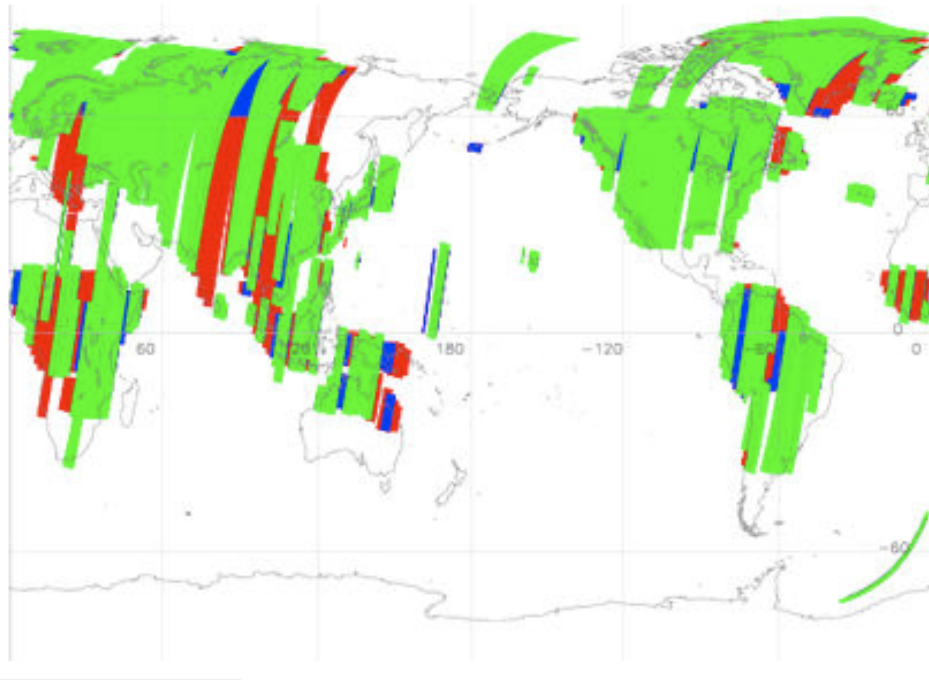


Cycle 8: 49%

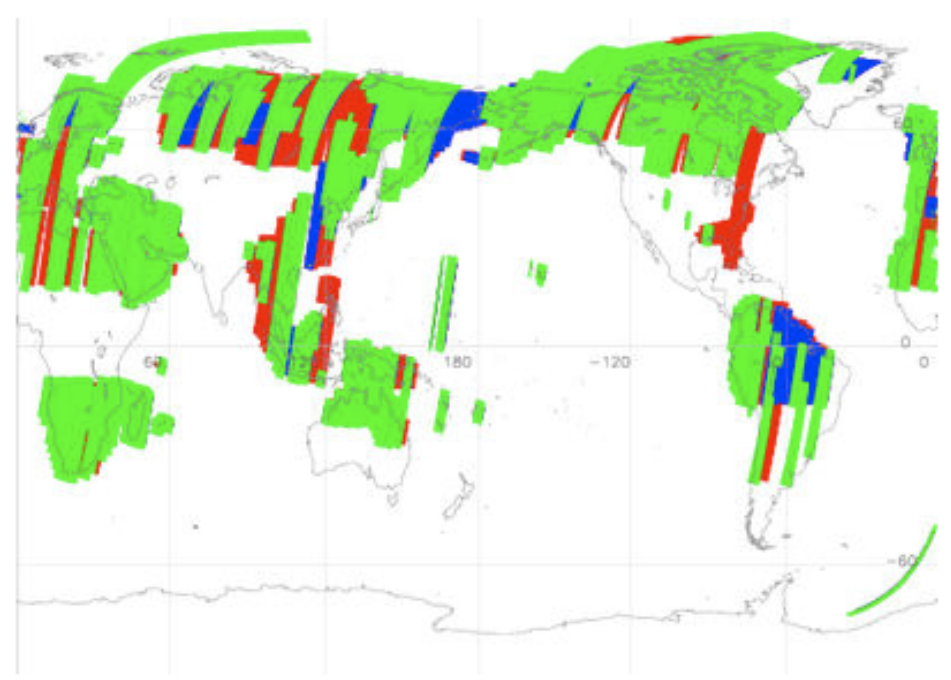


Cycle 9: 81%

			Cycle8(2006/12/5~2007/1/19)				Cycle9(2007/1/20~2007/3/6)			
			req[id]	req[scene]	obs[scene]	obs rate[%]	req[id]	req[scene]	obs[scene]	obs rate[%]
PALSAR	Asce	全体	3359	60096	29488	49	2394	44967	36447	81
	Desce	All	683	3662	810	22	1286	6476	3490	54
		ScanSAR_Wetlands	154	882	317	36	757	4336	2074	48
PRISM	Desce	3方向視	1557	46221	26294	57	2031	47410	36040	76
		直下		15407	8765	57		15803	12013	76
AVNIR-2		Desce	1100	15954	11690	73	613	14339	11713	81

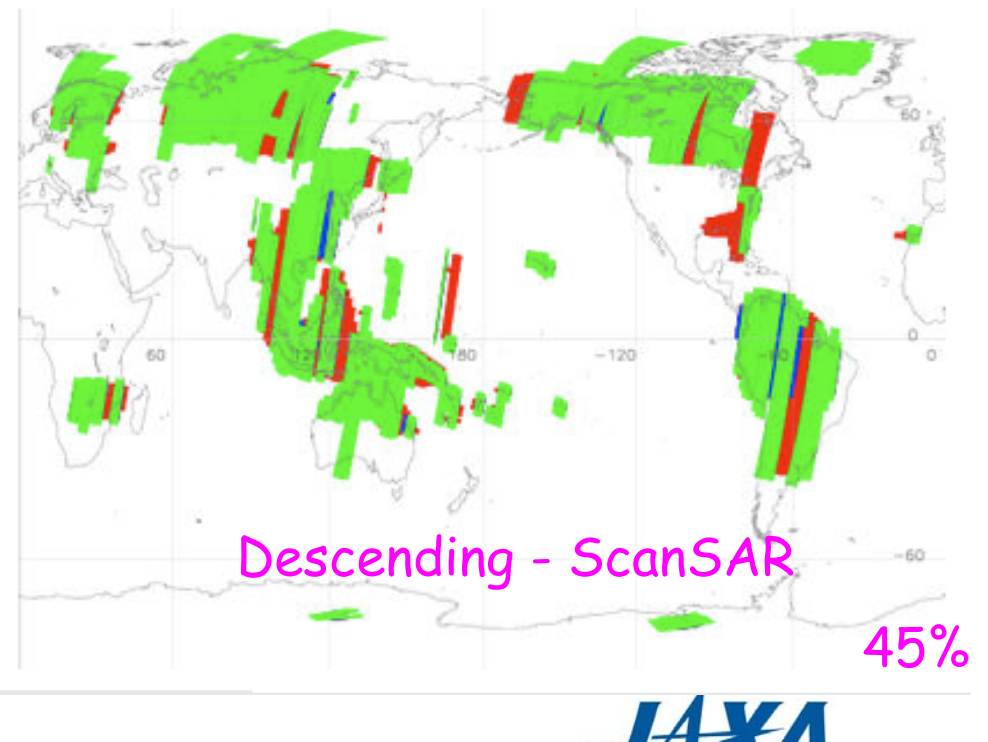
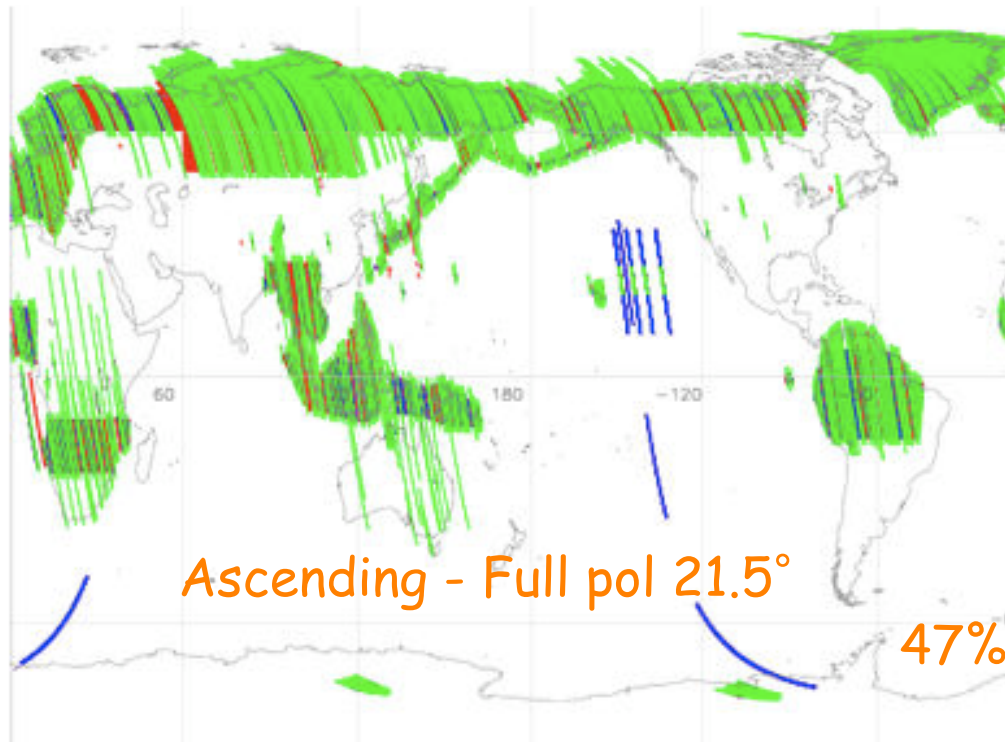


Cycle 8: 22%



Cycle 9: 54%

			Cycle10(2007/3/7~2007/4/21)			
			req[id]	req[scene]	obs[scene]	obs rate[%]
PALSAR	Asce	全体	1727	32844	15661	47
	Desce	All	93	370	167	45
		ScanSAR_Wetlands	333	1953	877	45
PRISM	Desce	3方向視	1363	37123	23178	62
		直下		12374	7726	62
AVNIR-2		Desce	544	8449	6096	72





## Ascending observations

- Ascending success rate 81% levels for cycle 9 (FBS). Still below acceptable levels.
- Ascending success rate far below acceptable levels for cycles 8 (FBS) and 10 (POL)
- AGAP maps, however, seem to indicate better performance.
- What is the reason for the low performance?

## Descending observations (ScanSAR)

- Success rate below 50% for all cycles
- AGAP maps, however, seem to indicate better performance.
- What is the reason for the low performance?

- Post-launch assessment of the observation strategy planned for next week.

			Cycle8(2006/12/5~2007/1/19)				Cycle9(2007/1/20~2007/3/6)				Cycle10(2007/3/7~2007/4/21)			
			req[id]	req[scene]	obs[scene]	obs rate[%]	req[id]	req[scene]	obs[scene]	obs rate[%]	req[id]	req[scene]	obs[scene]	obs rate[%]
PALSAR	Asce	全体	3359	60096	29488	49	2394	44967	36447	81	1727	32844	15661	47
	Desce		683	3662	810	22	1286	6476	3490	54	93	370	167	45
		ScanSAR_Wetlands	154	882	317	36	757	4336	2074	48	333	1953	877	45
PRISM	Desce	3方向視	1557	46221	26294	57	2031	47410	36040	76	1363	37123	23178	62
		直下		15407	8765	57		15803	12013	76		12374	7726	62
AVNIR-2	Desce		1100	15954	11690	73	613	14339	11713	81	544	8449	6096	72