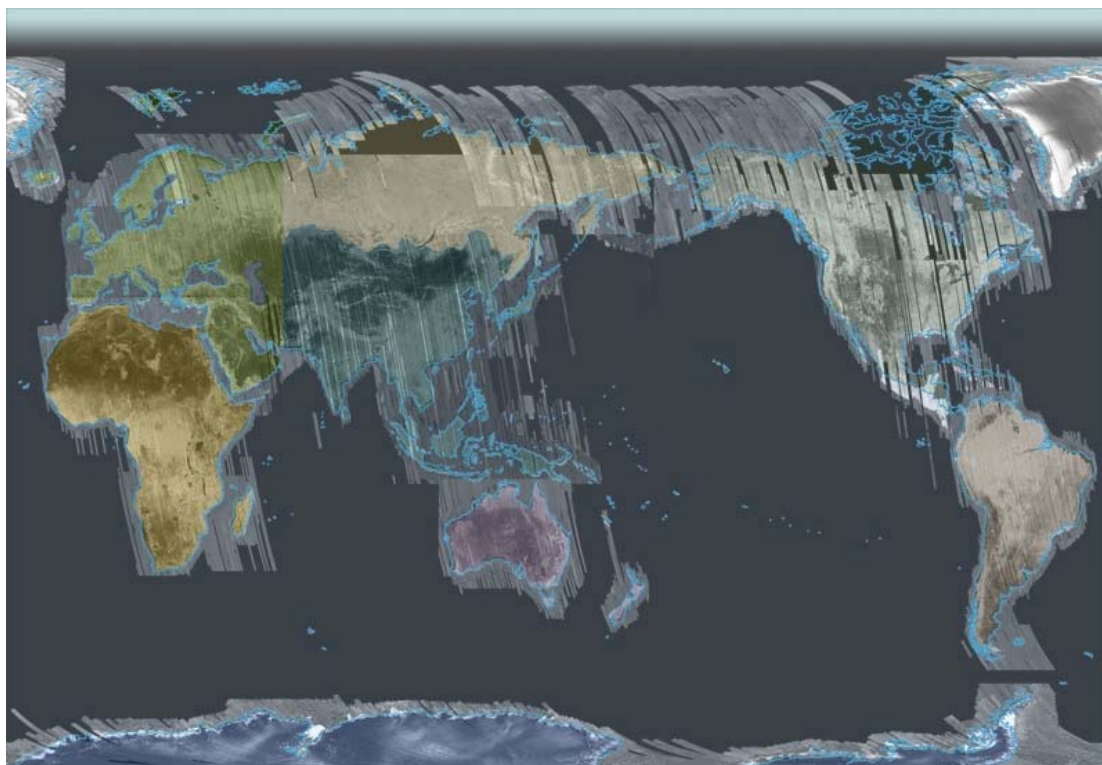




Assessment of ALOS(-1) Basic Observation Scenario performance

A. Rosenqvist (soloEO), M. Shimada, T. Tadono (JAXA EORC)
K. Tsuzuku, T. Watanabe, E. Aoki & F. Ohgushi (RESTEC)





The Systematic Observation Strategy - Factors considered

Spatio-temporal consistency over regional scales

- Semi-continental wall-to-wall coverage
- Acquisitions within a short time window (46-day cycle)

"Adequate" temporal repetition;

- Plan individually adapted to forest and wetlands monitoring

Accurate timing;

- Regional seasonality a major driver

Consistent sensor configuration;

- Limitation of the PALSAR operational modes
 - Creation of consistent archives
 - Minimising request conflicts

Long-term continuity

- Repetition to EOL the target, continuation with ALOS-2

***Systematic Data Acquisitions - A Pre-requisite for Meaningful Biophysical Parameter Retrieval?**

Communications, IEEE Transactions on Geoscience and Remote Sensing, Vol. 41:7, 2003.



Approach to minimise PALSAR programming conflicts

Step 1: Reducing the number of operational modes to a small number of "default observation modes" (132 => 5)

Step 2: Designating each 46-day cycle to a specific default mode.

Step 3: Separating conflicting requests into ascending and descending operations.

Ascending passes:

- Dedicated to global-scale, dual-season monitoring
- Fine-res, HH+HV @ 34.3° (Forest & Land Cover)
- Fine-res, HH @ 34.3° (Solid Earth, Forest & Land Cover)
- Quad-pol @ 21.5° & 23.2° (Pol-InSAR R/D)

Descending passes:

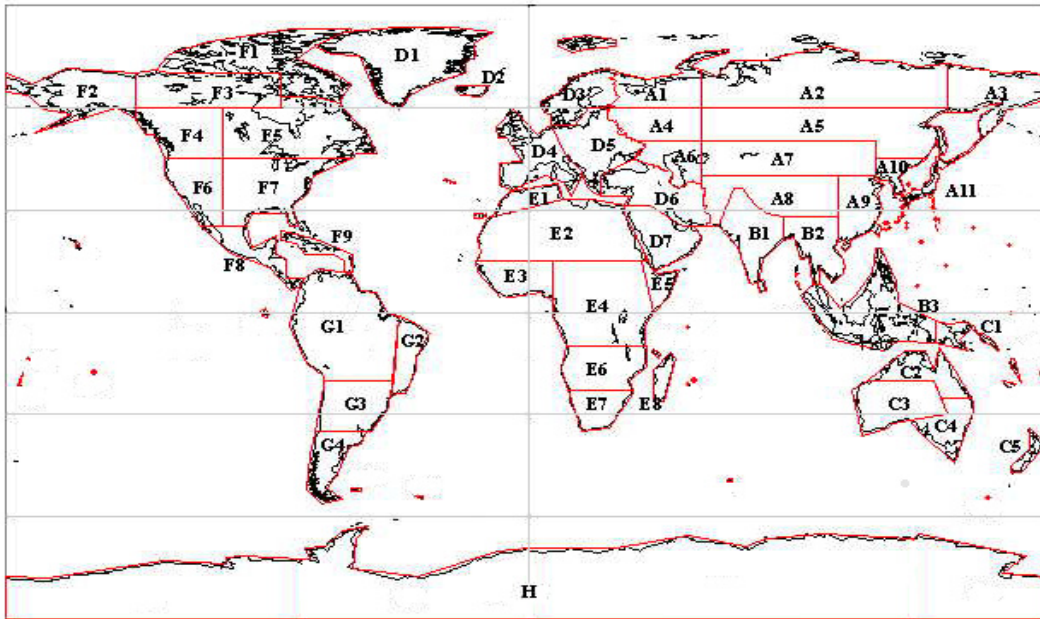
- Dedicated to regional-scale, every-cycle repeat monitoring
- ScanSAR HH 5-beam (Wetlands & Rapid-deforestation)

"Best trade-off" sensor modes based on scientific requirements, identified in collaboration with an international science advisory group (K&C Science Advisory Panel)

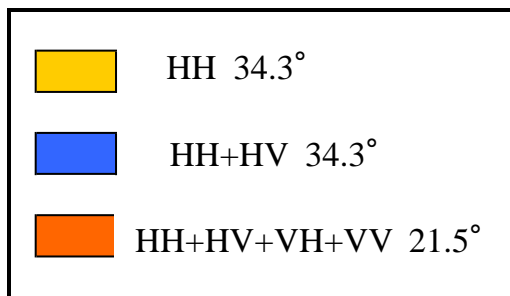


Observation matrix plan concept

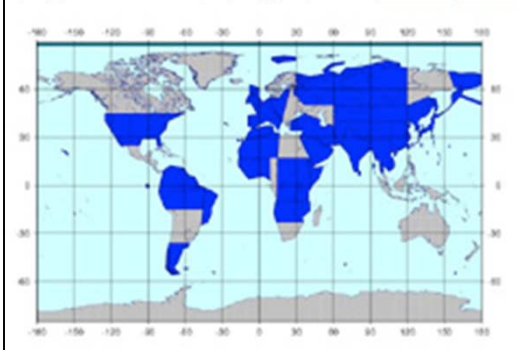
Geographical observation units



Fixed observation modes (ascending passes)



Year		2006										2007							
Month		6	7	8	9	10	11	12	1	2	3	4	5	6	7	8			
Satellite cycle		7	8	9	10	11	12	13	14	15	16	7	8	9	10				
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																		
QE Islands	F1																		
Alaska	F2																		





PALSAR Ascending (Fine Beam) acquisitions 2010 – 2011/06



CYCLE_32 / 13-Dec.-2009



CYCLE_33 / 28-Jan.-2010



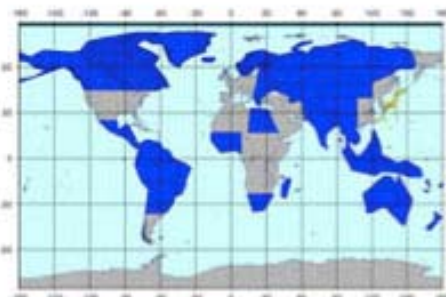
CYCLE_34 / 15-Mar.-2010



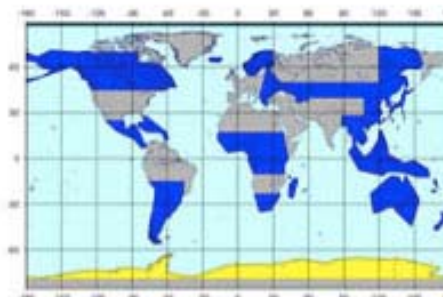
CYCLE_35 / 30-Apr.-2010



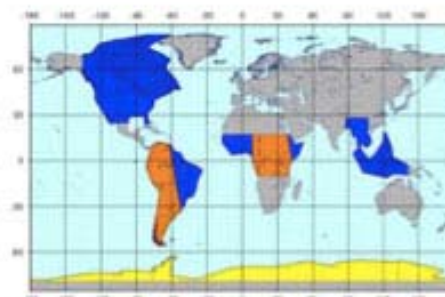
CYCLE_36 / 15-Jun.-2010



CYCLE_37 / 31-Jul.-2010



CYCLE_38 / 15-Sep.-2010



CYCLE_39 / 31-Oct.-2010



CYCLE_40 / 16-Dec.-2010



CYCLE_41 / 31-Jan.-2011



CYCLE_42 / 18-Mar.-2011



CYCLE_43 / 3-May-2011

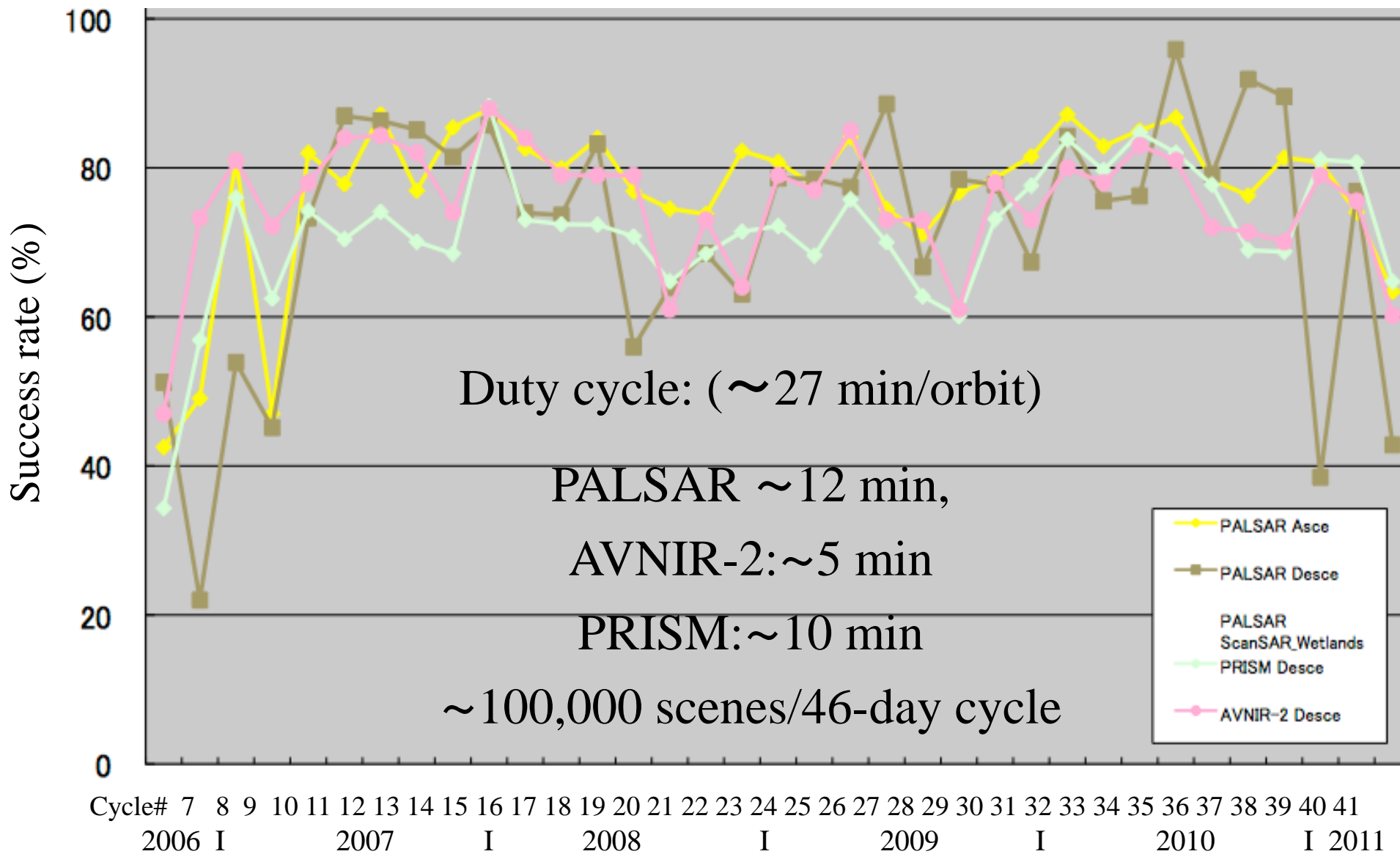
Fine Beam	34.3°	HH+HV
Fine Beam	34.3°	HH
Fine Beam	21.5°	HH+HV+VH+VW
Fine Beam	23.1°	HH+HV+VH+VW



ALOS BOS in operation

Acquisition success rate:

Strip map (Asc) : ~80%, ScanSAR (Desc) : ~72%





ALOS BOS in operation

Acquisition success rates

Acquisition results for Cycles 7-42 (2006/10-2011/04)

	PALSAR			ScanSAR	PRISM	AVNIR-2
	Fine Beam modes					
	FBD	FBS	POL			
2006	42.5%			40.9%	34.3%	47.0%
2007	80.4%	62.8%	65.3%	56.9%	69.8%	79.5%
2008	77.1%	84.4%	N/A	67.5%	71.6%	75.5%
2009	75.5%	79.4%	79.1%	73.2%	68.7%	74.6%
2010	80.1%	85.1%	N/A	78.1%	77.4%	75.5%
2011	N/A	69.1%	77.3%	63.5%	72.8%	68.8%
All	78.3%	76.6%	73.4%	66.7%	71.8%	74.4%
# scenes acquired	1,121,354			80,178	1,493,120	712,523



PALSAR

FBS, FBD, POL

	FBD	FBS	POL
2006	42.5%		N/A
2007	80.4%	62.8%	65.3%
2008	77.1%	84.4%	N/A
2009	75.5%	79.4%	79.1%
2010	80.1%	85.1%	N/A
2011	N/A	69.1%	77.3%
All	78.3%	76.6%	73.4%

- Low success rate during first 6 months of operations
- The average success rates 75-85% mid 2007-2010.
- FBD few % lower than FBS (FBD during NH summer – peak of optical requests)
- Each geographical region covered two times during each seasonal time window as a means of automated gap-filling. Approx. **95% complete coverage** was generally achieved over the **3-4 cycles** of the dual-seasonal FBS and FBD acquisition windows.
- Drop in FBS success rate in late 2010/2011



PALSAR ScanSAR

	ScanSAR
2006	40.9%
2007	56.9%
2008	67.5%
2009	73.2%
2010	78.1%
2011	63.5%
All	66.7%

- ScanSAR observations in descending mode → sharing of system resources with optical sensors.
- ScanSAR priority < optical
- Results unsatisfactory: every 3rd or 4th observation unsuccessful → strong impact on time-series applications (e.g. wetland inundation)
- Gradual improvement 2006 – 2010
- 15% drop in success rate 2011



PRISM & AVNIR-2

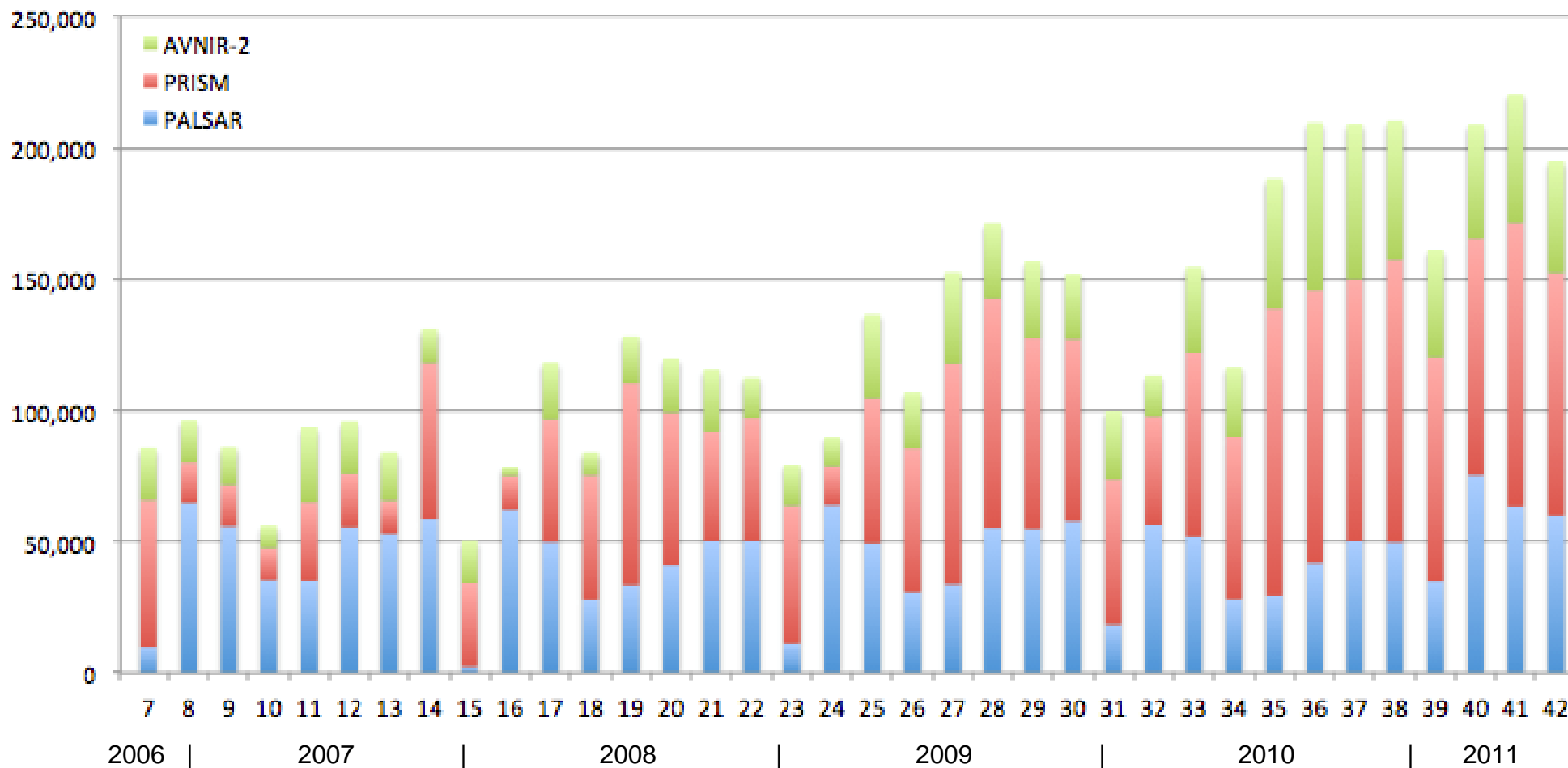
	PRISM	AVNIR-2
2006	34.3%	47.0%
2007	69.8%	79.5%
2008	71.6%	75.5%
2009	68.7%	74.6%
2010	77.4%	75.5%
2011	72.8%	68.8%
All	71.8%	74.4%

- Low success rate during first 6 months of operations
- The average success rates 70-80% mid 2007-2010.
- The number of acquisition requests for AVNIR-2 and PRISM data increased steadily every year, with AVNIR-2 reaching almost 3 times, and PRISM almost 4 times, the number of requests in 2010/2011 compared to that of 2007.
- Drop in success rate 2011



ALOS BOS in operation

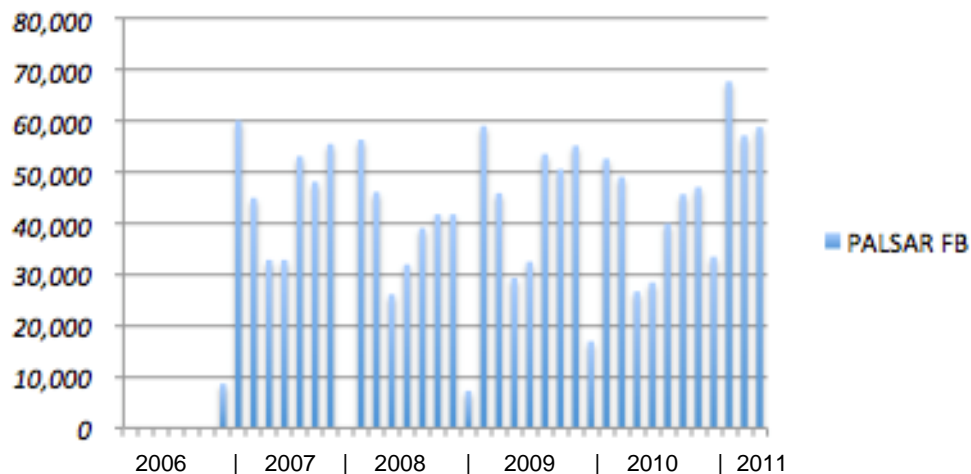
Number of acquisition requests



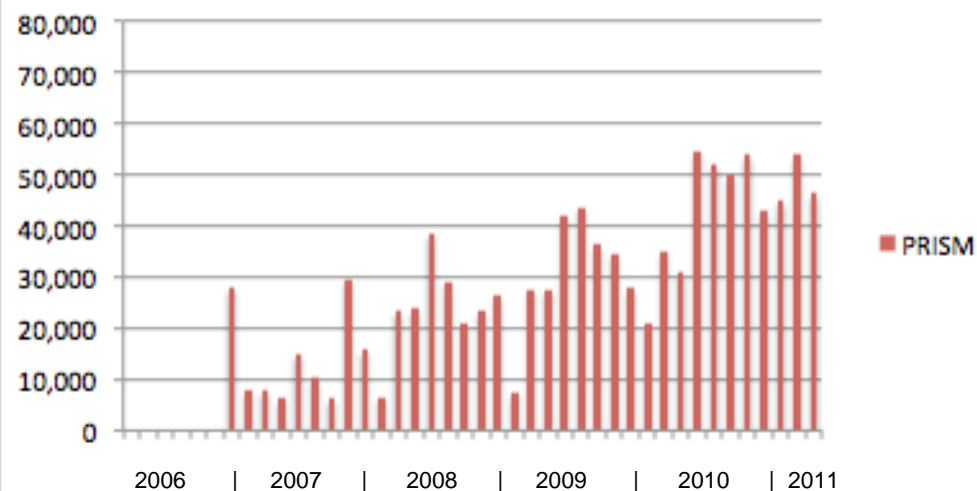


Number of acquisition requests (normalised to 70 km scenes)

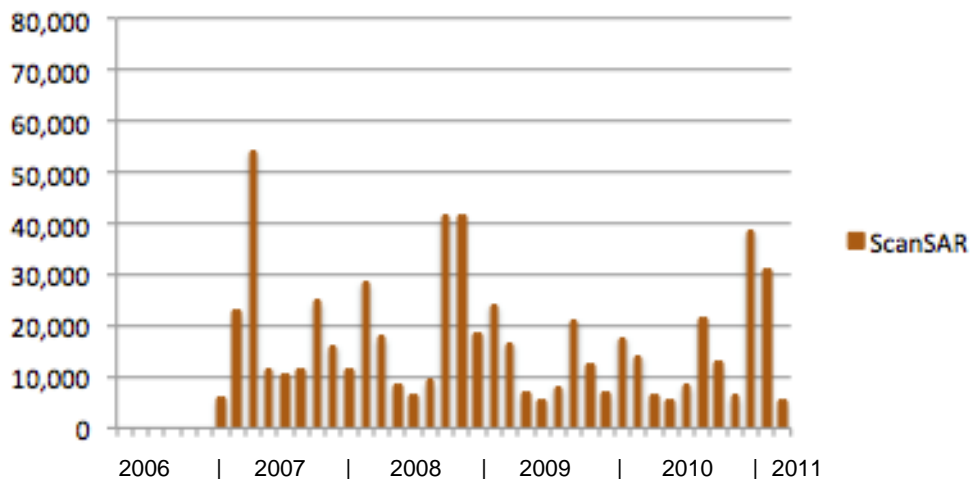
PALSAR FB



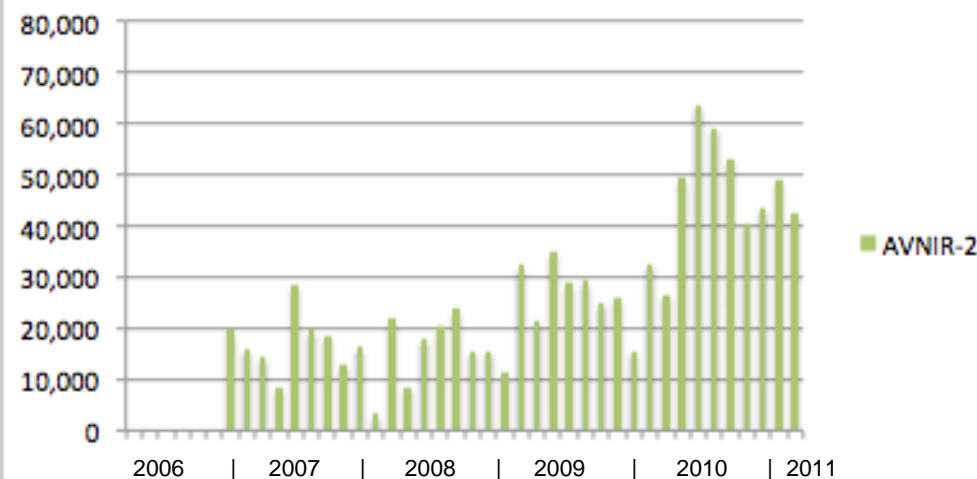
PRISM



ScanSAR



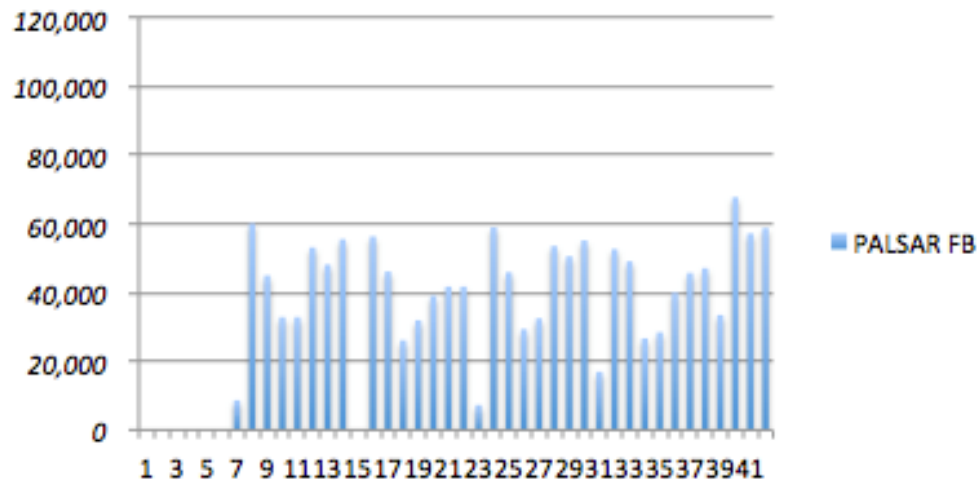
AVNIR-2



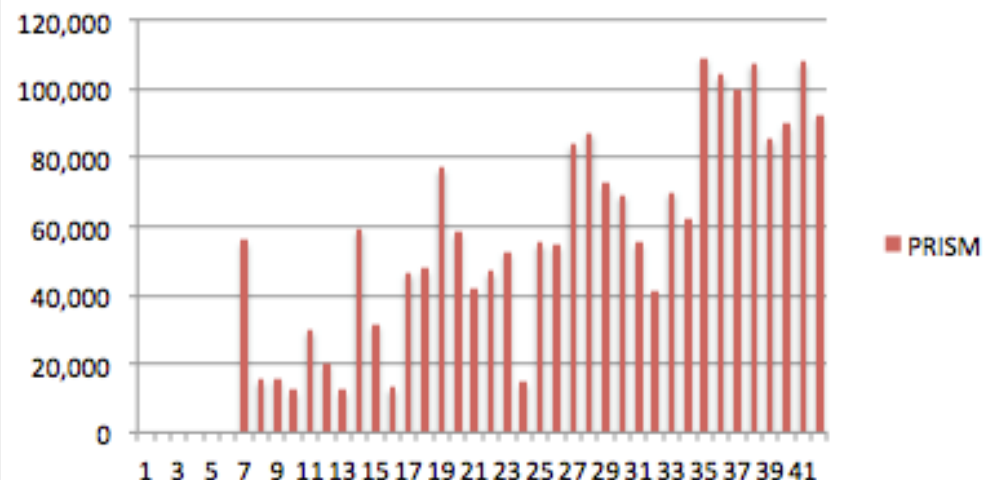


Number of acquisition requests (scenes)

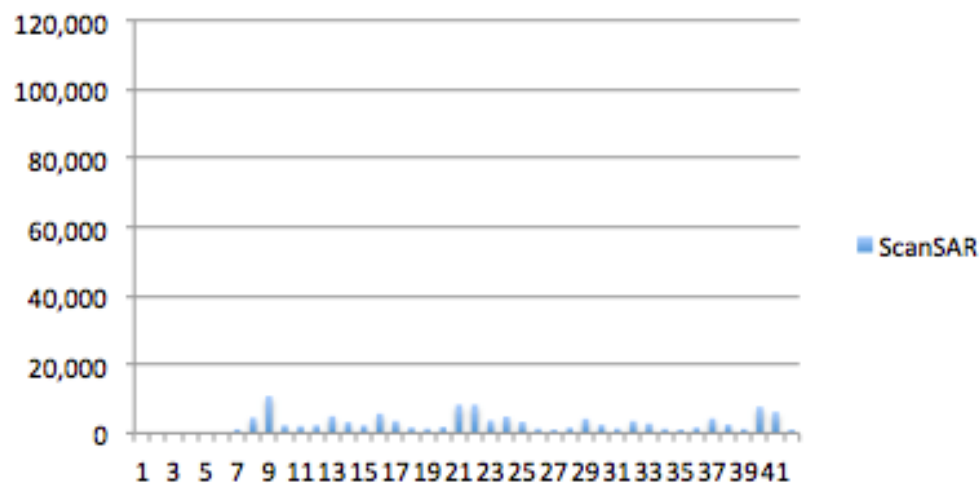
PALSAR FB



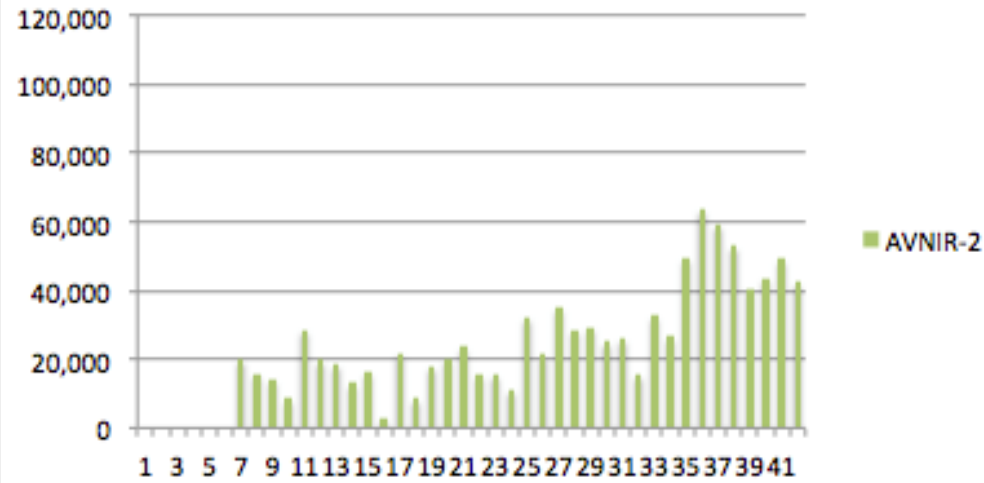
PRISM



ScanSAR



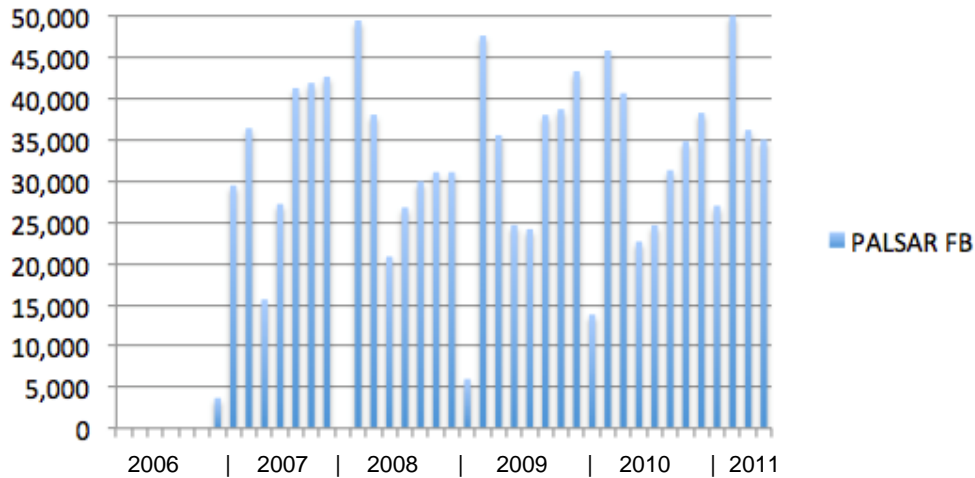
AVNIR-2



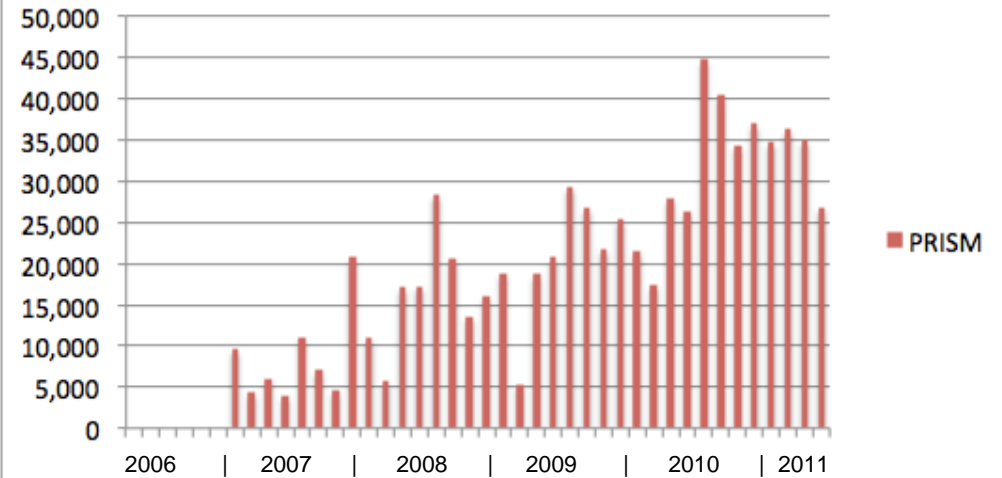


Number of successfully acquired scenes (70km-scene equivalents)

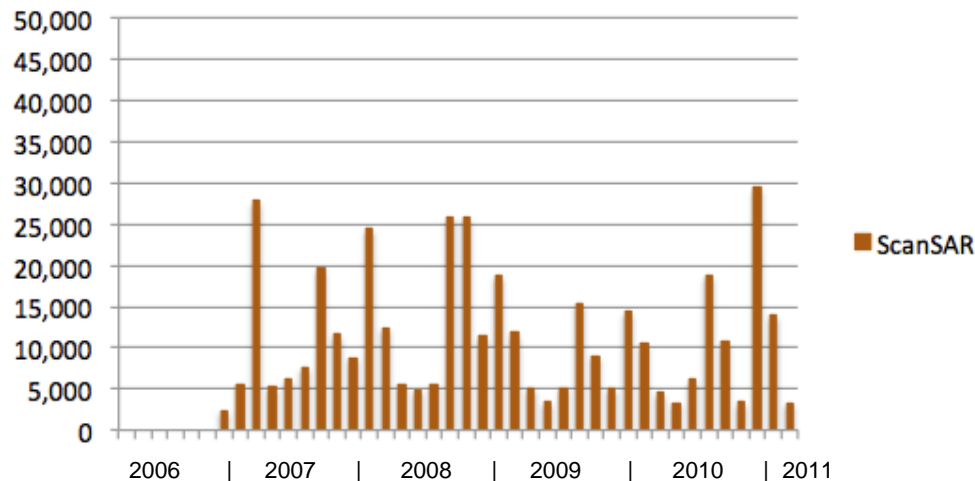
PALSAR FB



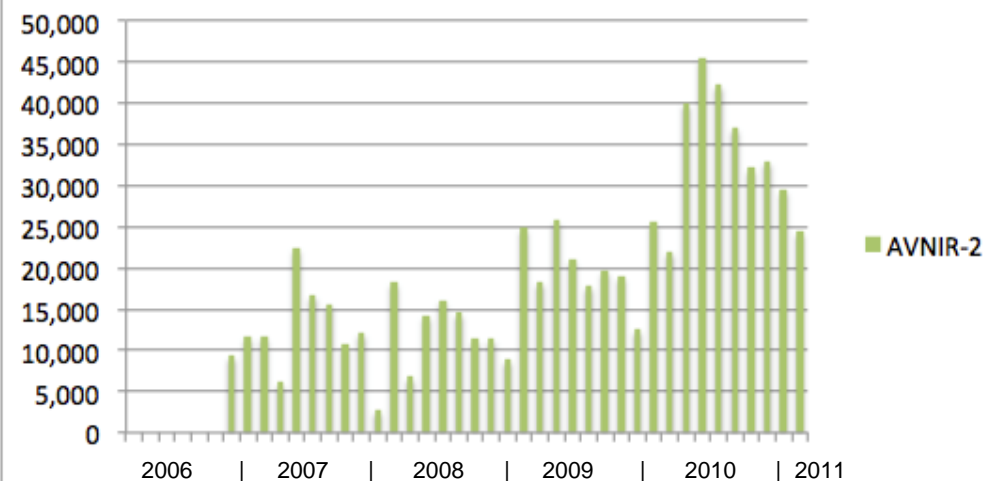
PRISM



ScanSAR



AVNIR-2





Duty cycle (average/day) [%]

Duty cycle (%)

