Collection of global baseline datasets for REDD
-
The ALOS
Systematic Observation Strategy

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ALOS Systematic Observation Strategy

The ALOS mission features a systematic observation strategy which comprises fixed global observation plans for all three instruments.

The strategy is implemented as a top-level foreground mission and with a priority level second only to that of emergency observations.

Additional user requests are accepted, but alignment with the default observation modes for each sensor strongly recommended.

ALOS Systematic Observation Strategy

The observation strategy is developed by JAXA EORC to provide

- Global wall-to-wall coverage
  - Fine resolution
  - Spatially consistent (no gaps)
  - Temporally consistent (regions acquired within 1-2 cycles)
- on a repetitive basis
  - Multi-seasonal (winter+summer / dry+rainy)
  - Multi-annual (mission-long; assessment/revision after 3 years)
- For each of the three sensors (PALSAR,

ALOS Systematic Observation Strategy

Aims:

- Creation of a comprehensive and homogeneous global archive of PALSAR, PRISM and AVNIR-2 data, in which a consistent time-series of fine resolution data can be found for any arbitrary area or extended region on Earth.
- Minimizing programming conflicts

Additional user requests (scientific and commercial via the ALOS Data Nodes, ALOS PI programme, etc.) are scheduled on a routine basis, but alignment with the default observation modes for each sensor is strongly recommended to improve success rate and avoid conflicts.

PRISM & AVNIR-2 default modes

Cycle #	Start date	PRISM	AVNIR-2
7	20-Oct-06	+ 1.2°	Nadir
8	5-Dec-06	- 1.2°	Nadir
9	20-Jan-07	+ 1.2°	Nadir
10	7-Mar-07	- 1.2°	Nadir
11	22-Apr-07	+ 1.2°	Nadir
12	7-Jun-07	- 1.2°	Nadir
13	23-Jul-07	+ 1.2°	Nadir
14	7-Sep-07	- 1.2°	Nadir
15	23-Oct-07	+ 1.2°	Nadir
16	8-Dec-07	- 1.2°	Nadir
17	23-Jan-08	+ 1.2°	Nadir
18	9-Mar-08	- 1.2°	Nadir
19	24-Apr-08	+ 1.2°	Nadir
20	9-Jun-08	- 1.2°	Nadir
21	25-Jul-08	+ 1.2°	Nadir
22	9-Sep-08	- 1.2°	Nadir
23	25-Oct-08	+ 1.2°	Nadir
24	10-Dec-08	- 1.2°	Nadir
25	25-Jan-09	+ 1.2°	Nadir

PRISM

- 3-telescope (triplet) mode
  - 35-km swath
  - Alternate viewing
    +/- 1.2 ° (across track)
  - Odd cycles: +1.2 °
  - Even cycles: -1.2 °

- 2-telescope mode
  - (nadir & backward)
  - 70 km & 35 km swath (selected regional)

AVNIR-2

- Nadir viewing mode

PRISM & AVNIR-2

Advanced Land Observing Satellite

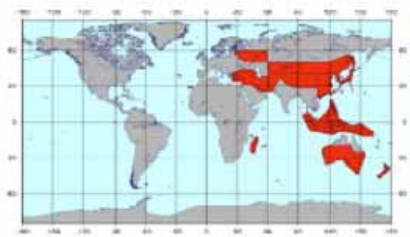
Aim:

• One global coverage per year for each sensor

Timing based on cloud statistics, seasonality and sun elevation

CYCLE_15 / 23-Oct.-2007
(+1.2° off-nadir)

CYCLE_16 / 08-Dec.-2007
(-1.2° off-nadir)



CYCLE_15 / 23-Oct.-2007

CYCLE_16 / 08-Dec.-2007

Sensor mode	Pointing	Oversevation mode
OB1	+1.2°/ -1.2°	Tripret (35km)
OB2	0°	Nadir (70km) + Backward (35km)

CYCLE_19 / 24-Apr.-2008
(+1.2° off-nadir)

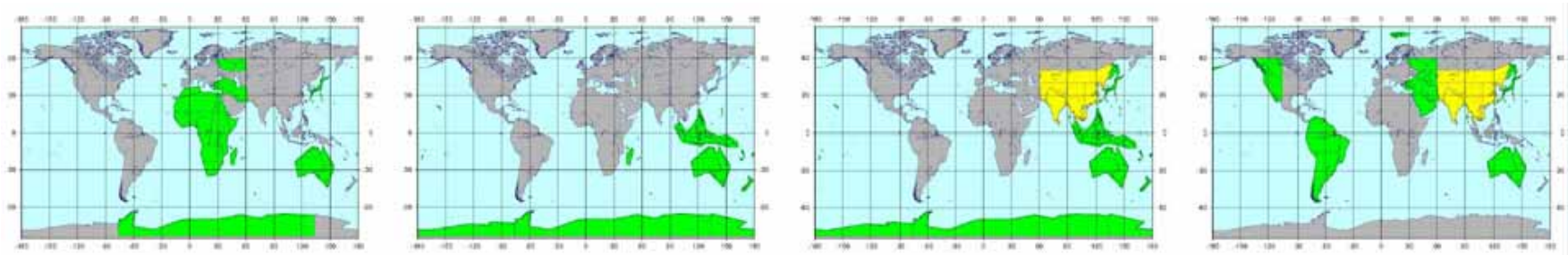
CYCLE_20 / 09-Jun.-2008
(-1.2° off-nadir)

PRISM & AVNIR-2 Observation results

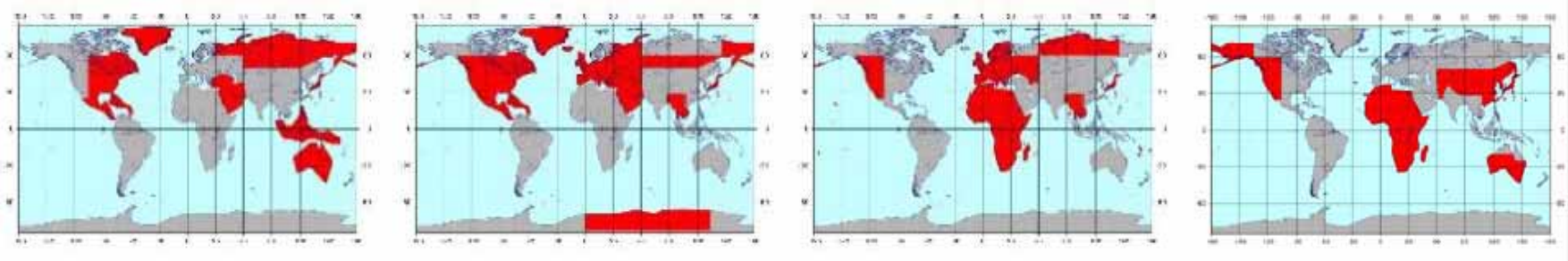
PRISM (cycles 7-17)

63%

(211.500 scenes / 585.600 stereo pairs/triplets)



AVNIR-2 (cycles 7-17)



76%

(139.300 scenes)

PALSAR - 4 default modes

Cycle #	Start date	PALSAR	
		Ascending	Descending
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

Ascending obs. (10.30 pm)

- Single-pol (HH) 34.3 °
  - Global / Annual
  - December ~ March
- Dual-pol (HH+HV) 34.3 °
  - Global / Annual
  - May ~ October
- Fully polarimetric 21.5 °
  - Regional / Bi-annual
  - March ~ May

One cycle/year open for arbitrary mode requests

Descending obs. (10.30 am)

- ScanSAR (HH) 5-beam
  - Global / Annual
  - Regional / every cycle

ALOS Acquisition Strategy
PALSAR Fine resolution

Advanced Land Observing Satellite

Year		05	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
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																																									

Cal/val period

HH 41.5 deg.

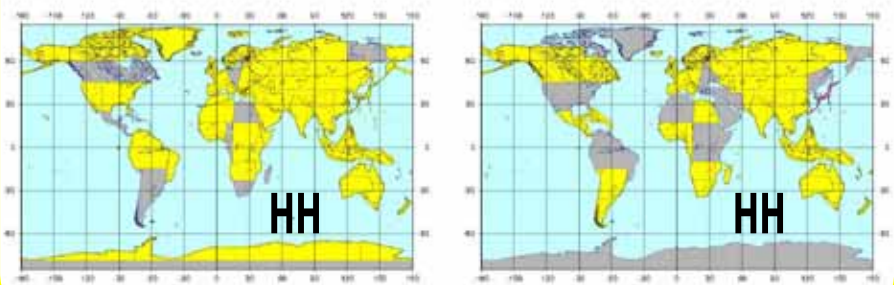
HH+HV; 41.5 deg.

Polarimetric; 21.5 deg.

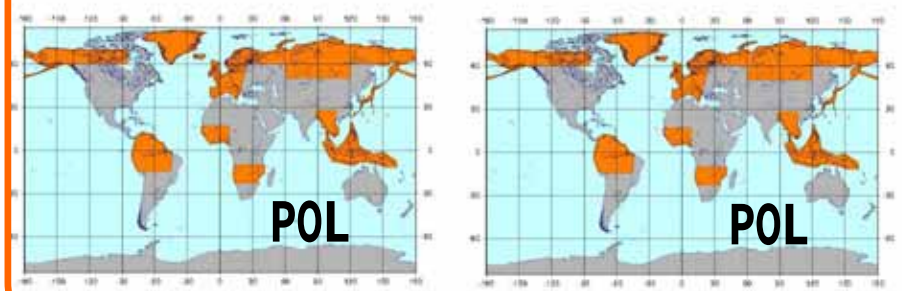
PALSAR Ascending (pm) observations

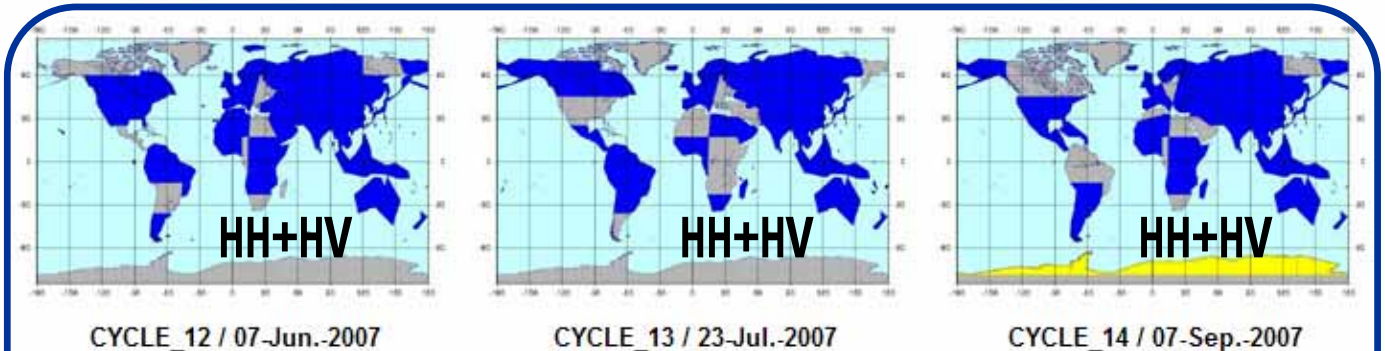
Advanced Land Observing Satellite

Single-pol (HH) 34.3 °
- Global / Annual
- December ~ March



Fully polarimetric 21.5 °
- Regional / Bi-annual
- March ~ May

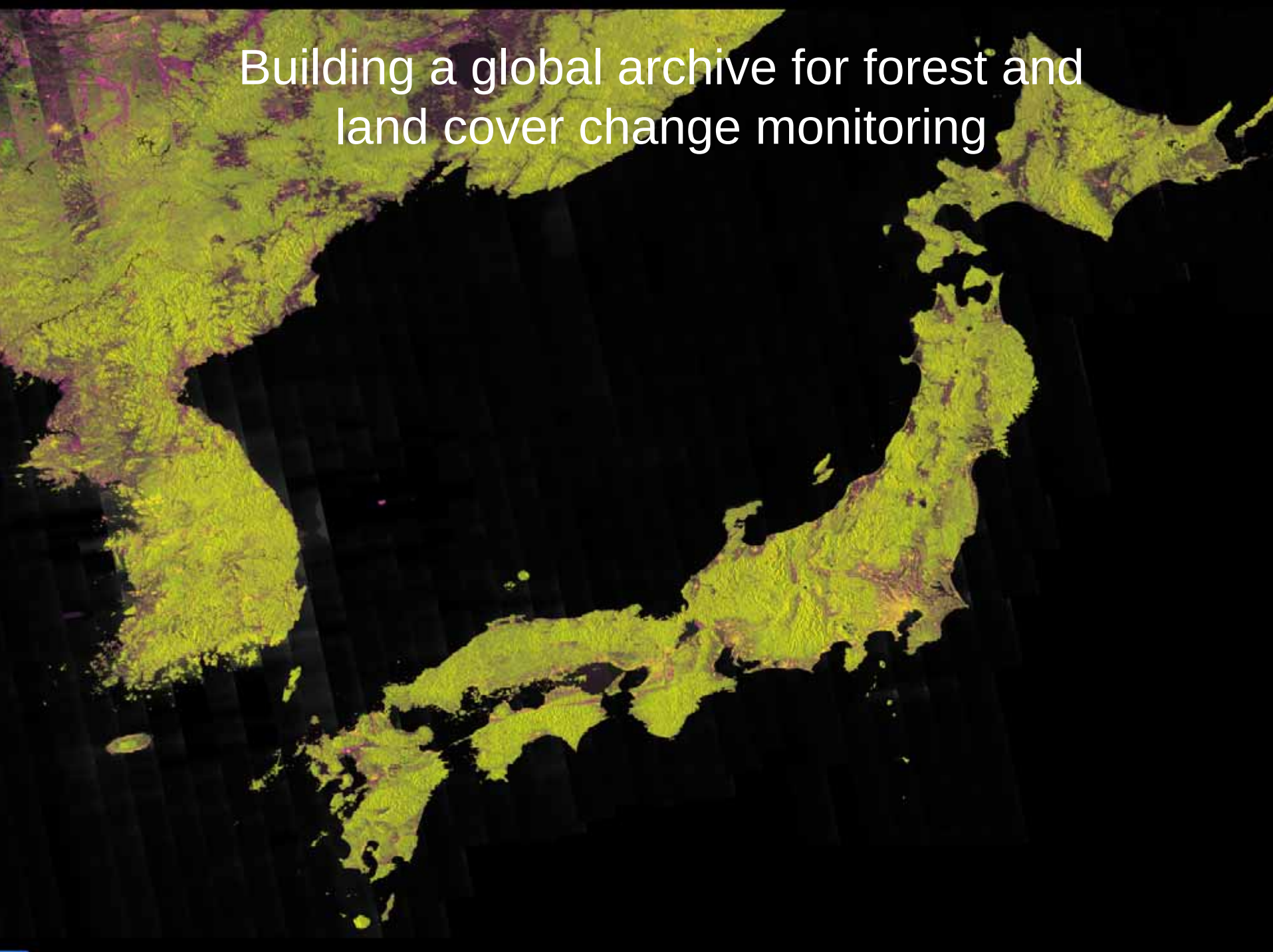




Dual-pol (HH+HV) 34.3 °
- Global / Annual
- May ~ October

One cycle/year open for arbitrary mode requests

Building a global archive for forest and land cover change monitoring



Building a global archive for forest and land cover change monitoring

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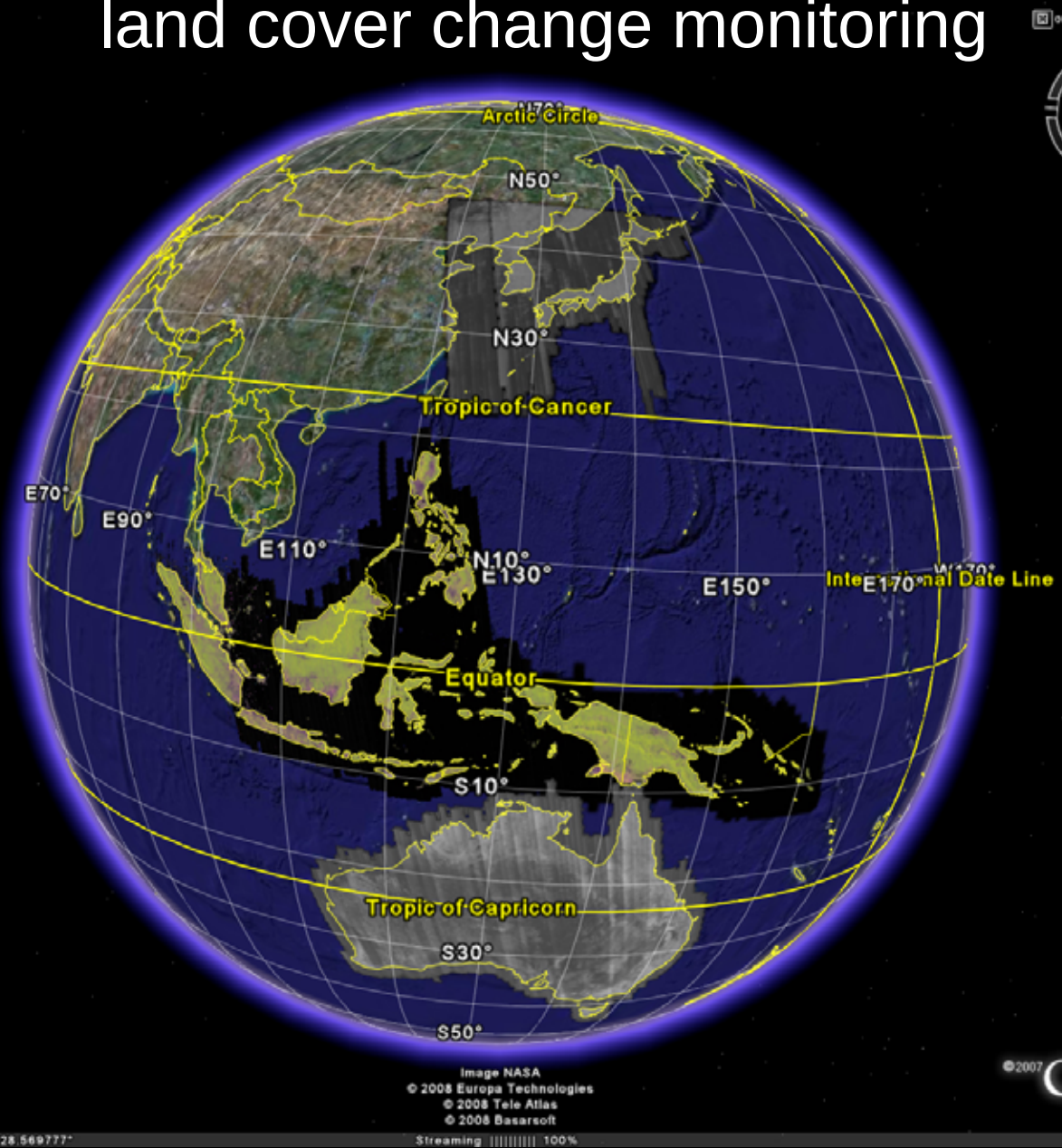

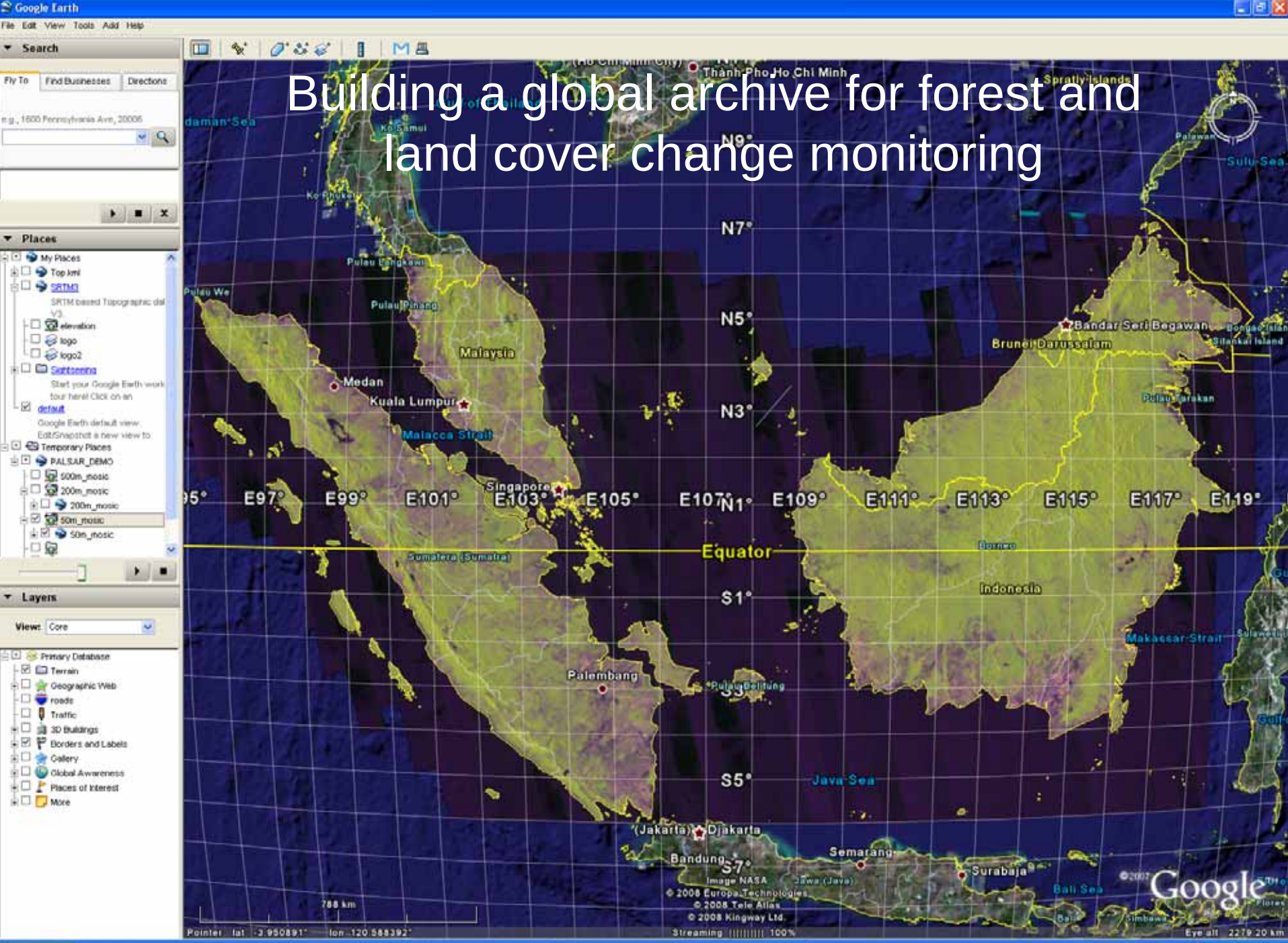
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Traffic
3D Buildings
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Places of Interest
More
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Spratly Islands
Sulu Sea
Palawan
Ko Samui
Ko Phuket
Pulau Langkawi
Pulau We
Pulau Pinang
Malaysia
Medan
Kuala Lumpur
Malacca Strait
Singapore
Bandar Seri Begawan
Brunei Darussalam
Pulau Tarakan
Sumatera (Sumatra)
Equator
Indonesia
Makassar Strait
Palembang
Pulau Belitung
Java Sea
(Jakarta) Djakarta
Bandung
Semarang
Surabaya
Bali Sea
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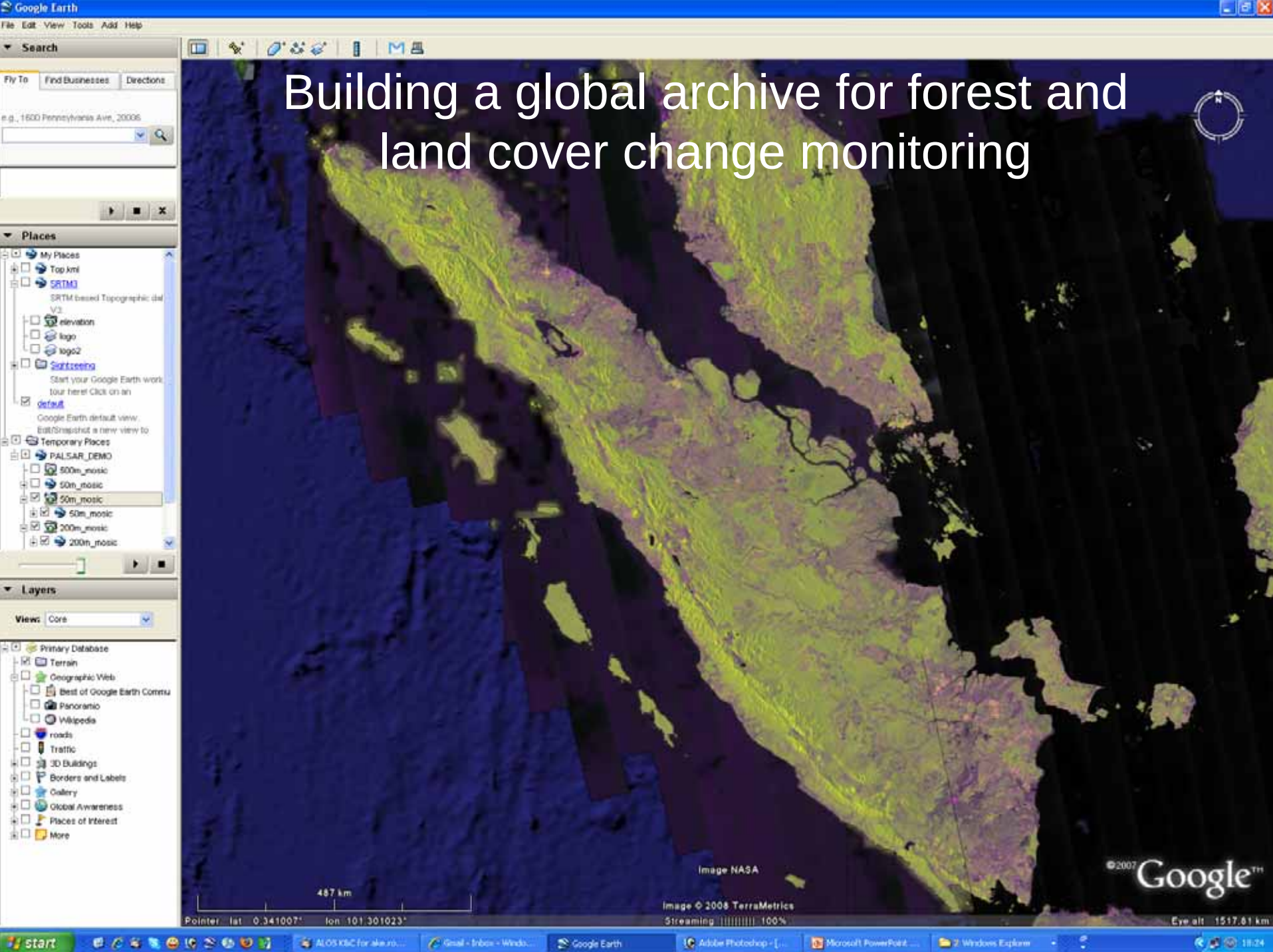
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Global Awareness
Places of Interest
More
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Image NASA
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Streaming 100%
Eye alt 1517.61 km
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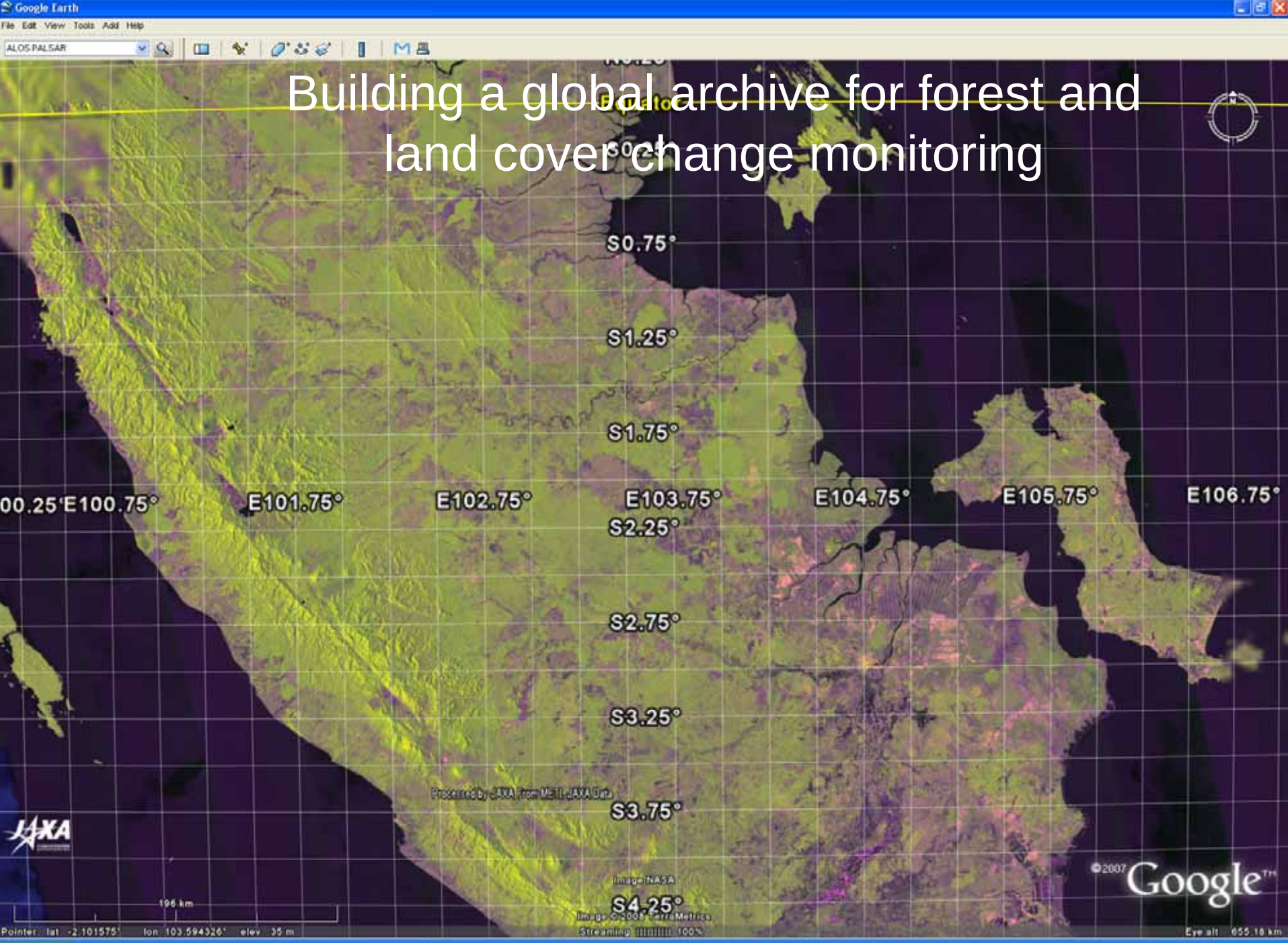
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JAXA
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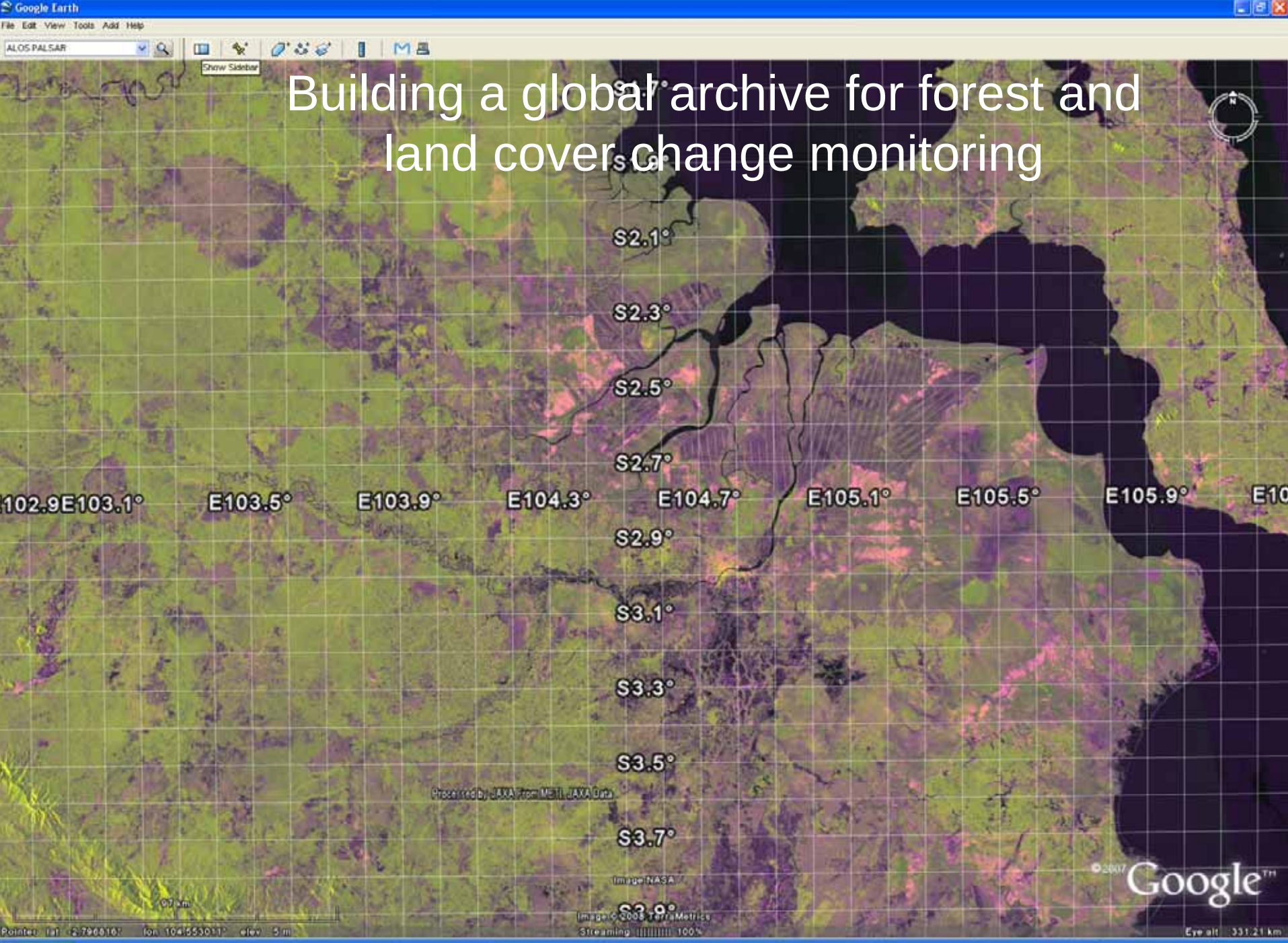
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Building a global archive for forest and land cover change monitoring
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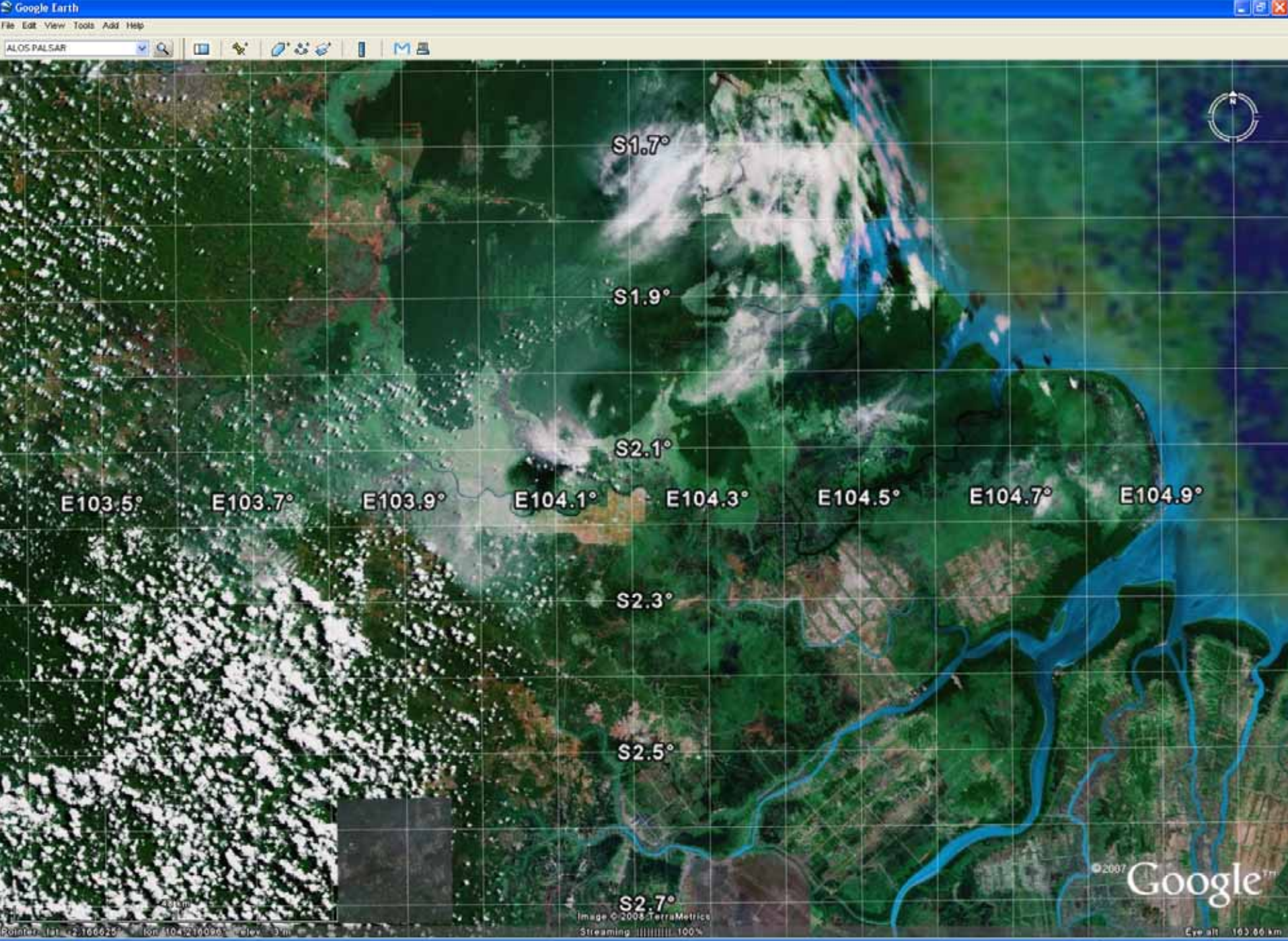
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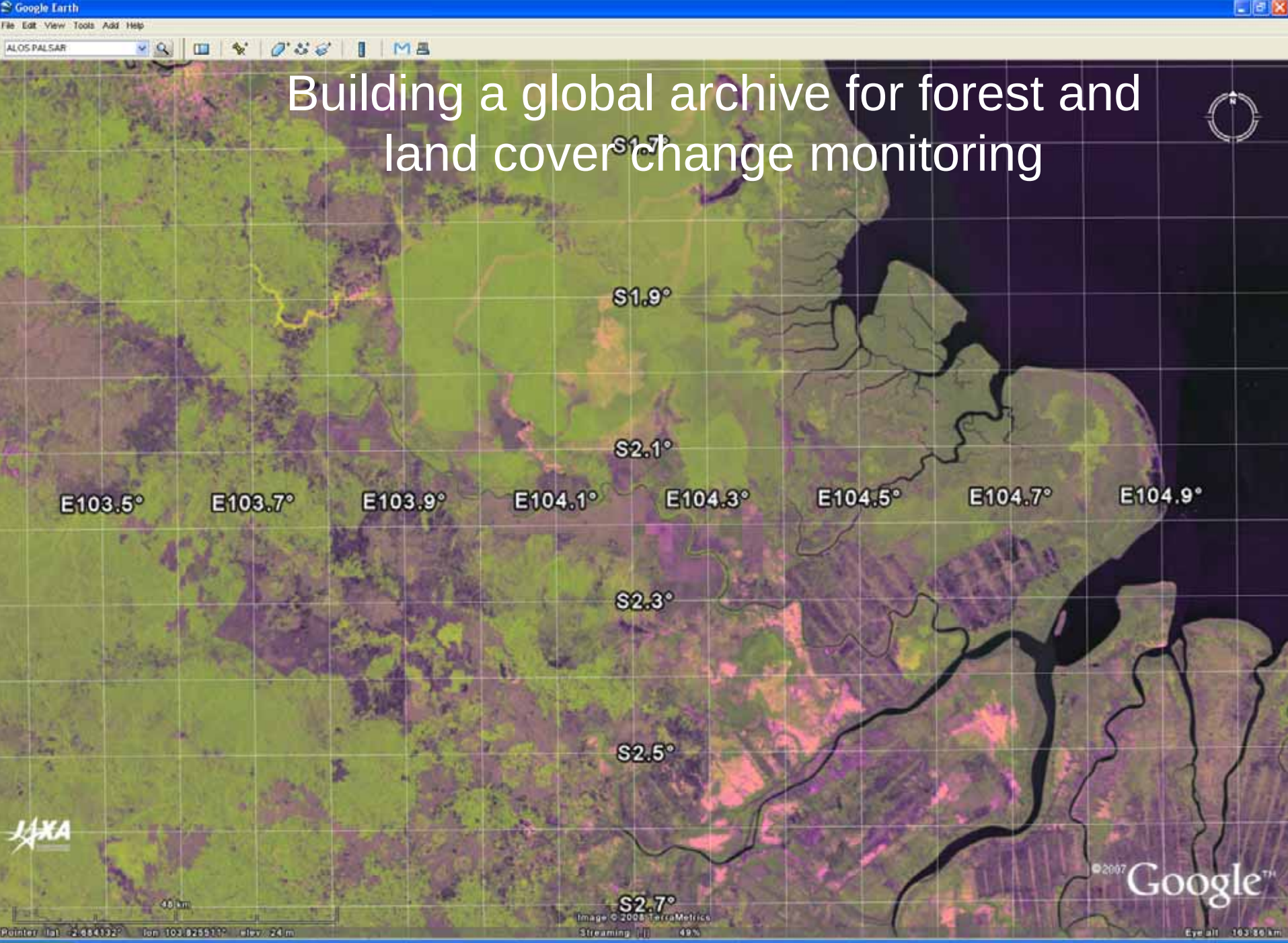
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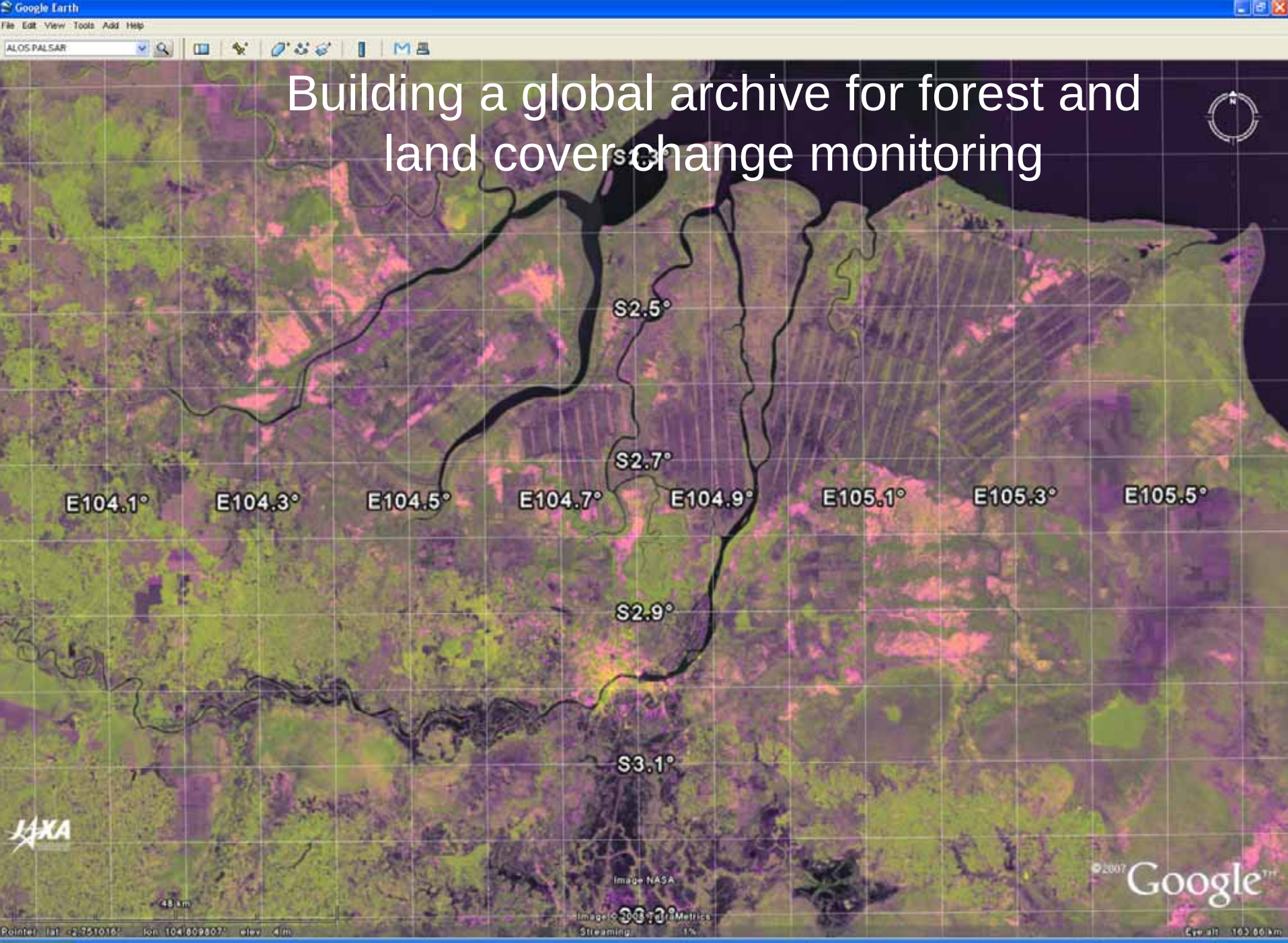
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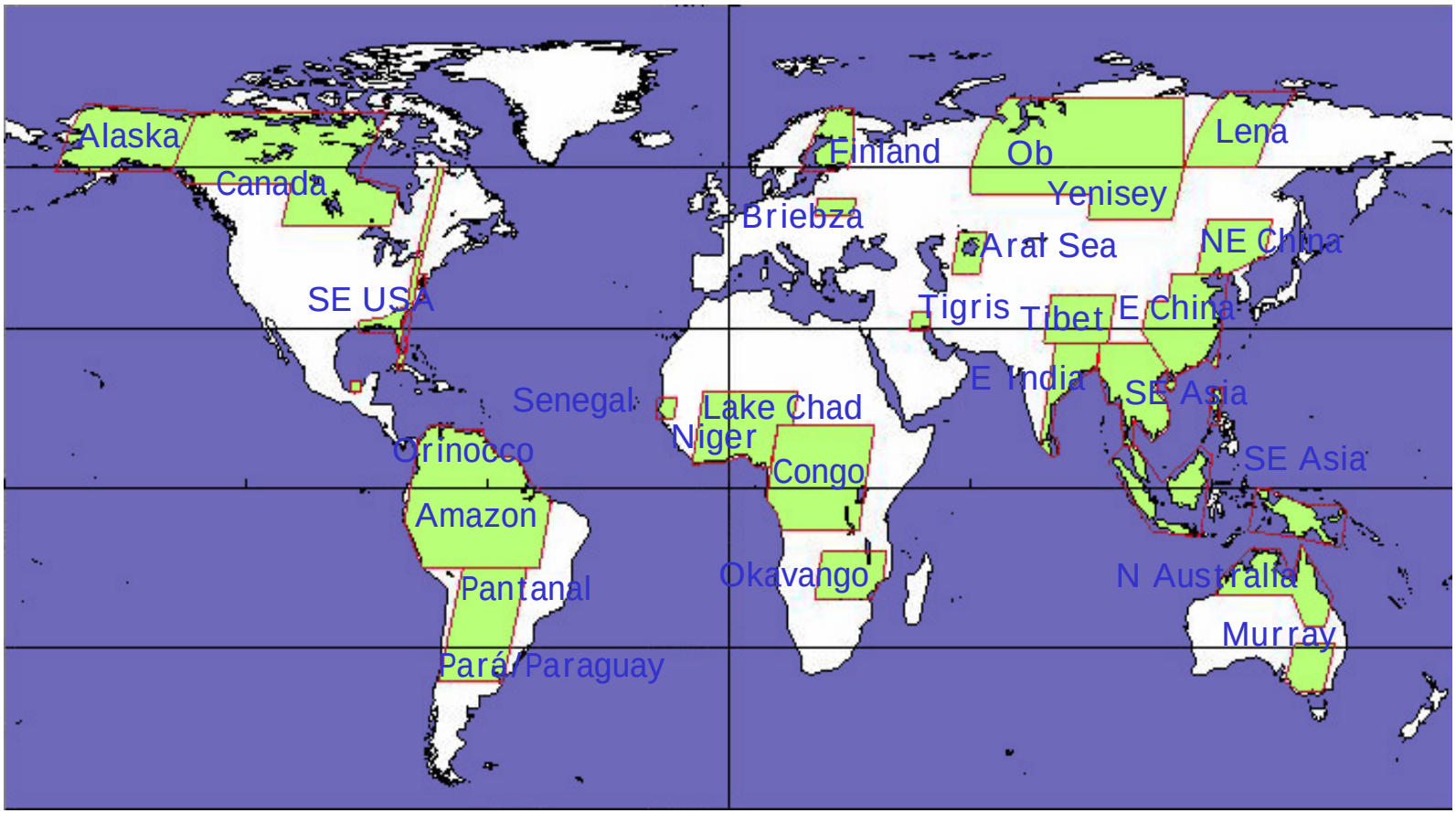
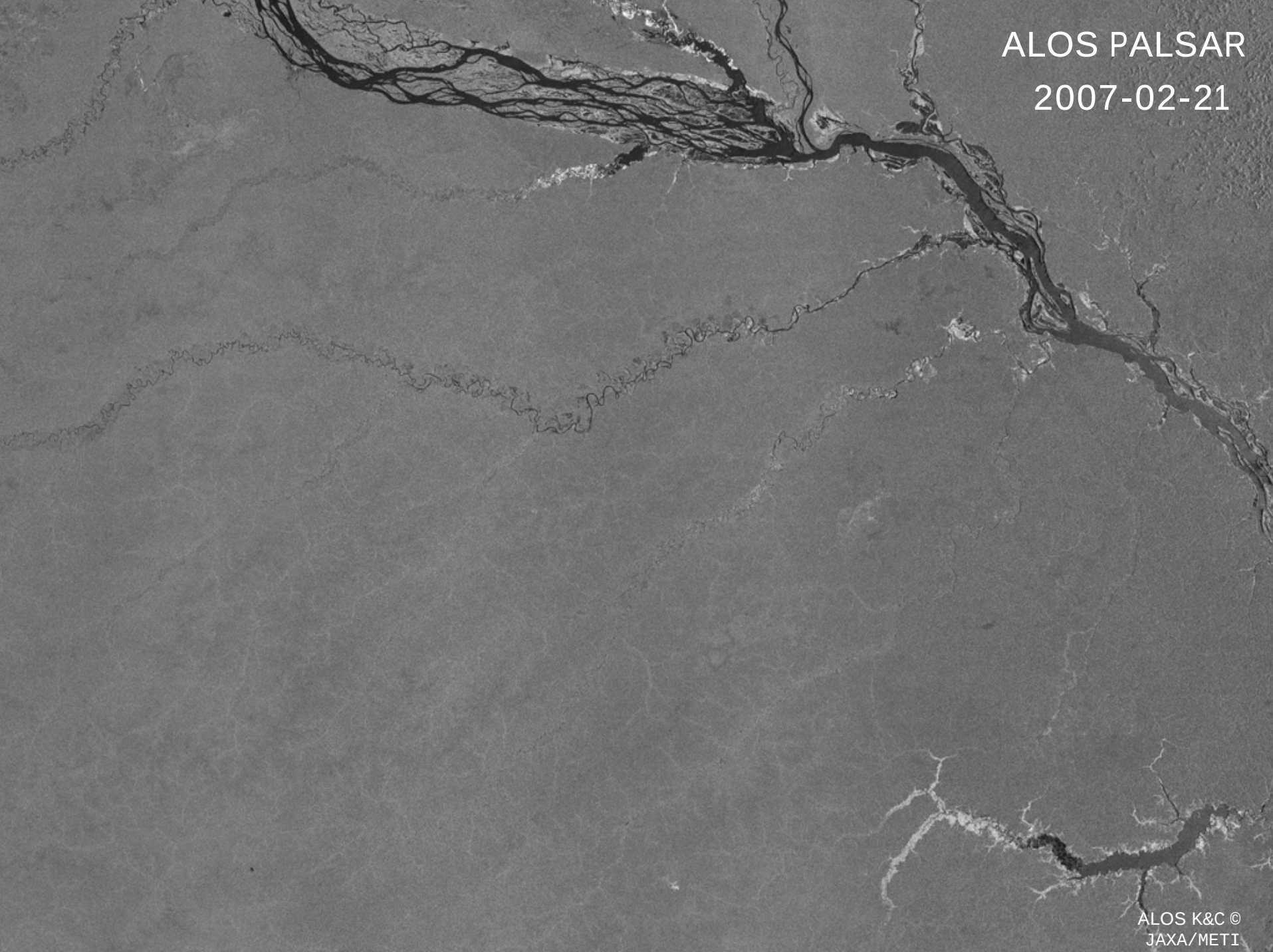
Building a global archive for forest and land cover change monitoring

Intensive monitoring wetlands



100 m ScanSAR
Every cycle (46 days) during 12 months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2007-02-21
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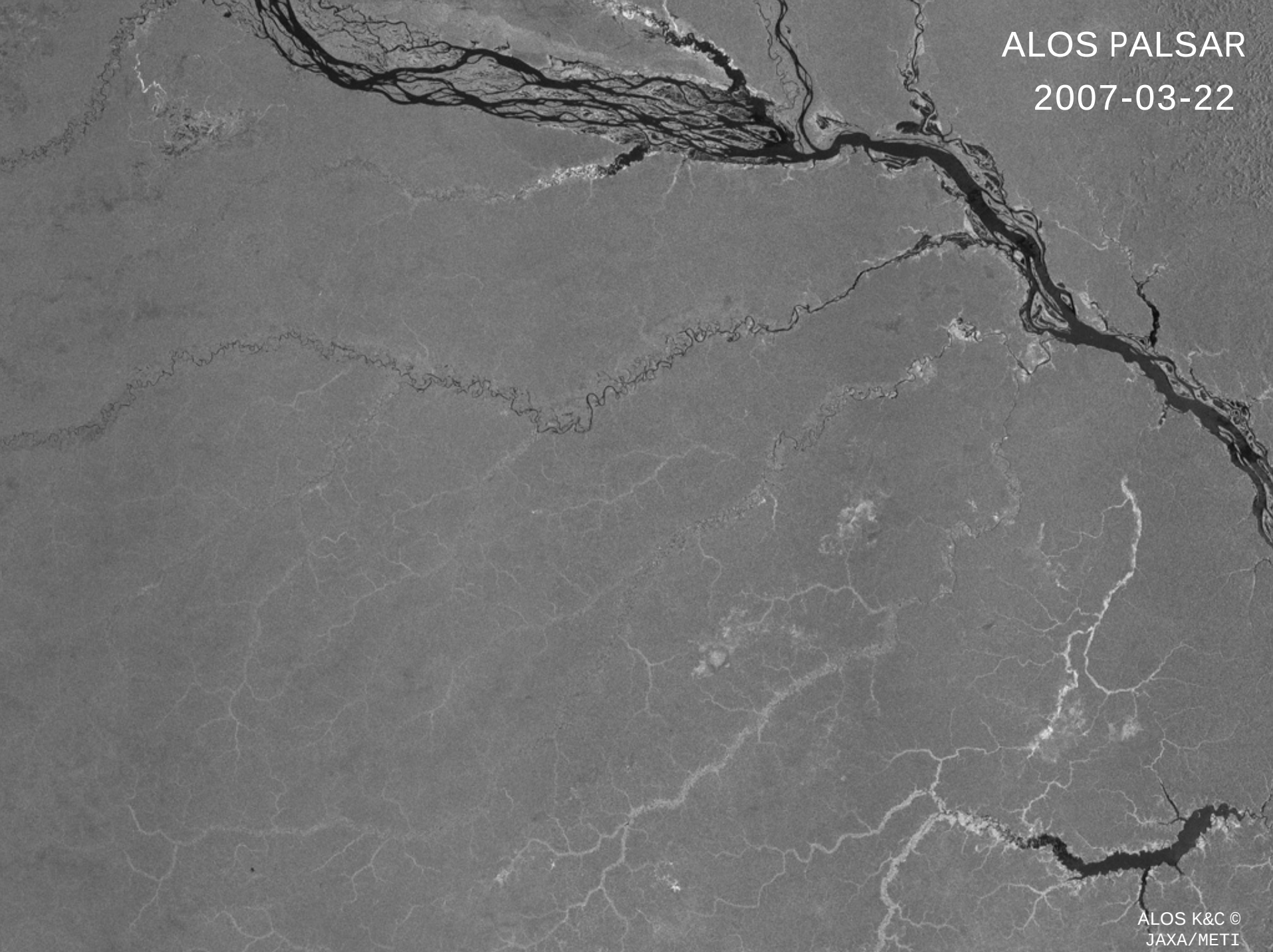
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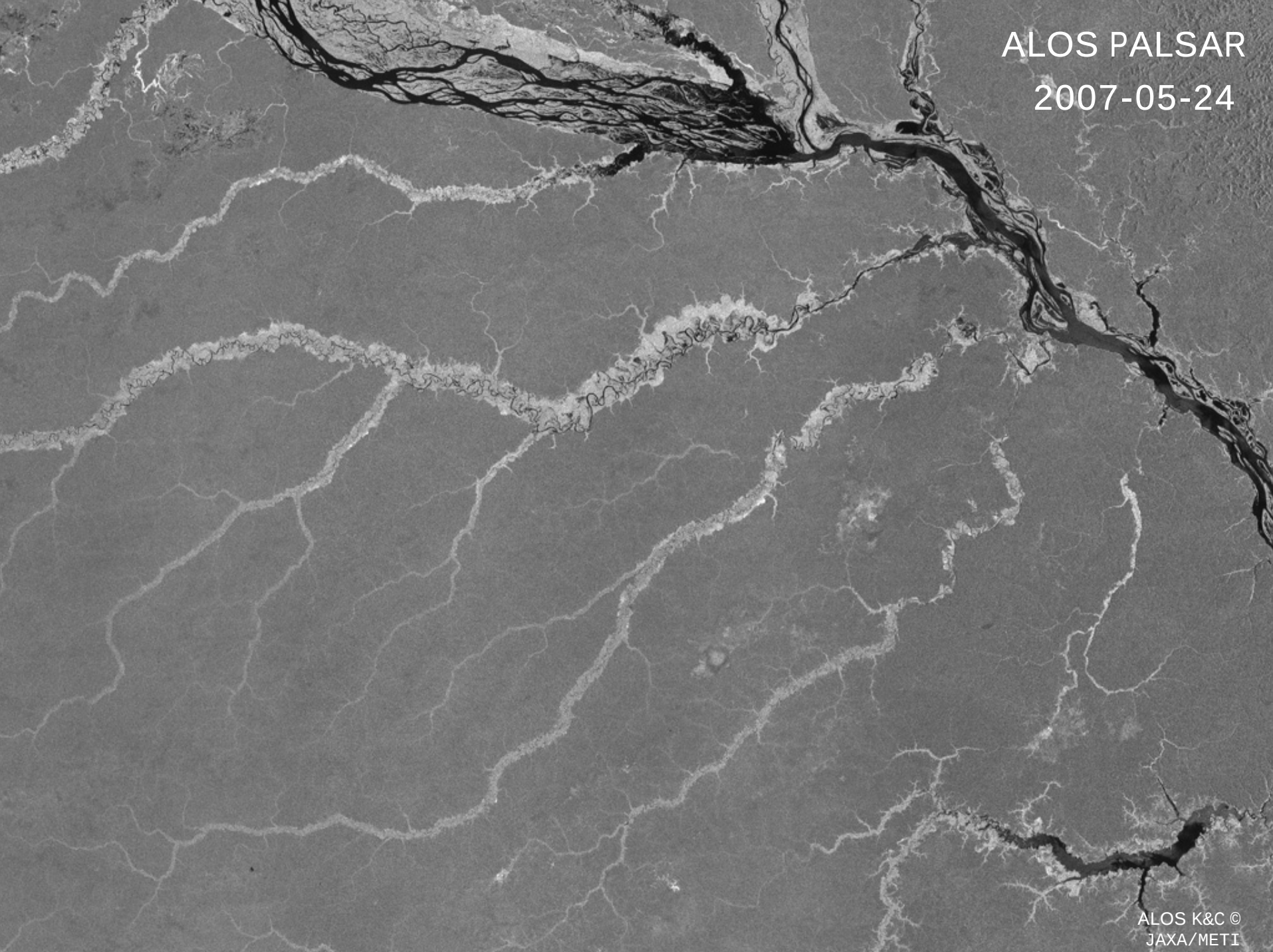
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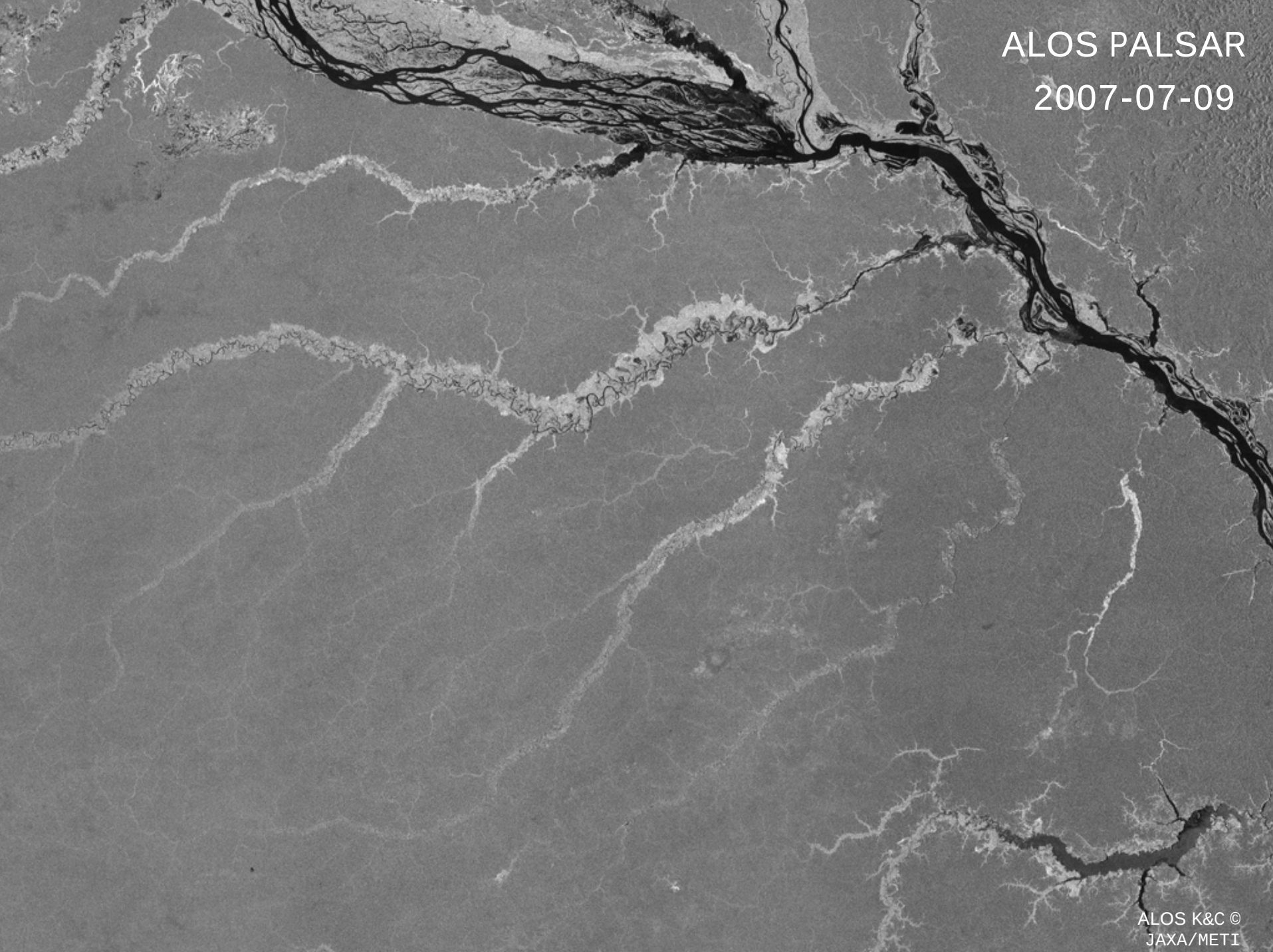
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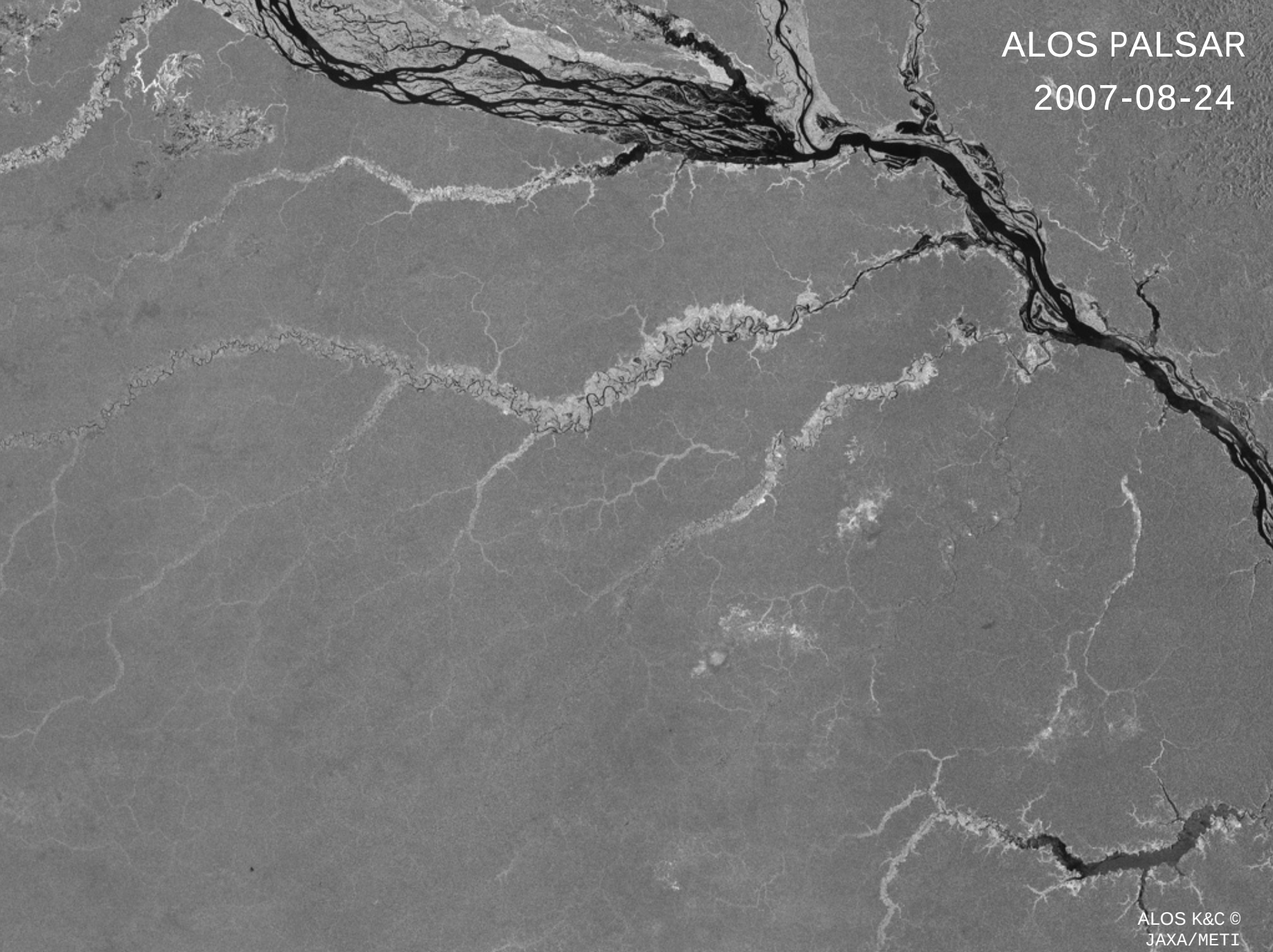
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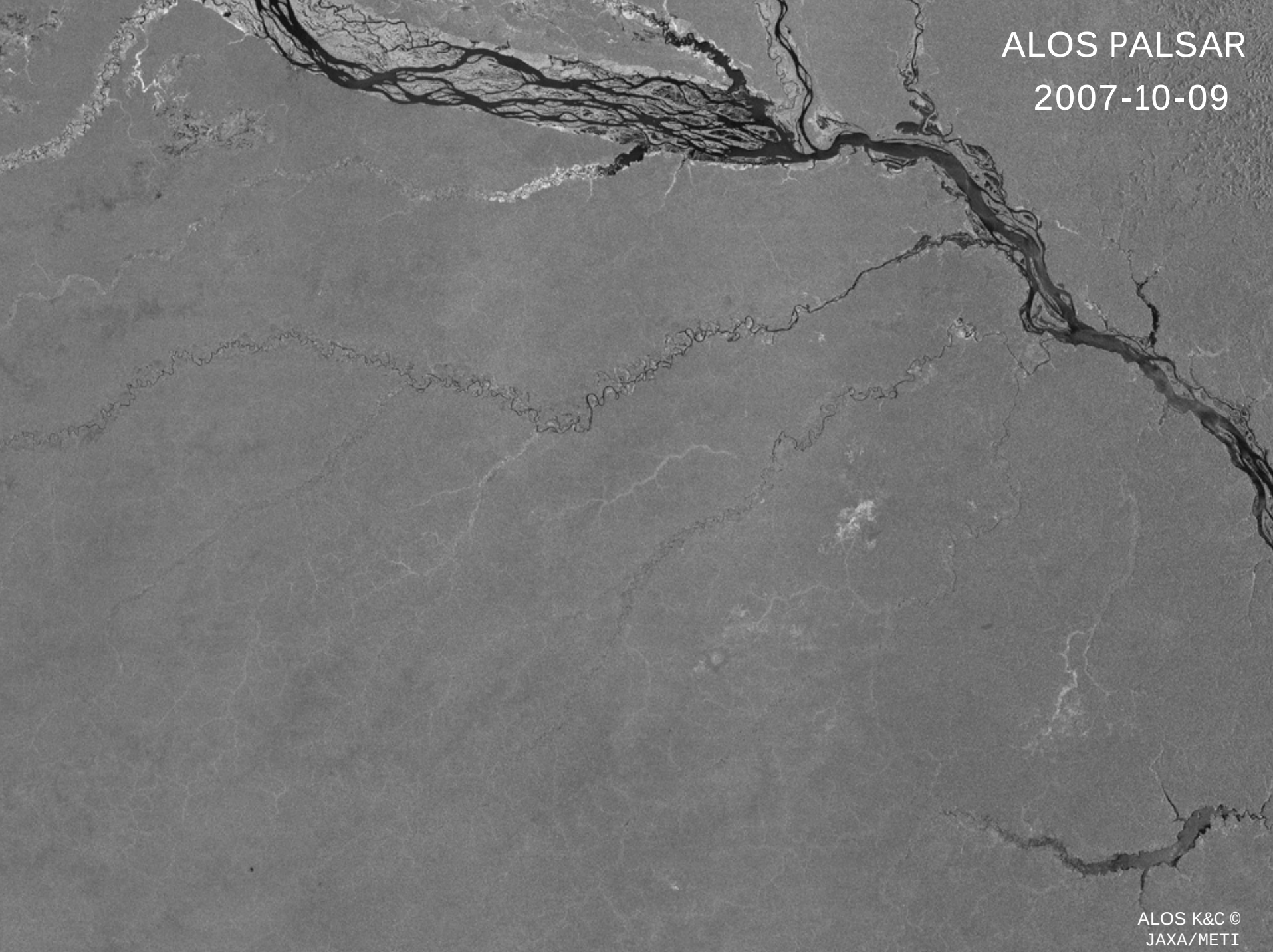
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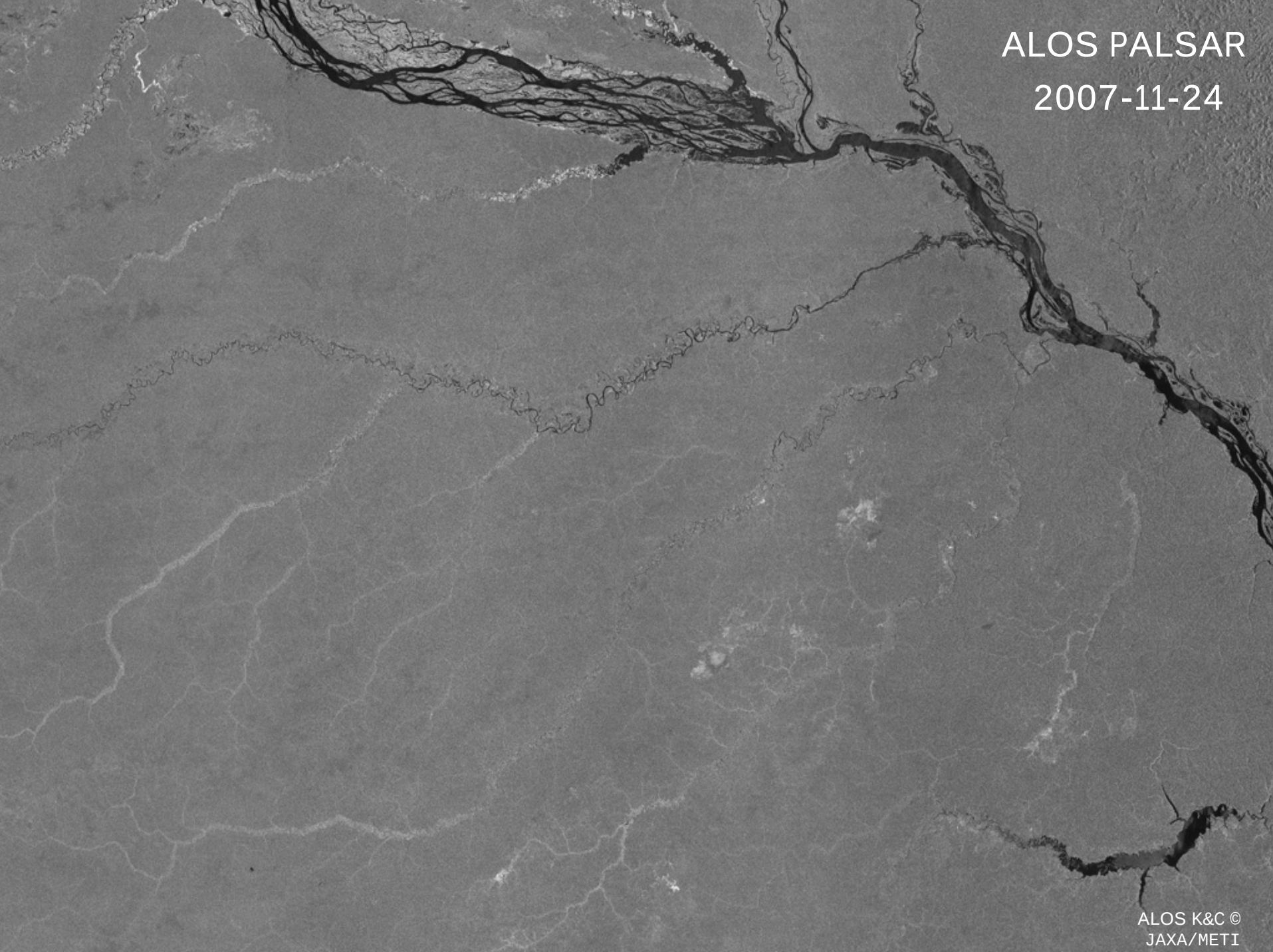
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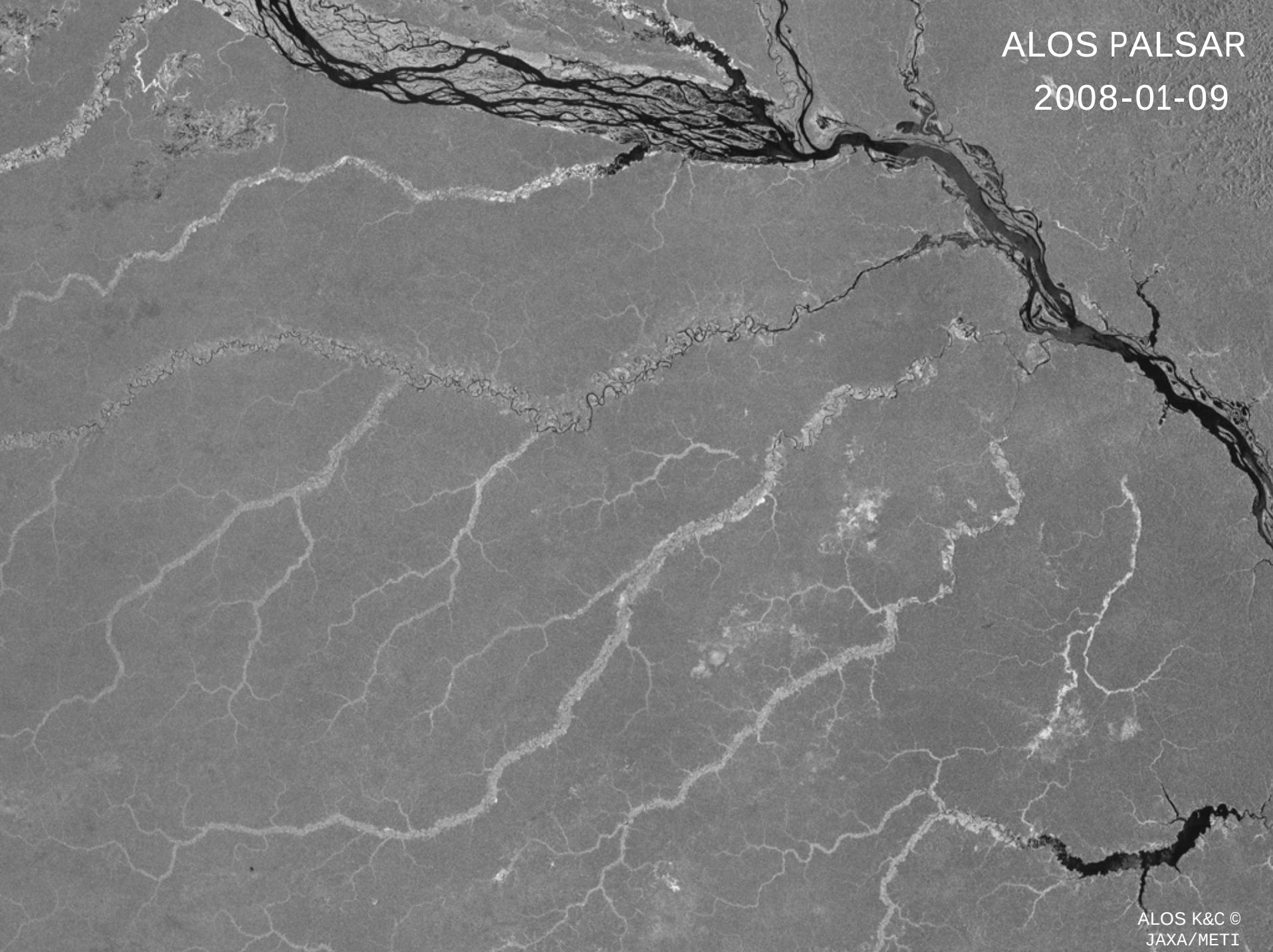
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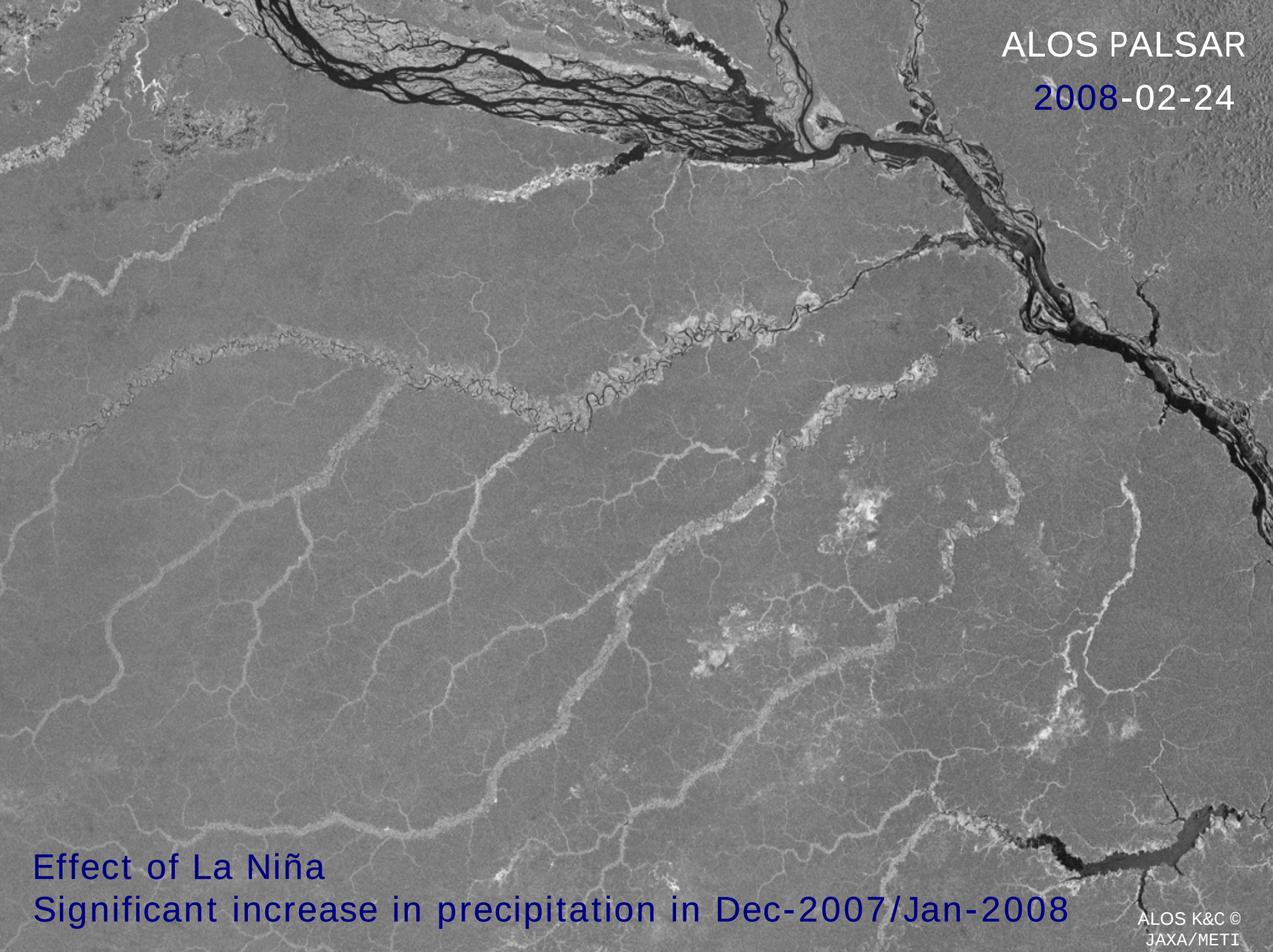
ALOS PALSAR
2008-02-24
Effect of La Niña
Significant increase in precipitation in Dec-2007/Jan-2008
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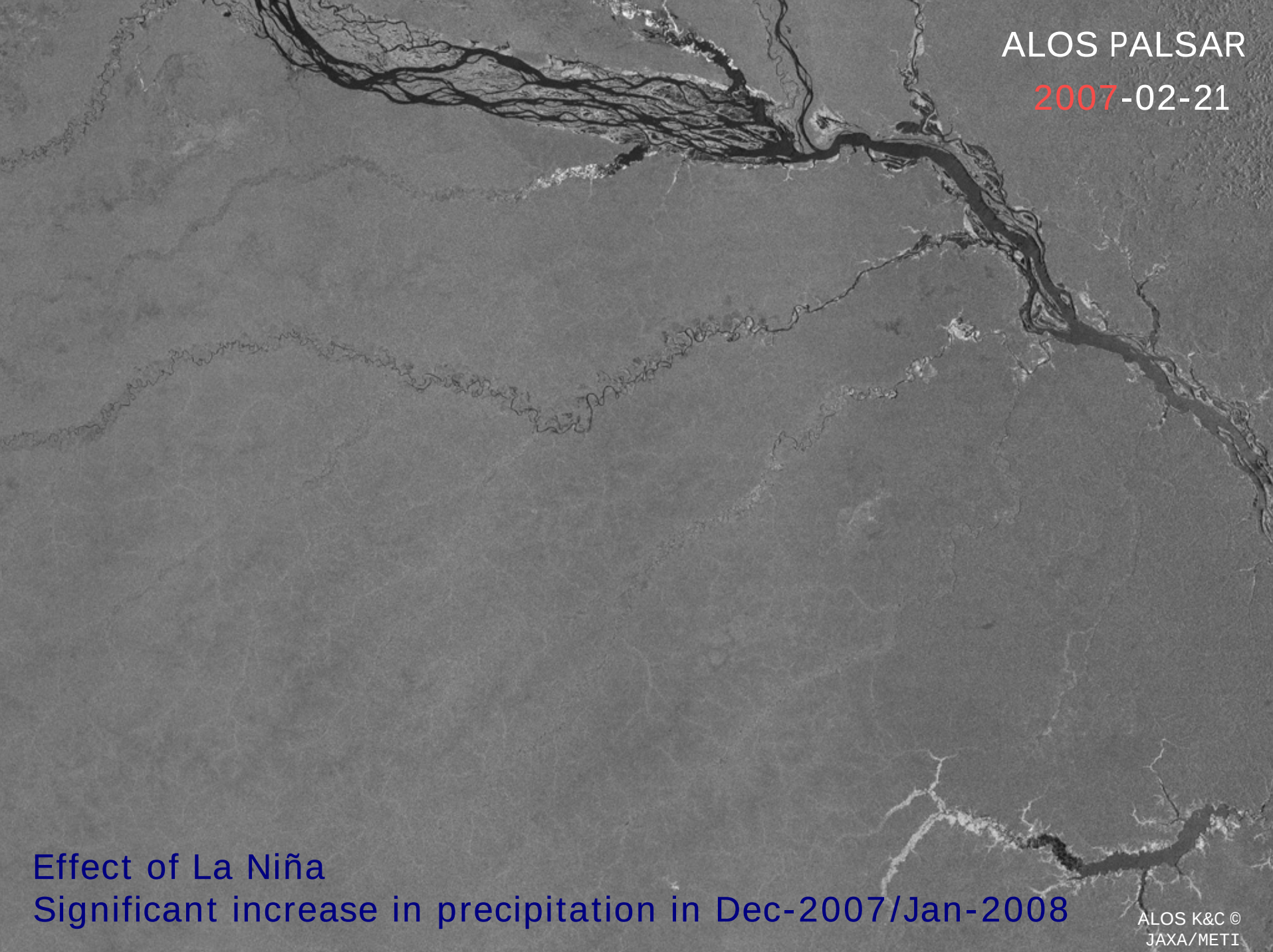
ALOS PALSAR
2007-02-21
Effect of La Niña
Significant increase in precipitation in Dec-2007/Jan-2008
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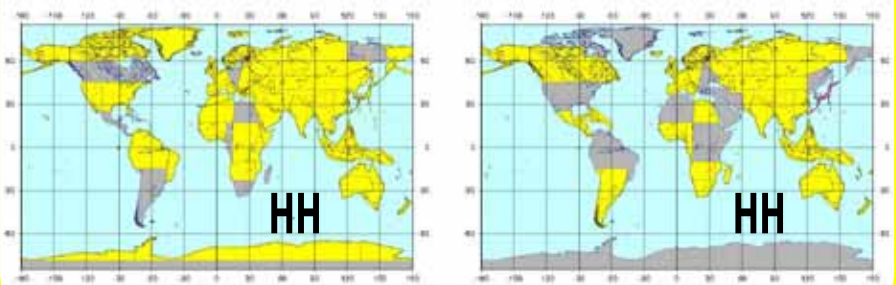
JAXA/METI

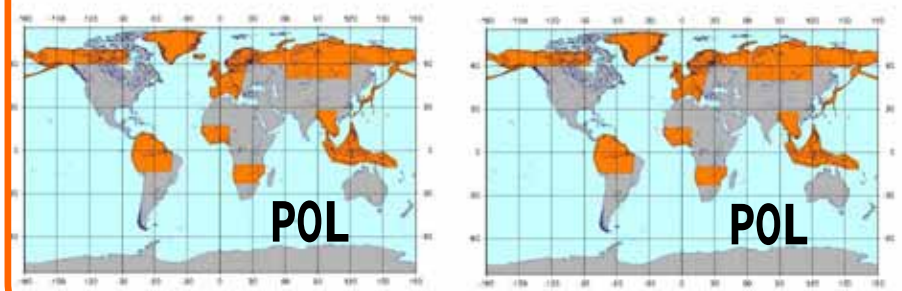
PALSAR Observation results

63%
(65,900 scenes)

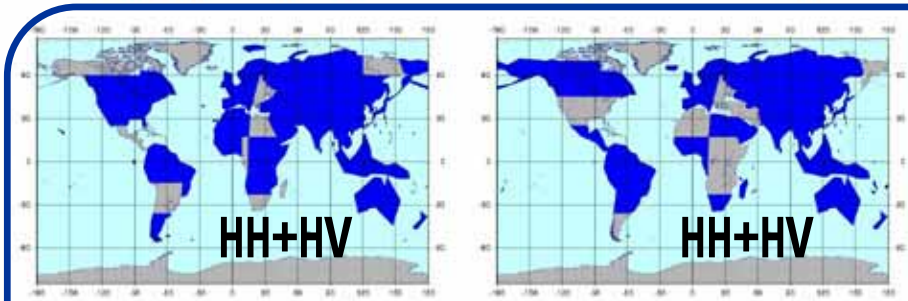


CYCLE_08 / 05-Dec.-2006 CYCLE_09 / 20-Jan.-2007

65%
(42,900 scenes)

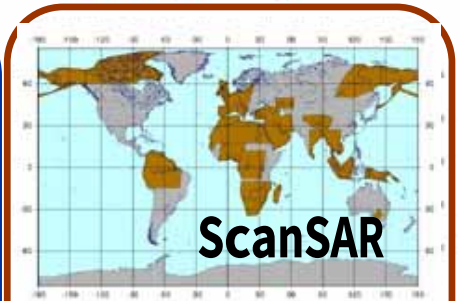


CYCLE_10 / 07-Mar.-2007 CYCLE_11 / 22-Apr.-2007



CYCLE_12 / 07-Jun.-2007 CYCLE_13 / 23-Jul.-2007 CYCLE_14 / 07-Sep.-2007

80%
(125,900 scenes)



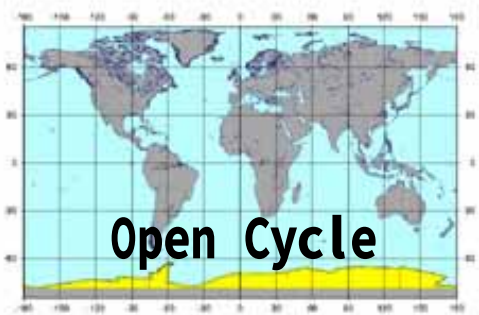
CYCLE_08 / CYCLE_14

55%
(16,700 scenes)

PALSAR Observation results

Highlighting the importance of systematic observation planning:

16%
(7,400 scenes)



CYCLE_15 / 23-Oct.-2007

88%
(49,500 scenes)

CYCLE_16 / 8-Dec-2007

83%
(38,100 scenes)

CYCLE_17 / 23-Jan-2008

During the “open cycle” (23/10 - 7/12/2007) - when no fixed observation mode was applied and users - acquisition success rate decreased to 16% (47,500 scenes requested, 7,400 scenes acquired)

Conclusions

Systematic wall-to-wall acquisitions for ALOS provide first-of-the-kind consistent fine resolution global base-line coverage at a repetitive basis. It is a pre-requisite for credible and reliable REDD monitoring support.

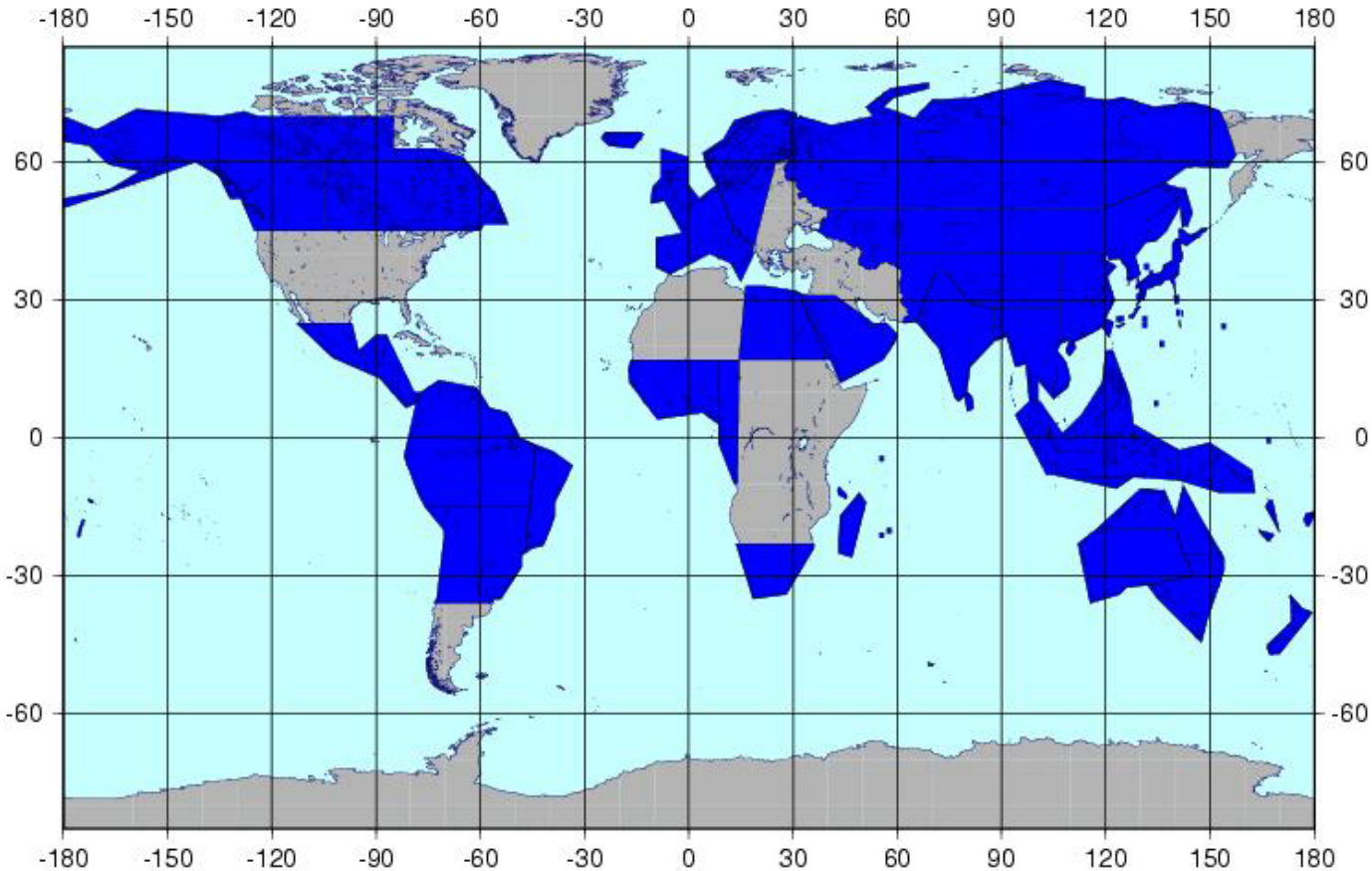
Tentative plans to continue acquisition strategy until ALOS EOL. Should be endorsed by GEO.

ALOS follow-on will be dedicated to diaster AND forest/wetlands monitoring. New acquisition strategy very likely. Should be endorsed by GEO.

Acquisition synergy with other missions advantageous for all space agencies. Should be endorsed by GEO.

Planned observations

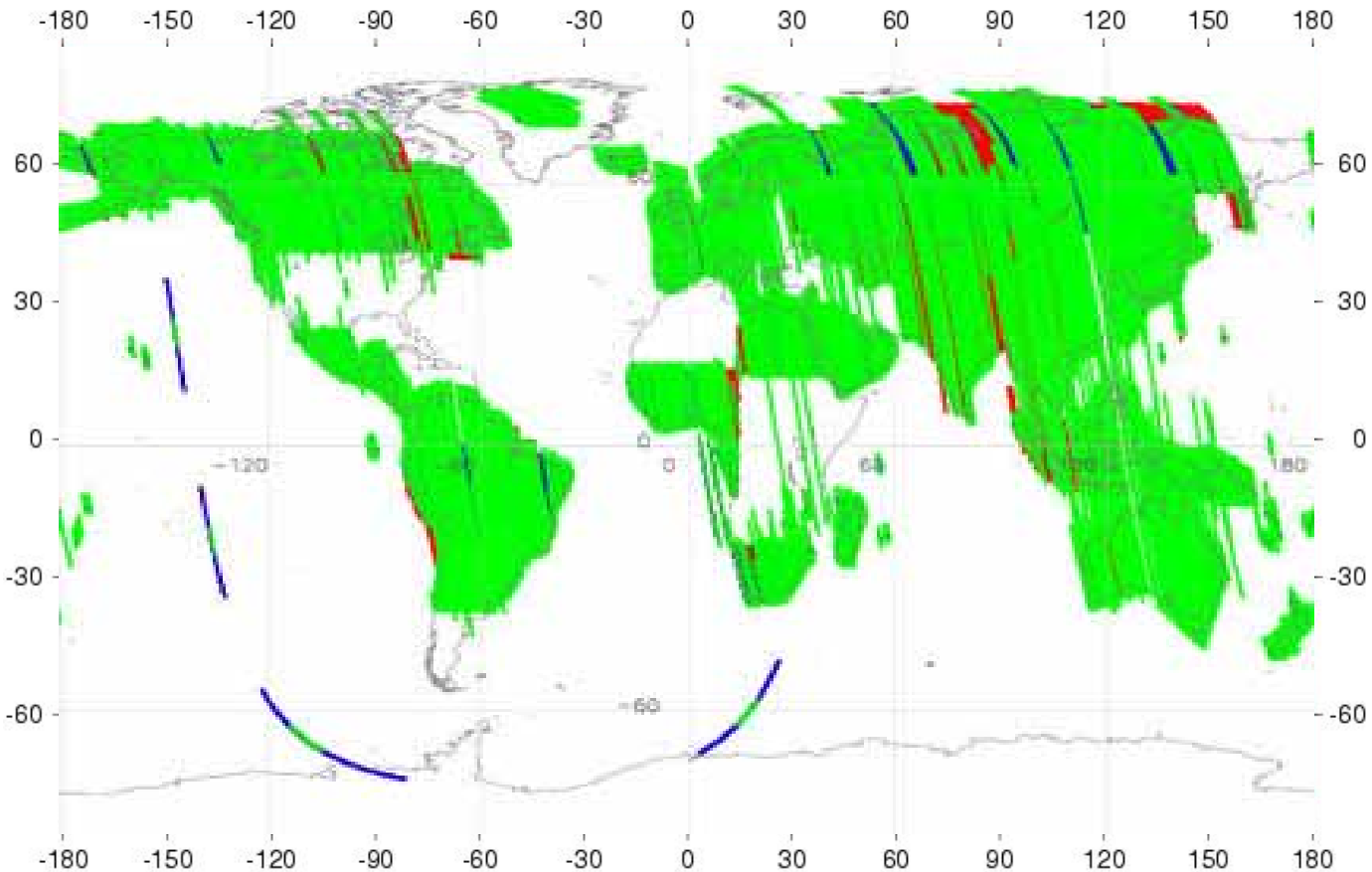
PALSAR - Ascending
Cycle 13 (23-JUL-07 – 6-SEP-07)



Default mode: HH+HV 34.3°

Actual observations

PALSAR - Ascending
Cycle 13 (23-JUL-07 – 6-SEP-07)



48,123 scenes requested
41,947 scenes acquired

87% success rate

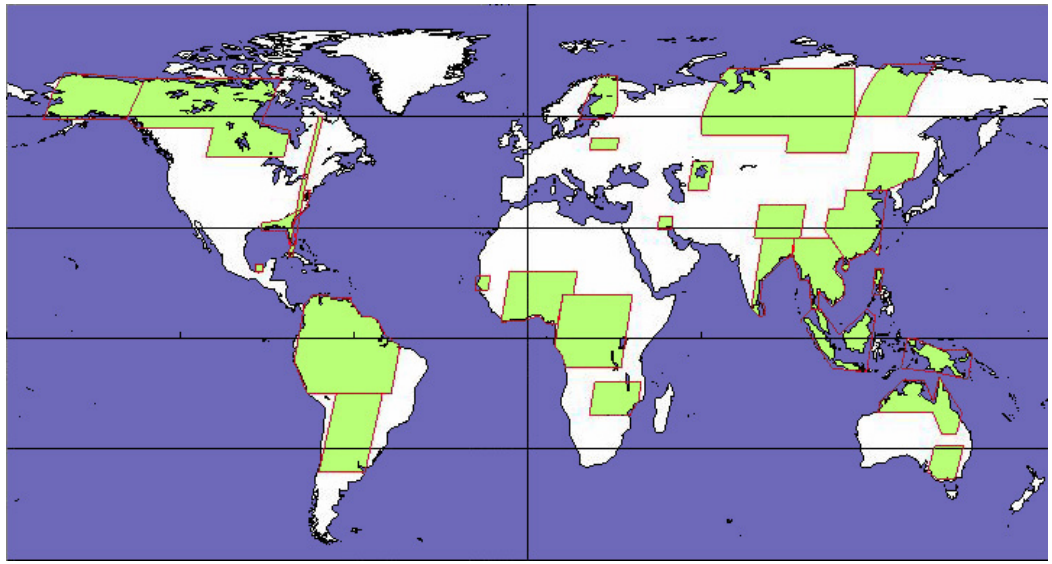
ALOS Acquisition Strategy
PALSAR Descending

Advanced Land Observing Satellite

Descending (~10 am):

** PALSAR acquired in ScanSAR (5-beam mode, HH)*

** Focus on wetland & CH4 intensive monitoring*



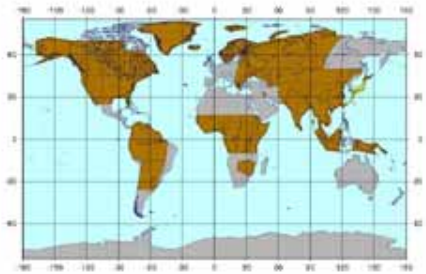
PALSAR Wetlands monitoring

Year	2006		2007											2008											2009								
Month	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	6	7	8	9
Satellite cycle	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30											
West Siberia			■	■	■	■	■	■	■	■																									
Lena Delta											■	■	■	■	■	■	■	■																	
Volga Delta											■	■	■	■	■	■	■	■																	
Amur			■	■	■	■	■	■	■	■																									
East China paddy			■	■	■	■	■	■	■	■																									
Tibet											■	■	■	■	■	■	■	■																	
India paddy									■	■	■	■	■	■	■	■																			
Mainland SE-Asia	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Insular SE-Asia	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Luzon	■	■	■	■	■	■	■	■	■																										
New Guinea	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
North Australia	■	■	■	■	■	■	■	■	■																										
Murray-Darling											■	■	■	■	■	■	■	■																	
Finland	■	■	■	■	■	■	■	■	■																										
Pripet-Biebrza			■	■	■	■	■	■	■	■																									
Tigris marshes									■	■	■	■	■	■	■																				
Niber Basin											■	■	■	■	■	■	■	■																	
Congo Basin							■	■	■	■	■	■	■	■																					
Okavango-Mozambique	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■																			
Senegal wetlands											■	■	■	■	■	■	■	■																	
ASF mask			■	■	■	■	■	■	■	■																									
Canada W			■	■	■	■	■	■	■	■																									
Quebec-Everglades			■	■	■	■	■	■	■	■																									
SE USA			■	■	■	■	■	■	■	■																									
Mexico											■	■	■	■	■	■	■	■																	
Amazon Basin	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Pantanal	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

PALSAR Descending (am) observations

ScanSAR (HH) 5-beam
- Global / Annual
- Regional / every cycle

CYCLE_15 / 23-Oct.-2007



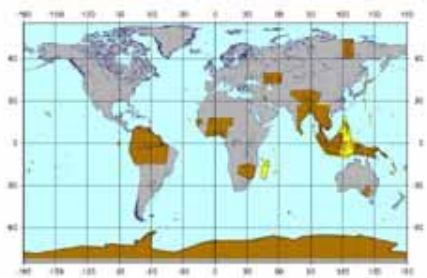
CYCLE_16 / 08-Dec.-2007

CYCLE_17 / 23-Jan.-2008

CYCLE_18 / 09-Mar.-2008

CYCLE_19 / 24-Apr.-2008

CYCLE_20 / 09-Jun.-2008



CYCLE_21 / 25-Jul.-2008

CYCLE_22 / 09-Sep.-2008

PRISM & AVNIR-2 first priority in descending mode.
To minimise sensor conflicts, only every 3rd ScanSAR pass scheduled (overlap still >50%).