The Kyoto & Carbon Initiative
- Overview and status up-date -

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NASDA EORC

4th K&C Science Advisory Panel meeting
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May 20-23, 2003

• The Kyoto & Carbon Initiative

- The K&C Initiative forms the continuation and extension of the GRFM/GBFM activities into the era of the next generation of NASDA satellites: **ALOS** (Aug., 2004) and **ADEOS-II** (Dec. 14, 2002).
- Aims to support information needs posed by:
  - Multinational Environmental Conventions and Declarations:
    - **UNFCCC Kyoto Protocol** (Land Cover change);
    - **Ramsar Treaty on Wetlands** (wetland characteristics and disturbances);
    - **UN Millenium Declaration & WSSD** (water supply and water management);
    - Other international conventions (Biodiversity[CBD] and Desertification [UNCCD]).
  - The **terrestrial carbon cycle** science community (CO_2 & CH_4 sources and sinks);

and Terrestrial Carbon Cycle Science**

Data

- Development of systematic observation systems and data archives;

Derived information

- Annual changes in forest- and land cover (detection and spatial quantification);
- Incremental changes in [regenerating] above-ground biomass (R/D);
- Monitoring of anthropogenic sources of CH4:
  - Active acreage & crop cycle timing of irrigated rice

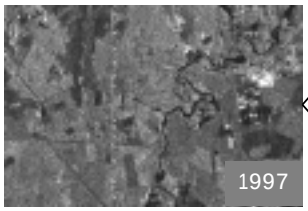
* *Remote Sensing and the Kyoto Protocol: A Review of Available and Future Technology for Monitoring Treaty Compliance*, ISPRS Report, 2000

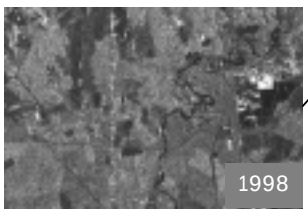
** *IGOS-P carbon cycle observations theme: terrestrial and atmospheric components. A report to IGOS-P*, TCO Theme Team, 2001

(1) Systematic data observations and consistent data archives

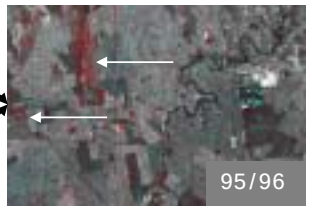
Spatial & temporal consistency over continental scales

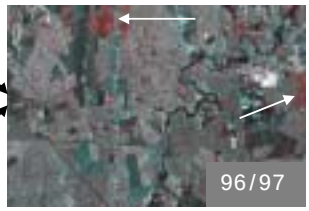
- Spatial consistency: no gaps

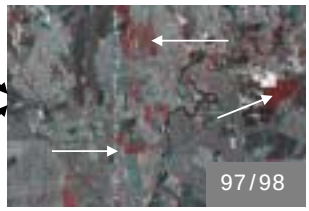




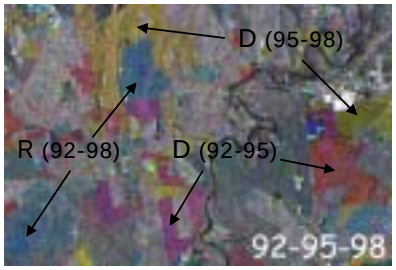
SAR time sequence



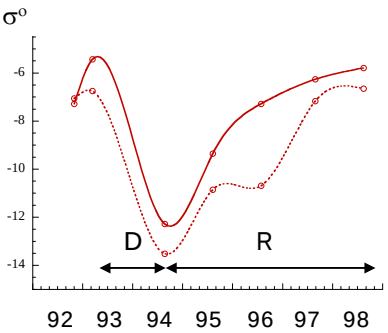




Annual forest change
(red areas)

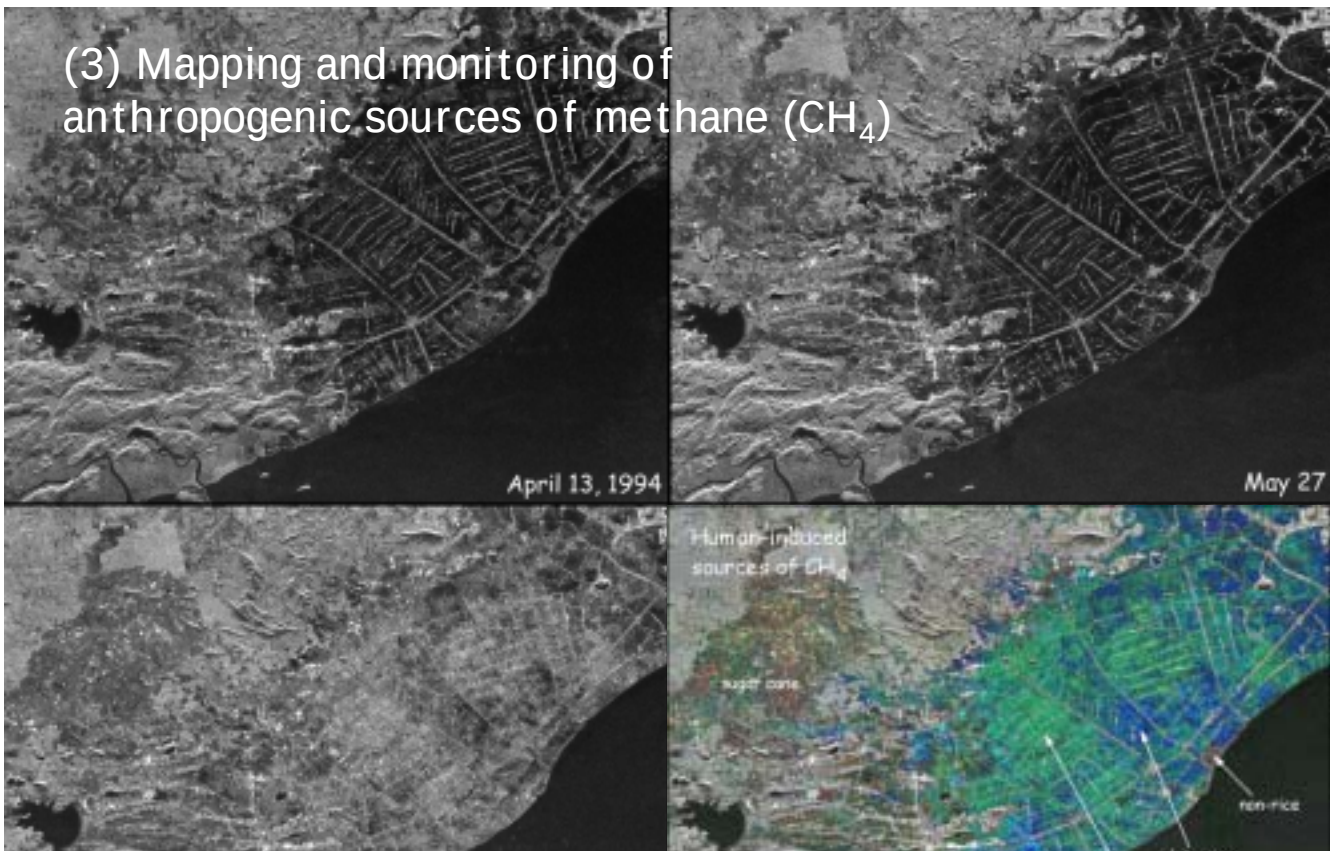


Multi-annual forest change
Clearings: red/yellow/magenta
Regeneration: blue



Incremental biomass change
(< ~100 t/ha)

(3) Mapping and monitoring of anthropogenic sources of methane (CH_4)



and TCO

Ramsar information requirements*

(1) Spatial and temporal characteristics of flooding patterns in Ramsar designated (and other) wetland areas

- Spatial extent;
- Temporal cycle (seasonal/annual/decadal…);

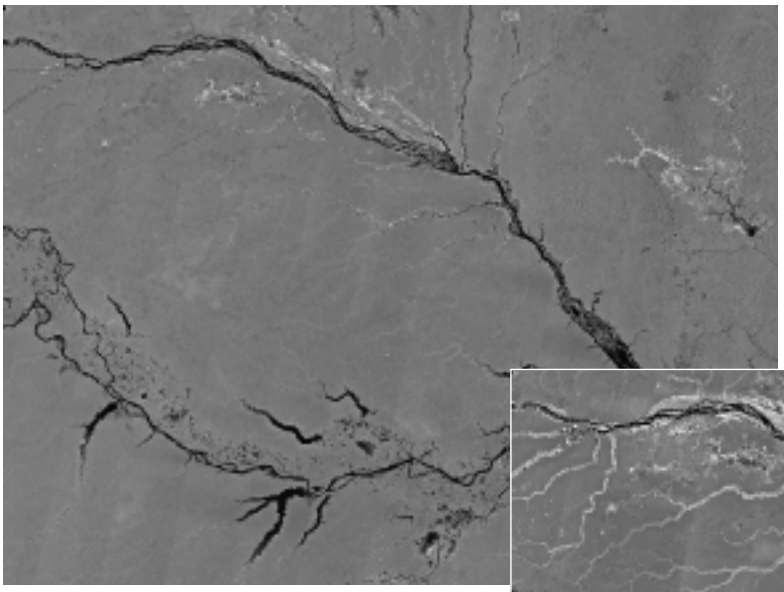
(2) Identification of natural- and human-induced disturbances in wetlands;

(3) Support to the Ramsar global wetlands inventory.

Relevance to TCO:

- Wetlands as sources of CH4.

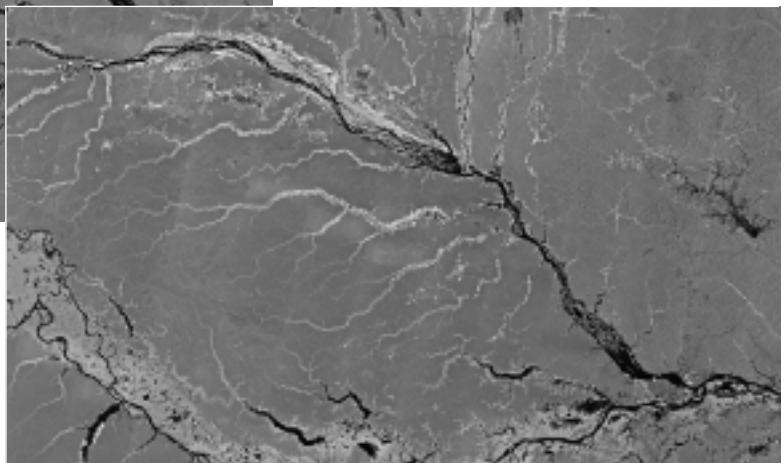
* *Personal communication: Ramsar Bureau and Wetlands International (Oct. 2002)*



Central Amazon basin
Low flood (Oct. 1995)

(1) Spatial and temporal characteristics of flooding patterns

High flood (May 1996)



wetland disturbances

Peat swamp conversion to rice
(Banjarmasin, Indonesia)

Mangrove clearing (A)
and conversion to aquaculture (B)
(Kedah, Malaysia)

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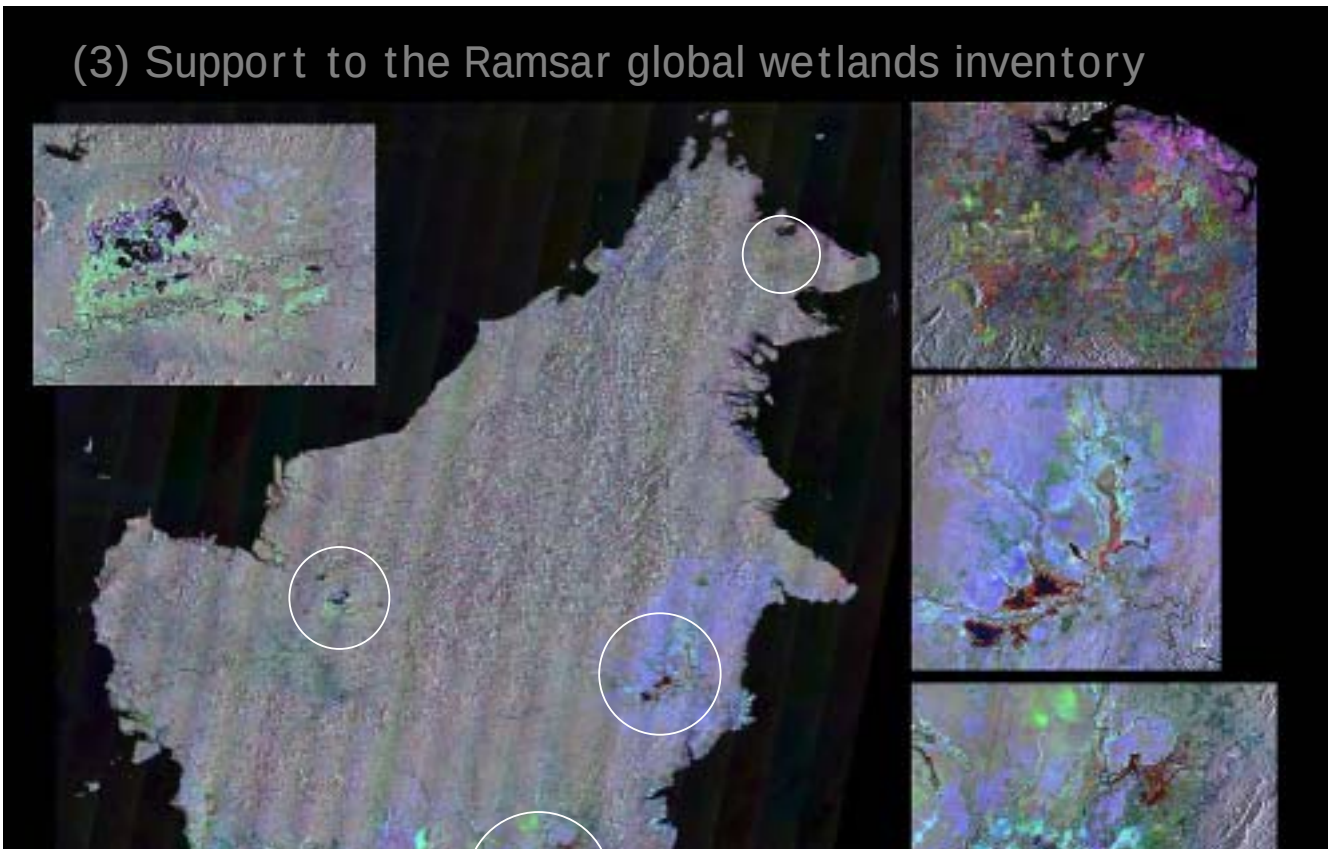
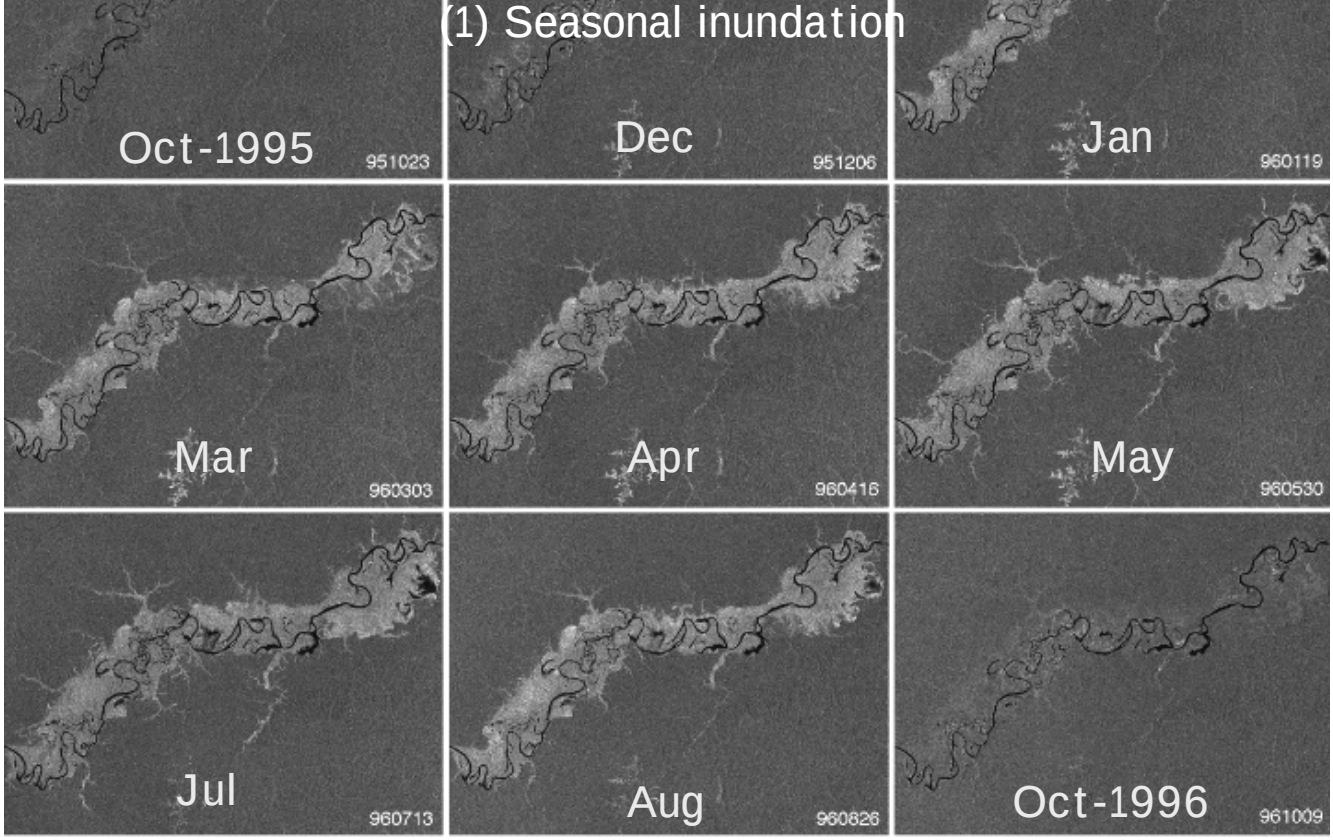
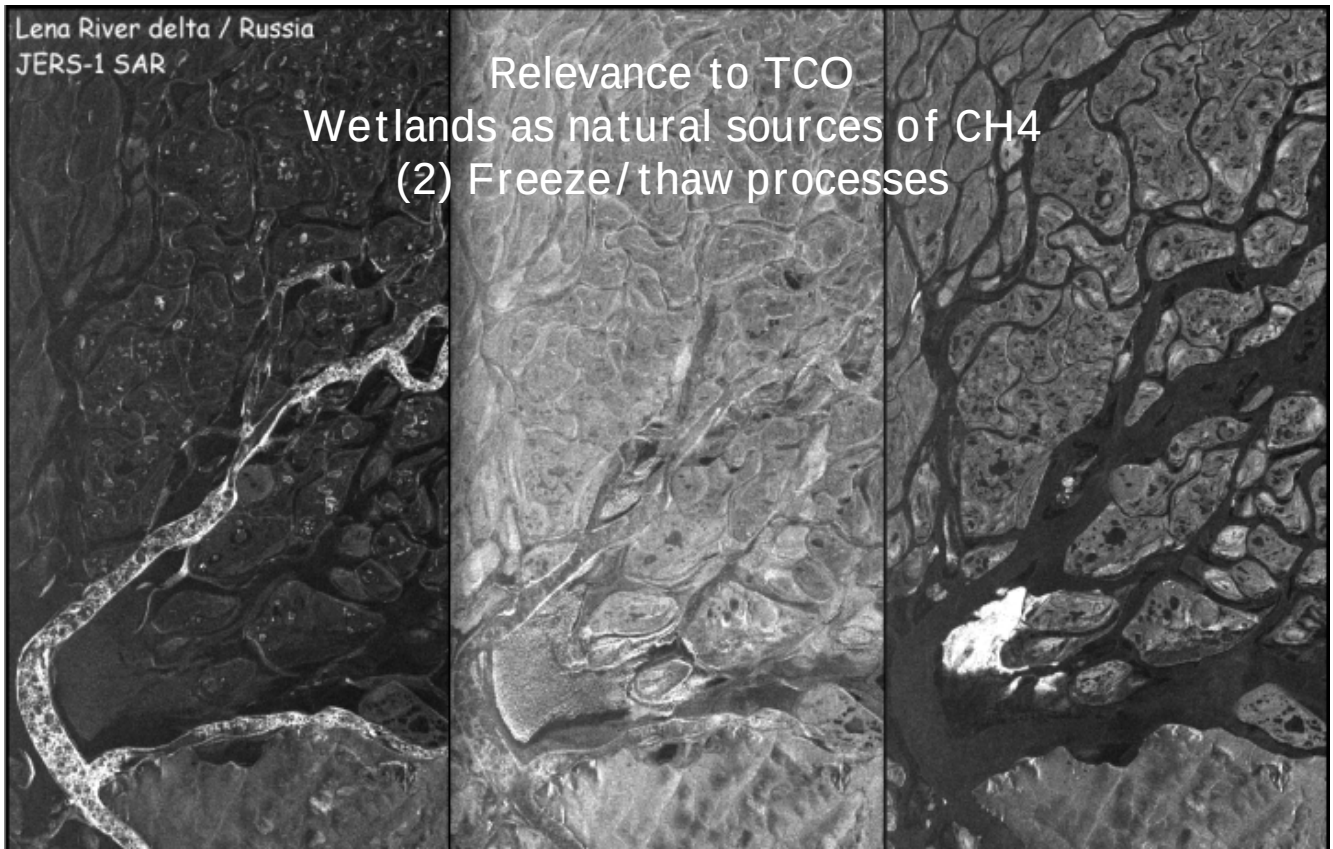
(3) Support to the Ramsar global wetlands inventory



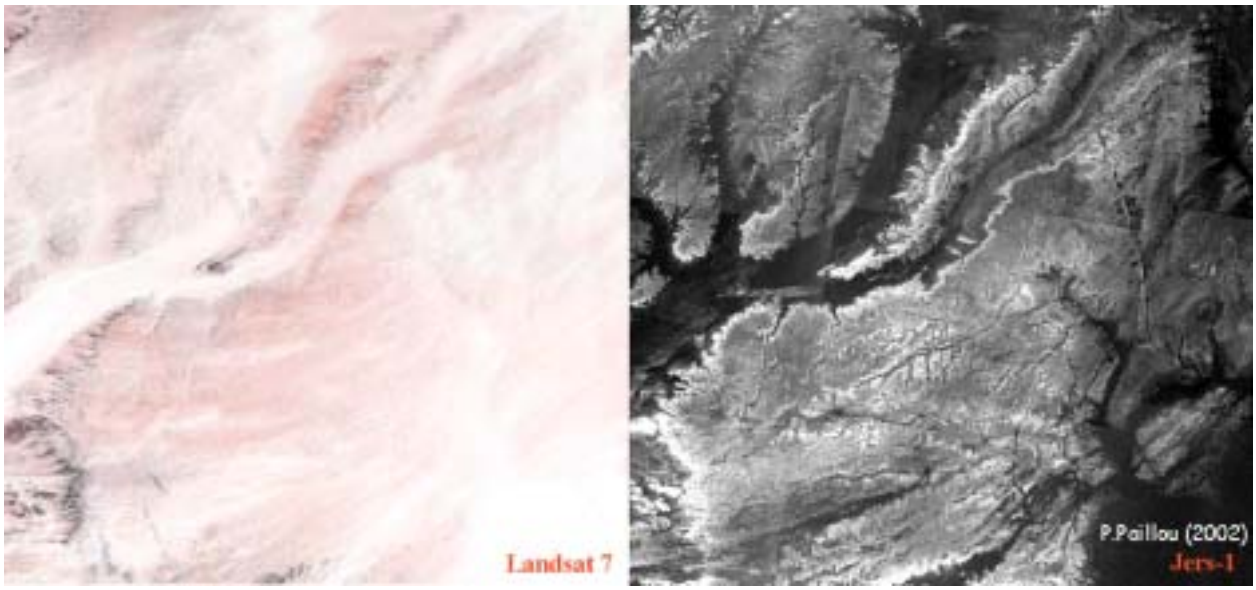
(1) Seasonal inundation



Relevance to TCO
Wetlands as natural sources of CH4
(2) Freeze/thaw processes



"... to halfe, by the year 2015, the proportion of people who are unable to reach or afford safe drinking water as outlined in the [UN] Millenium Declaration..."
[WSSD Implementation Plan, IV:24]



SAHARASAR: Mapping of sub-surface hydrology in arid areas.

K&C Product Development Work Approach

Methodology development

• Development of algorithms and methods required to support the specific information requirements identified (e.g. annual biomass change, wetland flooding dynamics, etc.);

Regional-scale prototype demonstration

• Operational demonstration of the methodology to a "large" geographical region;

Global-scale extrapolation

• Implementation of a Systematic Data Observation Strategy *to enable* application of the methods developed to any other area on Earth.

NOTE:

- Land Use, Land Use Change and Forestry (LULUCF)
  Kyoto & TCO (Terrestrial carbon sinks and sources)
- Wetlands & CH4
  Ramsar & TCO (Wetlands conservation & CH_4 sources);
- Desert & Water
  WSSD (Water supply)
- Mosaic Products
-

Development and generation of high level data- and information products to be performed through international collaboration.

Advisory Panel meetings

- 1st Panel meeting (NASDA EORC: Nov. 2001)
  - ALOS technical/operational capacity and limitations;
  - Determine "optimal" sensor configuration;
  - Review of Kyoto Protocol and TCO carbon information requirements;
  - Review ALOS Data Acquisition Strategy.
- 2nd & 3rd Panels (UCSB: May 2002; U-Jena: Oct.2002)
  - Proposals of intermediate and higher level output products.
  - Identification of collaboration partners;
- 4th Panel meeting (NASDA EORC: May 2003)
  - Product specifications and reviews
  - Science Plan drafting