Forest Theme Work Session

Ake Rosenqvist, K&C Science Coordinator

Science Team meeting #14
JAXA TKSC/RESTEC HQ, Tsukuba/Tokyo, June 14-18, 2010

JAXA
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Forest Theme work session

- Wrapping up phase 2: Collection of results – a concerted effort
  - KC booklet
  - Member report summaries and schedules (due tomorrow, AM)
    - Reports from previous meeting still valid?
    - Residual reporting from members absent at previous meeting
    - How to make products available on KC web (wiki + EORC www)
  - Global Change Biology Special Issue
  - Australian Remote Sensing and Photogrammetry Conference, Alice Springs, Australia (Sept , 2010)
  - ALOS PI Symposium, Tokyo (Nov., 2010)

K&C booklet

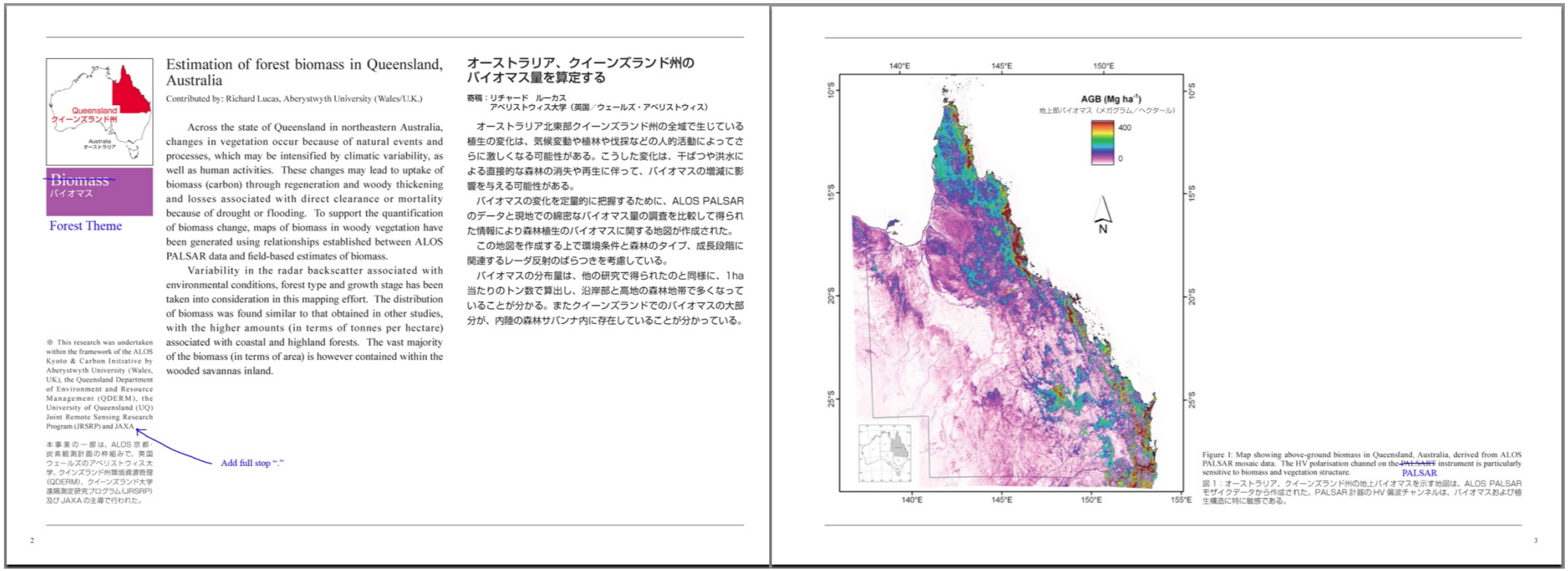
- Good input from Science Team
  - 26 contributions from 20 (out of 25) science team members
  - 7-9 more in the pipeline
- Publication company contracted (iWord)
  - Layout
  - English/Japanese translations
  - All contributions have been edited (Ake) to 200-240 words
- Final versions by July 9, 2010
- Layout proofs generated for 17 contributions

K&C booklet

Forest Theme

K&C booklet – proof layout

Richard Lucas *et al.*



Estimation of forest biomass in Queensland, Australia

Contributed by: Richard Lucas, Aberystwyth University (Wales/U.K.)

Queensland
クイーンズランド州
Australia
オーストラリア

Biomass
バイオマス

Forest Theme

Across the state of Queensland in northeastern Australia, changes in vegetation occur because of natural events and processes, which may be intensified by climatic variability, as well as human activities. These changes may lead to uptake of biomass (carbon) through regeneration and woody thickening and losses associated with direct clearance or mortality because of drought or flooding. To support the quantification of biomass change, maps of biomass in woody vegetation have been generated using relationships established between ALOS PALSAR data and field-based estimates of biomass.

Variability in the radar backscatter associated with environmental conditions, forest type and growth stage has been taken into consideration in this mapping effort. The distribution of biomass was found similar to that obtained in other studies, with the higher amounts (in terms of tonnes per hectare) associated with coastal and highland forests. The vast majority of the biomass (in terms of area) is however contained within the wooded savannas inland.

※ This research was undertaken within the framework of the ALOS Kyoto & Carbon Initiative by Aberystwyth University (Wales, UK), the Queensland Department of Environment and Resource Management (QDERM), the University of Queensland (UQ) Joint Remote Sensing Research Program (JRSRP) and JAXA.

本事業の一部は、ALOS 京都・炭素観測計画の枠組みで、英国ウェールズのアベリストウィス大学、クイーンズランド州環境資源管理(QDERM)、クイーンズランド大学遠隔測定研究プログラム(JRSRP)及び JAXA の主導で行われた。

Add full stop "."

オーストラリア、クイーンズランド州のバイオマス量を算定する

寄稿：リチャード ルーカス
アベリストウィス大学（英国／ウェールズ・アベリストウィス）

オーストラリア北東部クイーンズランド州の全域で生じている植生の変化は、気候変動や植林や伐採などの人的活動によってさらに激しくなる可能性がある。こうした変化は、干ばつや洪水による直接的な森林の消失や再生に伴って、バイオマスの増減に影響を与える可能性がある。

バイオマスの変化を定量的に把握するために、ALOS PALSAR のデータと現地での綿密なバイオマス量の調査を比較して得られた情報により森林植生のバイオマスに関する地図が作成された。

この地図を作成する上で環境条件と森林のタイプ、成長段階に関連するレーダ反射のばらつきを考慮している。

バイオマスの分布量は、他の研究で得られたのと同様に、1ha 当たりのトン数で算出し、沿岸部と高地の森林地帯で多くなっていることが分かる。またクイーンズランドでのバイオマスの大部分が、内陸の森林サバンナ内に存在していることが分かっている。

Figure 1: Map showing above-ground biomass in Queensland, Australia, derived from ALOS PALSAR mosaic data. The HV polarisation channel on the ~~PALSAR~~ PALSAR instrument is particularly sensitive to biomass and vegetation structure.

図 1：オーストラリア、クイーンズランド州の地上バイオマスを示す地図は、ALOS PALSAR モザイクデータから作成された。PALSAR 計器の HV 偏波チャンネルは、バイオマスおよび植生構造に特に敏感である。

Text OK

High resolution figure OK

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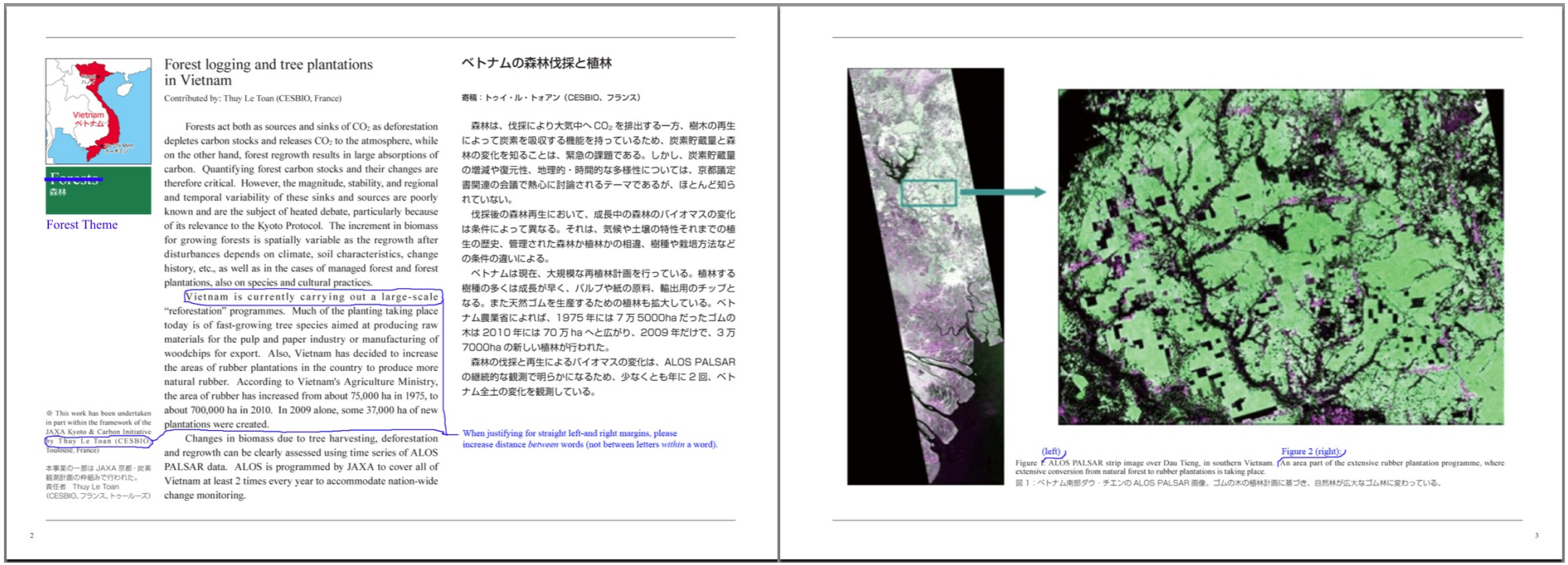
K&C booklet – proof layout

Thuy Le Toan *et al.*



Forest logging and tree plantations in Vietnam

Contributed by: Thuy Le Toan (CESBIO, France)

Forests act both as sources and sinks of CO_2 as deforestation depletes carbon stocks and releases CO_2 to the atmosphere, while on the other hand, forest regrowth results in large absorptions of carbon. Quantifying forest carbon stocks and their changes are therefore critical. However, the magnitude, stability, and regional and temporal variability of these sinks and sources are poorly known and are the subject of heated debate, particularly because of its relevance to the Kyoto Protocol. The increment in biomass for growing forests is spatially variable as the regrowth after disturbances depends on climate, soil characteristics, change history, etc., as well as in the cases of managed forest and forest plantations, also on species and cultural practices.

Vietnam is currently carrying out a large-scale "reforestation" programmes. Much of the planting taking place today is of fast-growing tree species aimed at producing raw materials for the pulp and paper industry or manufacturing of woodchips for export. Also, Vietnam has decided to increase the areas of rubber plantations in the country to produce more natural rubber. According to Vietnam's Agriculture Ministry, the area of rubber has increased from about 75,000 ha in 1975, to about 700,000 ha in 2010. In 2009 alone, some 37,000 ha of new plantations were created.

Changes in biomass due to tree harvesting, deforestation and regrowth can be clearly assessed using time series of ALOS PALSAR data. ALOS is programmed by JAXA to cover all of Vietnam at least 2 times every year to accommodate nation-wide change monitoring.

※ This work has been undertaken in part within the framework of the JAXA Kyoto & Carbon Initiative by Thuy Le Toan (CESBIO, Toulouse, France)

本事業の一部は JAXA 京都・炭素観測計画の枠組みで行われた。
責任者 Thuy Le Toan
(CESBIO, フランス, トゥールーズ)

ベトナムの森林伐採と植林

寄稿：トゥイ・ル・トォアン（CESBIO、フランス）

森林は、伐採により大気中へ CO_2 を排出する一方、樹木の再生によって炭素を吸収する機能を持っているため、炭素貯蔵量と森林の変化を知ることは、緊急の課題である。しかし、炭素貯蔵量の増減や復元性、地理的・時間的な多様性については、京都議定書関連の会議で熱心に討論されるテーマであるが、ほとんど知られていない。

伐採後の森林再生において、成長中の森林のバイオマスの変化は条件によって異なる。それは、気候や土壌の特性それまでの植生の歴史、管理された森林か植林かの相違、樹種や栽培方法などの条件の違いによる。

ベトナムは現在、大規模な再植林計画を行っている。植林する樹種の多くは成長が早く、パルプや紙の原料、輸出用のチップとなる。また天然ゴムを生産するための植林も拡大している。ベトナム農業省によれば、1975 年には 7 万 5000ha だったゴムの木は 2010 年には 70 万 ha へと広がり、2009 年だけで、3 万 7000ha の新しい植林が行われた。

森林の伐採と再生によるバイオマスの変化は、ALOS PALSAR の継続的な観測で明らかになるため、少なくとも年に 2 回、ベトナム全土の変化を観測している。

When justifying for straight left-and right margins, please increase distance *between* words (not between letters *within* a word).

(left) Figure 1: ALOS PALSAR strip image over Dau Tieng, in southern Vietnam. Figure 2 (right): An area part of the extensive rubber plantation programme, where extensive conversion from natural forest to rubber plantations is taking place.
図 1：ベトナム南部ダウ・チエンの ALOS PALSAR 画像。ゴムの木の植林計画に基づき、自然林が広大なゴム林に変わっている。

Text OK

High resolution figures missing

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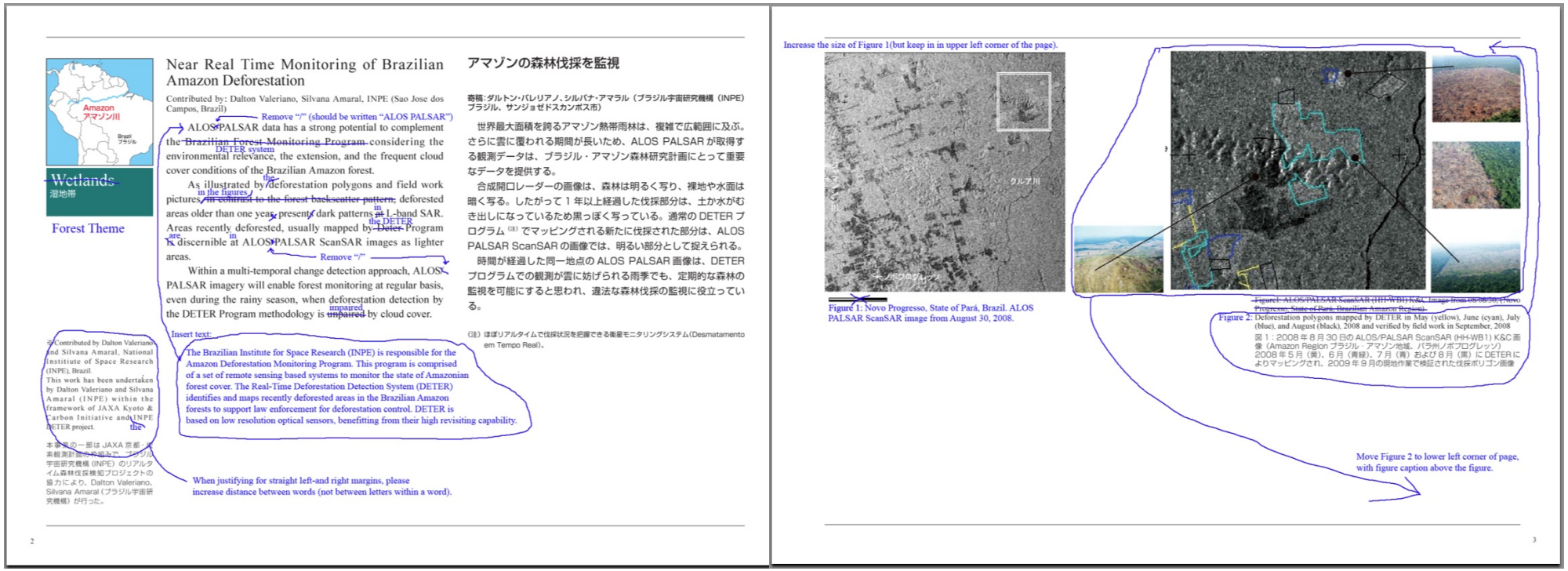
K&C booklet – proof layout

Dalton Valeriano, Silvana Amaral *et al.*



Text : to be confirmed by INPE

High resolution figures missing

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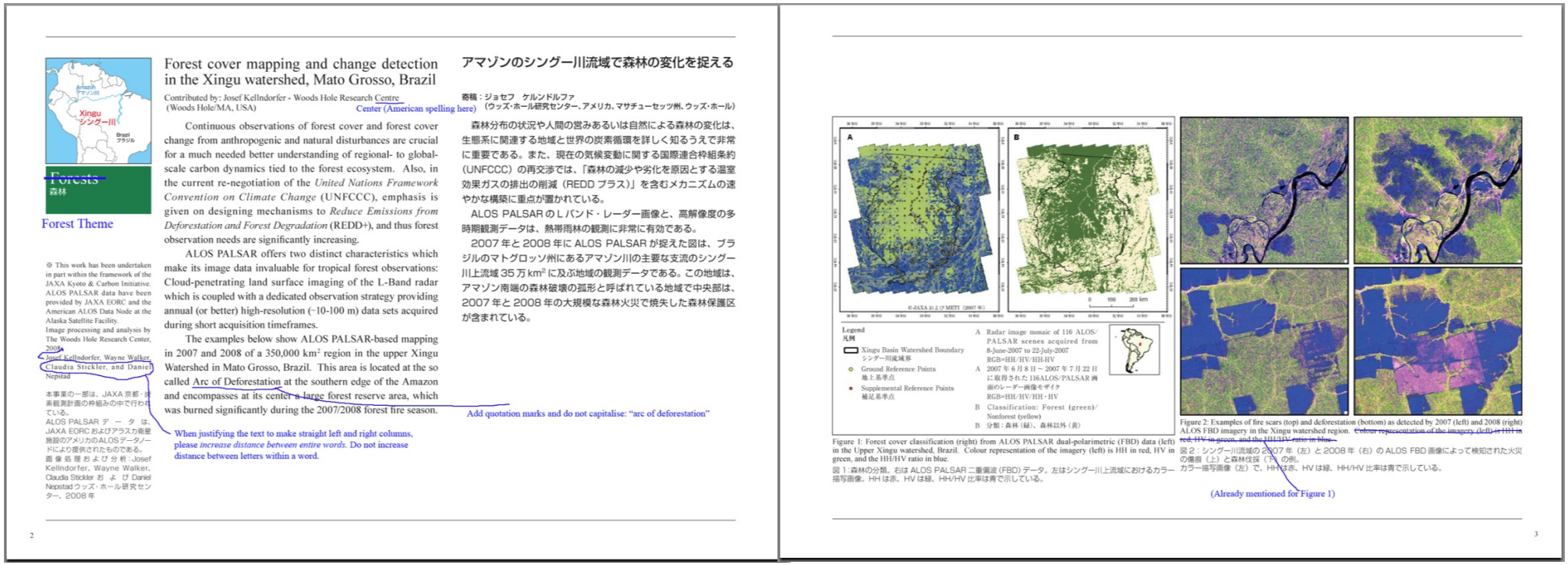
K&C booklet – proof layout

Josef Kellndorfer *et al.*



Forest cover mapping and change detection in the Xingu watershed, Mato Grosso, Brazil

Contributed by: Josef Kellndorfer - Woods Hole Research Centre (Woods Hole/MA, USA)

Center (American spelling here)

Continuous observations of forest cover and forest cover change from anthropogenic and natural disturbances are crucial for a much needed better understanding of regional- to global-scale carbon dynamics tied to the forest ecosystem. Also, in the current re-negotiation of the *United Nations Framework Convention on Climate Change* (UNFCCC), emphasis is given on designing mechanisms to *Reduce Emissions from Deforestation and Forest Degradation* (REDD+), and thus forest observation needs are significantly increasing.

ALOS PALSAR offers two distinct characteristics which make its image data invaluable for tropical forest observations: Cloud-penetrating land surface imaging of the L-Band radar which is coupled with a dedicated observation strategy providing annual (or better) high-resolution (~10-100 m) data sets acquired during short acquisition timeframes.

The examples below show ALOS PALSAR-based mapping in 2007 and 2008 of a 350,000 km^2 region in the upper Xingu Watershed in Mato Grosso, Brazil. This area is located at the so called Arc of Deforestation at the southern edge of the Amazon and encompasses at its center a large forest reserve area, which was burned significantly during the 2007/2008 forest fire season.

Add quotation marks and do not capitalise: "arc of deforestation"

When justifying the text to make straight left and right columns, please *increase distance between entire words*. Do not increase distance between letters within a word.

Forest Theme

※ This work has been undertaken in part within the framework of the JAXA Kyoto & Carbon Initiative. ALOS PALSAR data have been provided by JAXA EORC and the American ALOS Data Node at the Alaska Satellite Facility.
Image processing and analysis by The Woods Hole Research Center, 2008
Josef Kellndorfer, Wayne Walker, Claudia Stickler, and Daniel Nepstad

本事業の一部は、JAXA 京都・炭素観測計画の枠組みの中で行われている。
ALOS PALSAR データは、JAXA EORC およびアラスカ衛星施設のアメリカの ALOS データノードにより提供されたものである。
画像処理および分析：Josef Kellndorfer, Wayne Walker, Claudia Stickler および Daniel Nepstad ウッズ・ホール研究センター、2008 年

アマゾンのシングー川流域で森林の変化を捉える

寄稿：ジョセフ　ケルンドルファ（ウッズ・ホール研究センター、アメリカ、マサチューセッツ州、ウッズ・ホール）

森林分布の状況や人間の営みあるいは自然による森林の変化は、生態系に関連する地域と世界の炭素循環を詳しく知るうえで非常に重要である。また、現在の気候変動に関する国際連合枠組条約（UNFCCC）の再交渉では、「森林の減少や劣化を原因とする温室効果ガスの排出の削減（REDD プラス）」を含むメカニズムの速やかな構築に重点が置かれている。

ALOS PALSAR の L バンド・レーダー画像と、高解像度の多時期観測データは、熱帯雨林の観測に非常に有効である。

2007 年と 2008 年に ALOS PALSAR が捉えた図は、ブラジルのマトグロッソ州にあるアマゾン川の主要な支流のシングー川上流域 35 万 km^2 に及ぶ地域の観測データである。この地域は、アマゾン南端の森林破壊の孤形と呼ばれている地域で中央部は、2007 年と 2008 年の大規模な森林火災で焼失した森林保護区が含まれている。

Figure 1: Forest cover classification (right) from ALOS PALSAR dual-polarimetric (FBD) data (left) in the Upper Xingu watershed, Brazil. Colour representation of the imagery (left) is HH in red, HV in green, and the HH/HV ratio in blue.

図 1：森林の分類。右は ALOS PALSAR 二重偏波（FBD）データ、左はシングー川上流域におけるカラー描写画像。HH は赤、HV は緑、HH/HV 比率は青で示している。

Figure 2: Examples of fire scars (top) and deforestation (bottom) as detected by 2007 (left) and 2008 (right) ALOS FBD imagery in the Xingu watershed region. ~~Colour representation of the imagery, (left) is HH in red, HV in green, and the HH/HV ratio in blue.~~

図 2：シングー川流域の 2007 年（左）と 2008 年（右）の ALOS FBD 画像によって検知された火災の痕跡（上）と森林伐採（下）の例。
カラー描写画像（左）で、HH は赤、HV は緑、HH/HV 比率は青で示している。

(Already mentioned for Figure 1)

Text OK

High resolution figure TBC

JAXA Japan Aerospace Exploration Agency

K&C booklet – proof layout

Fransson, Santoro *et al.*

clear-cut
National ~~deforestation~~ mapping in Sweden

Forest Theme

Contributed by: Johan Fransson (SLU, Sweden) and Maurizio Santoro (Gamma, Switzerland)

In Sweden, a nationwide coverage of optical satellite data is acquired annually by the government for forest monitoring purposes. The images are used by the Swedish Forest Agency for change detection in order to find clear-felled areas and subsequent verification of the cutting permits of about 70,000 clear-felled areas yearly. In combination with about 50,000 National Forest Inventory (NFI) field plots, the images are also used for producing nationwide forest maps (e.g. stem volume and biomass). In order to obtain the 200 cloud-free optical (SPOT) scenes that are required for a nationwide coverage, about 5,000 programming attempts are needed because of frequent cloud-cover and long periods of reduced solar illumination. In this respect it is of interest to investigate images acquired by ALOS PALSAR, which achieves full cloud-free coverage of Sweden at least twice per year in dual polarisation mode. In this mode the sensitivity of the intensity recorded by the satellite is maximised with respect to forest properties. The radar backscatter is typically lower for bare ground, e.g. clear-felled areas, compared to mature and regrowing forest. Within this project a methodology has been developed for detection and delineation of deforestation (primarily clear-cuts) in Sweden using strips of ALOS PALSAR images, to be integrated in the mapping system used by the Swedish Forest Agency.

※ This work has been undertaken within the framework of the JAXA Kyoto & Carbon Initiative, funded by the Swedish National Space Board, by Johan Fransson, Andreas Pantze and Håkan Olsson (Swedish University of Agricultural Sciences, Sweden), Maurizio Santoro (Gamma Remote Sensing, Switzerland), Leif Eriksson and Lars Ulander (Chalmers University of Technology, Sweden)

※本事業の一部は JAXA 京都・炭素観測計画の枠組みで、スウェーデン国家宇宙局の助成により、Johan Fransson、Andreas Pantze、Håkan Olsson（スウェーデン農業科学大学、スウェーデン）及び Maurizio Santoro（ガンマ・リモート・センシング社、スイス）Leif Eriksson、Lars Ulander（チャルマーズ大学、スウェーデン）が作成した。

スウェーデン全土の伐採を監視

寄稿：ヨハン　フランソン（スウェーデン農業科学大学）マウリチオ　サントーロ（ガンマ・リモート・センシング社、スイス）

スウェーデン政府は、全国土の森林状況を把握するため、人工衛星を利用した画像データを毎年取得している。その画像は、スウェーデン森林庁が、完全に伐採された場所を特定し、年間７万か所に制限している伐採地の確認に役立てられ、データは、森林管理局が統括する５万か所を照合して全国土の森林地図を作成するためにも使われる。

スウェーデンは、雲に覆われる日が多いため、地図作成には200枚の雲を透過した画像と5,000のプログラミングが必要となる。２つの偏波モードをもつ ALOS PALSAR を用いると、年に２回行われる全国の調査画像が利用できる。

成木林や再生林と比べ、伐採によって地面がむき出しになっている場所では、反射波は特に弱くなり、白い画像になる。森林調査は、感度が良いこのデータが最大限に活かされる。ALOS PALSAR 画像と、スウェーデン森林庁が利用している画像を統合して、伐採地域の輪郭を把握したり、新たな伐採が所を発見したりする方法が開発されている。

Insert "(SPOT)" between "optical" and "scenes"

When justifying for straight left-and right margins, please increase distance *between words* (not between letters within a word).

Increase the size of Figure 1 and decrease size of Figure 2, so that the two figures occupy about half the page each.

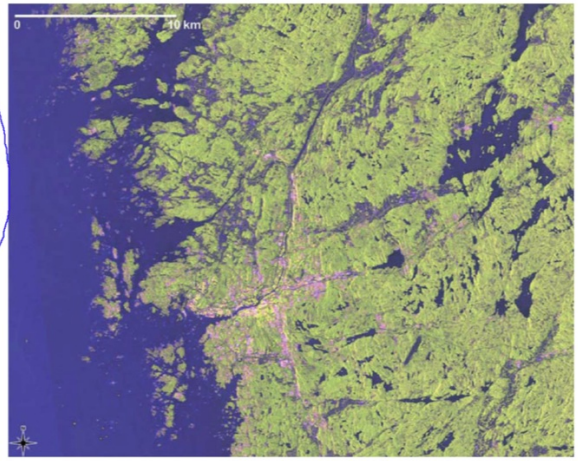


Figure 1: False colour ALOS PALSAR mosaic over four of the Nordic countries (Sweden, Norway, Denmark and Finland) at 50 m resolution. Forests appear in green. Bare surfaces, agricultural fields, recent clear-cuts and marshes appear in purple. Open water, such as rivers, lakes the sea appear in blue

図１：ALOS PALSAR フェールス・カラーによる、北欧４カ国（スウェーデン、ノルウェイ、デンマーク、フィンランド）のモザイク画像。森林は緑色、剥き出しの土地、農耕地、最近伐採された場所や湿地は紫色、川、湖、海などの水面は青色で示されている。

Add punctuation "."

Change to "lakes and the seas"

Figure 2: Gothenburg, the second largest city in Sweden, highlighting the level of detail in the ALOS PALSAR mosaic dataset.

図２：スウェーデン第２の都市ヨーテボリ。ALOS PALSAR モザイクデータでの詳細地図。

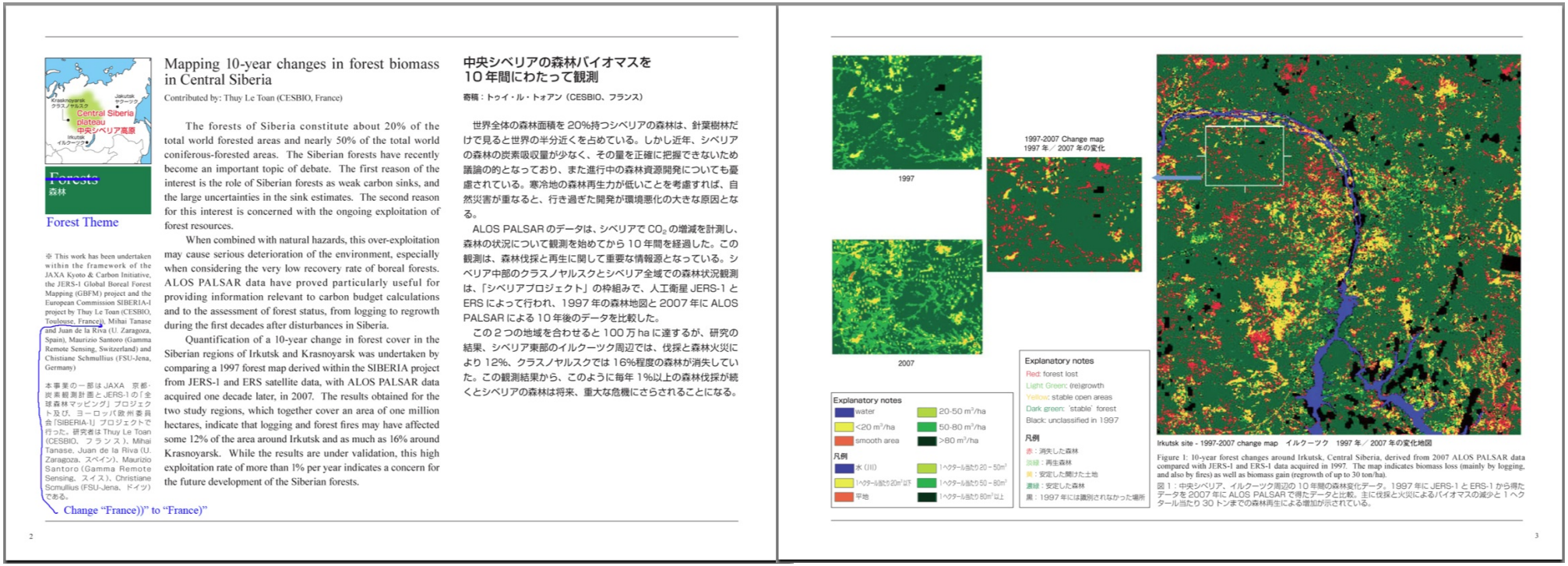
Text OK

High resolution figure OK

JAXA Japan Aerospace Exploration Agency

K&C booklet – proof layout

Thuy Le Toan *et al.*



Mapping 10-year changes in forest biomass in Central Siberia

Contributed by: Thuy Le Toan (CESBIO, France)

The forests of Siberia constitute about 20% of the total world forested areas and nearly 50% of the total world coniferous-forested areas. The Siberian forests have recently become an important topic of debate. The first reason of the interest is the role of Siberian forests as weak carbon sinks, and the large uncertainties in the sink estimates. The second reason for this interest is concerned with the ongoing exploitation of forest resources.

When combined with natural hazards, this over-exploitation may cause serious deterioration of the environment, especially when considering the very low recovery rate of boreal forests. ALOS PALSAR data have proved particularly useful for providing information relevant to carbon budget calculations and to the assessment of forest status, from logging to regrowth during the first decades after disturbances in Siberia.

Quantification of a 10-year change in forest cover in the Siberian regions of Irkutsk and Krasnoyarsk was undertaken by comparing a 1997 forest map derived within the SIBERIA project from JERS-1 and ERS satellite data, with ALOS PALSAR data acquired one decade later, in 2007. The results obtained for the two study regions, which together cover an area of one million hectares, indicate that logging and forest fires may have affected some 12% of the area around Irkutsk and as much as 16% around Krasnoyarsk. While the results are under validation, this high exploitation rate of more than 1% per year indicates a concern for the future development of the Siberian forests.

中央シベリアの森林バイオマスを10年間にわたって観測

寄稿：トゥイ・ル・トォアン（CESBIO、フランス）

世界全体の森林面積を20%持つシベリアの森林は、針葉樹林だけで見ると世界の半分近くを占めている。しかし近年、シベリアの森林の炭素吸収量が少なく、その量を正確に把握できないため議論の的となっており、また進行中の森林資源開発についても憂慮されている。寒冷地の森林再生力が低いことを考慮すれば、自然災害が重なると、行き過ぎた開発が環境悪化の大きな原因となる。

ALOS PALSARのデータは、シベリアでCO_2の増減を計測し、森林の状況について観測を始めてから10年間を経過した。この観測は、森林伐採と再生に関して重要な情報源となっている。シベリア中部のクラスノヤルスクとシベリア全域での森林状況観測は、「シベリアプロジェクト」の枠組みで、人工衛星JERS-1とERSによって行われ、1997年の森林地図と2007年にALOS PALSARによる10年後のデータを比較した。

この2つの地域を合わせると100万haに達するが、研究の結果、シベリア東部のイルクーツク周辺では、伐採と森林火災により12%、クラスノヤルスクでは16%程度の森林が消失していた。この観測結果から、このように毎年1%以上の森林伐採が続くとシベリアの森林は将来、重大な危機にさらされることになる。

Forests
森林

Forest Theme

※ This work has been undertaken within the framework of the JAXA Kyoto & Carbon Initiative, the JERS-1 Global Boreal Forest Mapping (GBFM) project and the European Commission SIBERIA-I project by Thuy Le Toan (CESBIO, Toulouse, France)), Mihai Tanase and Juan de la Riva (U. Zaragoza, Spain), Maurizio Santoro (Gamma Remote Sensing, Switzerland) and Chistiane Schmullius (FSU-Jena, Germany)

本事業の一部はJAXA「京都・炭素観測計画とJERS-1の「全球森林マッピング」プロジェクト及び、ヨーロッパ欧州委員会「SIBERIA-I」プロジェクトで行った。研究者はThuy Le Toan (CESBIO、フランス)、Mihai Tanase, Juan de la Riva (U. Zaragoza、スペイン)、Maurizio Santoro (Gamma Remote Sensing、スイス)、Christiane Scmullius (FSU-Jena、ドイツ)である。

Change "France))" to "France)"

1997

2007

1997-2007 Change map
1997年／2007年の変化

Explanatory notes
water
<20 m³/ha
smooth area
20-50 m³/ha
50-80 m³/ha
>80 m³/ha
凡例
水 (川)
1ヘクタール当たり20m³以下
平地
1ヘクタール当たり20～50m³
1ヘクタール当たり50～80m³
1ヘクタール当たり80m³以上

Explanatory notes
Red: forest lost
Light Green: (re)growth
Yellow: stable open areas
Dark green: 'stable' forest
Black: unclassified in 1997
凡例
赤：消失した森林
淡緑：再生森林
黄：安定した開けた土地
濃緑：安定した森林
黒：1997年には識別されなかった場所

Irkutsk site - 1997-2007 change map　イルクーツク　1997年／2007年の変化地図

Figure 1: 10-year forest changes around Irkutsk, Central Siberia, derived from 2007 ALOS PALSAR data compared with JERS-1 and ERS-1 data acquired in 1997. The map indicates biomass loss (mainly by logging, and also by fires) as well as biomass gain (regrowth of up to 30 ton/ha).

図1：中央シベリア、イルクーツク周辺の10年間の森林変化データ。1997年にJERS-1とERS-1から得たデータを2007年にALOS PALSARで得たデータと比較。主に伐採と火災によるバイオマスの減少と1ヘクタール当たり30トンまでの森林再生による増加が示されている。

2

3

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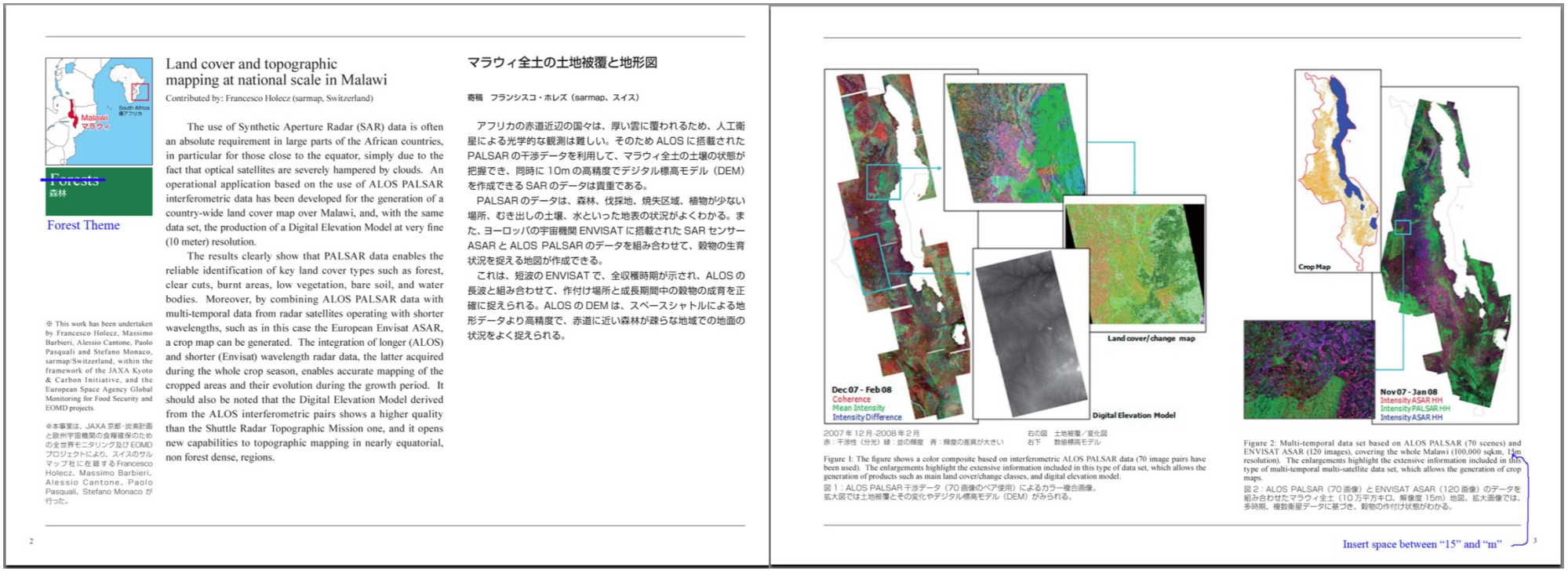
K&C booklet – proof layout

Francesco Holecz *et al.*



Land cover and topographic mapping at national scale in Malawi

Contributed by: Francesco Holecz (sarmap, Switzerland)

The use of Synthetic Aperture Radar (SAR) data is often an absolute requirement in large parts of the African countries, in particular for those close to the equator, simply due to the fact that optical satellites are severely hampered by clouds. An operational application based on the use of ALOS PALSAR interferometric data has been developed for the generation of a country-wide land cover map over Malawi, and, with the same data set, the production of a Digital Elevation Model at very fine (10 meter) resolution.

The results clearly show that PALSAR data enables the reliable identification of key land cover types such as forest, clear cuts, burnt areas, low vegetation, bare soil, and water bodies. Moreover, by combining ALOS PALSAR data with multi-temporal data from radar satellites operating with shorter wavelengths, such as in this case the European Envisat ASAR, a crop map can be generated. The integration of longer (ALOS) and shorter (Envisat) wavelength radar data, the latter acquired during the whole crop season, enables accurate mapping of the cropped areas and their evolution during the growth period. It should also be noted that the Digital Elevation Model derived from the ALOS interferometric pairs shows a higher quality than the Shuttle Radar Topographic Mission one, and it opens new capabilities to topographic mapping in nearly equatorial, non forest dense, regions.

Forest Theme

※ This work has been undertaken by Francesco Holecz, Massimo Barbieri, Alessio Cantone, Paolo Pasquali and Stefano Monaco, sarmap/Switzerland, within the framework of the JAXA Kyoto & Carbon Initiative, and the European Space Agency Global Monitoring for Food Security and EOMD projects.

※本事業は、JAXA 京都・炭素計画と欧州宇宙機関の食糧確保のための全世界モニタリング及び EOMD プロジェクトにより、スイスのサルマップ社に在籍する Francesco Holecz, Massimo Barbieri, Alessio Cantone, Paolo Pasquali, Stefano Monaco が行った。

マラウィ全土の土地被覆と地形図

寄稿　フランシスコ・ホレズ（sarmap、スイス）

アフリカの赤道近辺の国々は、厚い雲に覆われるため、人工衛星による光学的な観測は難しい。そのため ALOS に搭載された PALSAR の干渉データを利用して、マラウィ全土の土壌の状態が把握でき、同時に 10m の高精度でデジタル標高モデル（DEM）を作成できる SAR のデータは貴重である。

PALSAR のデータは、森林、伐採地、焼失区域、植物が少ない場所、むき出しの土壌、水といった地表の状況がよくわかる。また、ヨーロッパの宇宙機関 ENVISAT に搭載された SAR センサー ASAR と ALOS PALSAR のデータを組み合わせて、穀物の生育状況を捉える地図が作成できる。

これは、短波の ENVISAT で、全収穫時期が示され、ALOS の長波と組み合わせて、作付け場所と成長期間中の穀物の成育を正確に捉えられる。ALOS の DEM は、スペースシャトルによる地形データより高精度で、赤道に近い森林が疎らな地域での地面の状況をよく捉えられる。

2007 年 12 月 -2008 年 2 月
赤：干渉性（分光）緑：並の輝度　青：輝度の差異が大きい

右の図　土地被覆／変化図
右下　数値標高モデル

Figure 1: The figure shows a color composite based on interferometric ALOS PALSAR data (70 image pairs have been used). The enlargements highlight the extensive information included in this type of data set, which allows the generation of products such as main land cover/change classes, and digital elevation model.

図 1：ALOS PALSAR 干渉データ（70 画像のペア使用）によるカラー複合画像。
拡大図では土地被覆とその変化やデジタル標高モデル（DEM）がみられる。

Figure 2: Multi-temporal data set based on ALOS PALSAR (70 scenes) and ENVISAT ASAR (120 images), covering the whole Malawi (100,000 sqkm, 15m resolution). The enlargements highlight the extensive information included in this type of multi-temporal multi-satellite data set, which allows the generation of crop maps.

図 2：ALOS PALSAR（70 画像）と ENVISAT ASAR（120 画像）のデータを組み合わせたマラウィ全土（10 万平方キロ、解像度 15m）地図。拡大画像では、多時期、複数衛星データに基づき、穀物の作付け状態がわかる。

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K&C booklet

Additional completed contributions (layouts ongoing by iWord)

EORC/WWF – Riau LCC

K&C booklet – layout under generation

Longépé & JAXA/WWF team

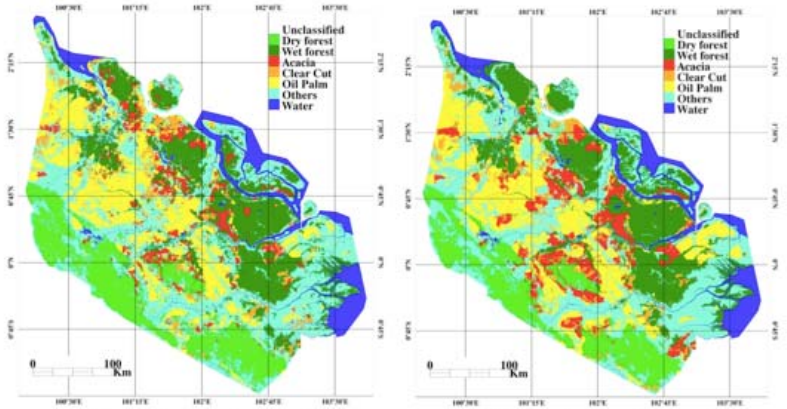
Mapping of Land Cover in Riau Province, Sumatra, Indonesia

Contributed by: Nicolas Longépé, Preesan Rakwatin, Osamu Isoguchi, Masanobu Shimada (JAXA) and Yumiko Uryu (WWF)

Author revised: 7 June 2010

This work aims to investigate the capabilities of using ALOS PALSAR mosaic data for land cover classification in tropical rainforest areas. In collaboration with the World Wildlife Fund (WWF), Riau province in central Sumatra was selected as study site. Riau is covered by vast peat lands estimated to hold Indonesia's largest stock of carbon. However, Riau is under serious threat because of rapid large-scale deforestation and conversion of the peat lands to plantations.

In this study, a land cover classification map was generated from PALSAR 50 meter resolution mosaic data using a so called Support Vector Machine (SVM) classification approach, which has been successfully introduced in remote sensing in recent years. There were six different classes discriminated: Dry natural forest, Swamp forest, Acacia, Clear cut, Oil palm and Others. The classification agreement is of the order of 70% for the land cover map in comparison with the WWF reference map, derived by manual interpretation of optical (Landsat) data. Both the ALOS PALSAR and Landsat data were acquired in 2007. When confining the classification to the distinction of forest and non-forest only (i.e. natural forest versus non-natural land cover types such as tree crops, plantations etc.) a classification accuracy of 86% was achieved, indicating that the mapping of the tropical rainforest belt using PALSAR data appears to be an achievable target.



Land cover classification based on automatic classification of 2007 ALOS PALSAR data

Land cover classification based on manual interpretation of 2007 Landsat data (reference data set)

This work has been undertaken by JAXA and WWF within the framework of the ALOS Kyoto & Carbon Initiative.

Text OK

High resolution figures OK

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K&C booklet

- Last input / feed-back from Science Team members by Friday (June 18)
  - All members –
    - Final proof reading of iWord layouts
    - provide HIGH RESOLUTION figures
  - Final modifications: Hoekman, Schmullius, Lucas, Shimada, Chapman, De Grandi/Bouvet, Shimada
  - Potential new contributions: Mesquitas (?), Quegan (?), Others?
- Both 2009 and 2010 contributions available on the K&C Wiki

http://intranet.iges.aber.ac.uk/en/subsites/alos-kyoto-amp-carbon-initiative/kampc-booklet-2010

http://intranet.iges.aber.ac.uk/en/subsites/alos-kyoto-amp-carbon-initiative/kc-booklet-contributions

Global Change Biology
Special Issue

- Richard is in discussion with GCB Editor for a K&C Special Issue
- Both Forest and Wetlands Theme
- Science team members action – provide tentative paper titles and status of completion [planned; in draft; nearly completed etc.]

Australian Remote Sensing and Photogrammetry Symposium (ARSPC)

- Alice Springs, Australia
- Sept 13-17, 2010

Task this week:

- Special Session to be organised
- 8 papers accepted (discussed at KC#13)
- Full paper submission deadline: July, 2010 (?)

- Contact Richard Lucas for details.

ALOS Joint PI Symposium

- Final Joint PI Symposium of ALOS Data Nodes
- Venue: Tokyo, Japan
- Date: Nov. 15-17, 2010

Task this week:

- Head count of KC members who plan to participate
- Proposal: Special K&C Poster session –
  alternatively - Permament K&C display during meeting
- Use K&C posters supplied by KC team at KC#13/14

Member report summaries and schedules

- Critical to provide JAXA with feed-back on results obtained, results in the pipeline and chenges to your schedule visavi your agreement

- Member reports presented by science team members at KC#13
  - Reports from previous meeting still valid?
  - Update reporting when necessary
- Residual reporting from members absent at KC#14

- Report template (presentations tomorrow, AM)

K&C Phase 2 (2009-2010)

- End date: Jan 24, 2011
- Reporting mandatory
- IEEE format (same as Phase 1 report)
- Submission deadline: November 30, 2010

K&C Extension phase (Phase 3)

- Expected, but still TBC by JAXA
- Probably 3-year extension (2011-2013)
- Proposals will be required (amendments to existing props ALT new proposals – TBC by JAXA)

Next step: Phase 3

Objectives of extension phase (Phase 3)

- Did we achieve the objectives set out for K&C?
  - develop regional-scale applications;
  - support to Carbon;
  - support to Conventions;
  - support to Conservation;
- K&C mosaics: are they used? Are they timely? Are they accurate?
- What did we do right?
- What needs to be improved?