

Significance of cloud coverage in the creation of a geo-database over the Tropics for forest estimates

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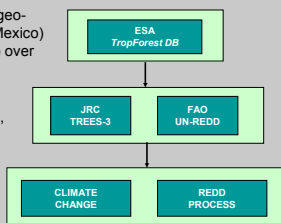
INTRODUCTION

The European Space Agency, with its TropForest project (funded by the ESA's Data User Element), is teaming up with the JRC's ACTION 3 - TREES (funded by the EC 7th Research Framework Program), and with the FAO's UN-REDD to have a joint action on the estimates of forests cover changes and degradation in the tropical forests of Latin America and South East Asia.

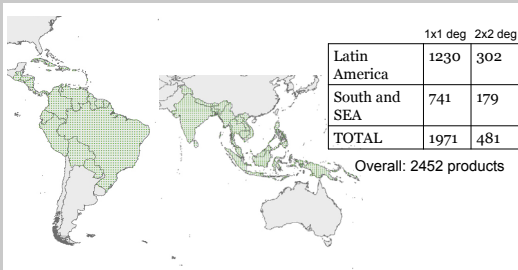
ESA: To create a harmonized remote sensing imagery geo-database covering the Tropical Latin America (without Mexico) and Tropical South and South East Asia (without China) over the years 2009 and 2010.

JRC + FAO + national/regional experts: To provide benchmark data on the state of the tropical forest extent, forest change and related carbon emissions.

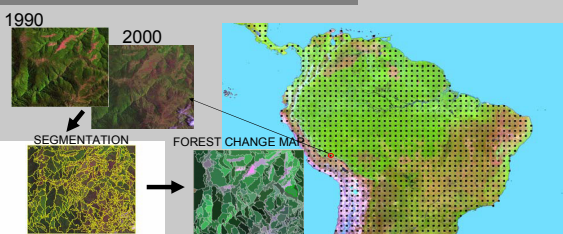
(ESA + JRC + FAO): to take a leading scientific position in the debate on climate change and the REDD process.



The TropForest project will at first create an harmonized remote sensing orthorectified/pre-processed imagery geo-database based on satellite data acquisitions (ALOS AVNIR-2, DEIMOS-1, KOMPSAT-2) performed in 2009 and 2010.

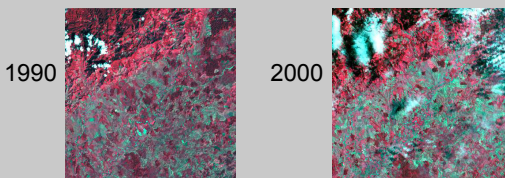


THE TREES PRODUCTS



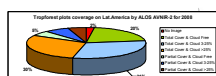
EFFECT OF CLOUDS

Cloud is very often over the forested areas. Using this scene (Llanos of Venezuela) would create a bias towards higher deforestation

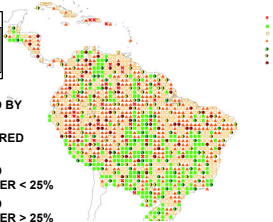


RESULTS FOR 2008

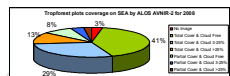
ALOS AVNIR-2 COVERED SITES ON TROPFOREST 20km PLOTS OVER LATIN AMERICA AND SOUTH EAST ASIA FOR 2008



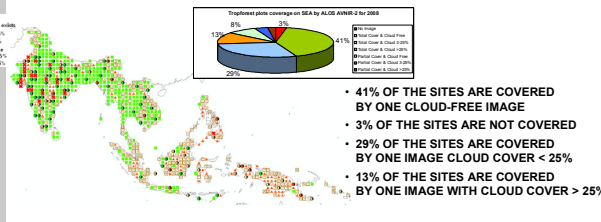
- 20% OF THE SITES ARE COVERED BY ONE CLOUD-FREE IMAGE
- 2% OF THE SITES ARE NOT COVERED BY AN IMAGE
- 31% OF THE SITES ARE COVERED BY ONE IMAGE WITH CLOUD COVER < 25%
- 30% OF THE SITES ARE COVERED BY ONE IMAGE WITH CLOUD COVER > 25%



- No image for 2008
- Total cover & cloud-free image with:
- Total cover & cloud cover < 25%
- Total cover & cloud cover > 25%
- Partial cover & cloud-free image
- Partial cover & cloud cover < 25%
- Partial cover & cloud cover > 25%

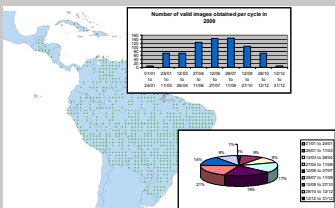


- 41% OF THE SITES ARE COVERED BY ONE CLOUD-FREE IMAGE
- 3% OF THE SITES ARE NOT COVERED
- 29% OF THE SITES ARE COVERED BY ONE IMAGE CLOUD COVER < 25%
- 13% OF THE SITES ARE COVERED BY ONE IMAGE WITH CLOUD COVER > 25%

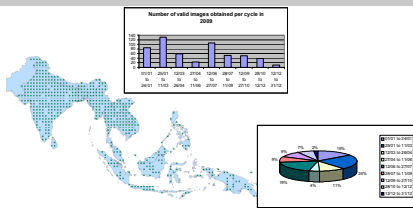


RESULTS FOR 2009

ALOS AVNIR-2 COVERED SITES ON TROPFOREST 20km PLOTS OVER LATIN AMERICA AND SOUTH EAST ASIA FOR 2009

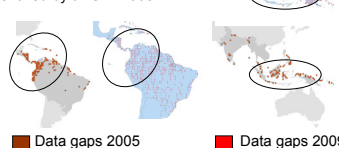


In SA 57% of the data were acquired between 27/04 and 11/09

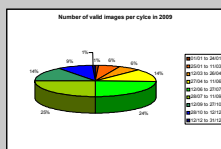
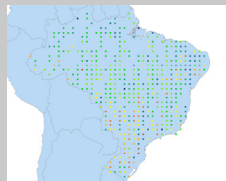


In SEA 57% of the data were acquired between 25/01 to 11/03 and 12/06 to 27/07

The areas identified as difficult due to cloud coverage are consistent with the ones identified by JRC in 2005



MORE IN DETAIL: BRASIL 2009



- 50% of the valid images have been acquired between 12/06 and 11/09
- 87% of the valid images have been acquired between 27/04 and 27/10

CONCLUSIONS

- ALOS AVNIR 2 does not allow to cover the tropical areas of SEA and SA in one year time.
- Clouds can introduce bias in forest cover estimates due to their occurrences in mountainous and humid forested areas.
- Problematic areas have been identified.
- Seasonal conditions can be used to optimise the number of cloud free acquisitions.
- Low temporal coverage over cloudy regions can render polar orbiting systems virtually useless for periodic (annual scales or less) forest monitoring.
- Cloud penetrating radar imagery is an alternative to optical data but has serious limitations in terms of land cover mapping.

