K&C Product Delivery Report and Schedule for 2010

Product F-2 – Boreal Land Cover Classification and Land Cover Change
Product F-9 – Boreal Disturbance Mapping

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K&C deliverables, Papers and Reports

- K&C Phase-1 report "Forestry Theme – Boreal Forest Mapping in Siberia
- "Significant findings" on K&C Wiki

- Publications:

- Ch. Thiel, Ca. Thiel, J. Reiche, R. Leiterer & C. Schmullius (2007): Analysis of ASAR and PALSAR data for Optimising Forest Cover Mapping – A GSE Forest Monitoring Study.-In: Proceedings CD of ForestSat 2007, 05. – 07. November, Montpellier, France.
- Ch. Thiel, Ca. Thiel, J. Reiche, R. Leiterer, M. Santoro & C. Schmullius (2007): Polarimetric PALSAR SAR data for forest cover mapping in Siberia.-In: Proceedings CD of First Joint PI Symposium of ALOS Data Nodes for ALOS Science Program, 19. – 23. November, Kyoto, Japan.
- M. Santoro, C. Schmullius, O. Cartus, C. Thiel & U. Wegmüller (2007): Observations of forest cover and forest growing stock volume in Siberia from PALSAR SAR and interferometric SAR data.-In: Proceedings CD of First Joint PI Symposium of ALOS Data Nodes for ALOS Science Program, 19. – 23. November, Kyoto, Japan.
- Ch. Thiel, Ca. Thiel, T. Riedel & C. Schmullius (2008): Object based classification of SAR data for the delineation of forest cover maps and the detection of deforestation – A viable procedure and its application in GSE Forest Monitoring. In: T. Blaschke, S. Lang & G. Hay [Eds.], Object-Based Image Analysis - Spatial concepts for knowledge-driven remote sensing applications.
- Ch. Thiel, Ca. Thiel, M. Santoro & C. Schmullius (2008): ALOS PALSAR Winter Coherence and Summer Intensities for Large Scale Forest Monitoring in Siberia.-In: Proceedings CD of Second Joint PI Symposium of ALOS Data Nodes for ALOS Science Program, 03. – 07. November, Rhodes, Greece.
- Christian J. Thiel, Carolin Thiel, and Christiane C. Schmullius (2009): Operational Large-Area Forest Monitoring in Siberia Using ALOS PALSAR Summer Intensities and Winter Coherence.- IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING, VOL. 47, NO. 12, DECEMBER 2009
- Carolin Thiel, Christian Thiel, Johannes Reiche, Reik Leiterer & Christiane Schmullius (2008): Großflächige Waldüberwachung in Sibirien unter Verwendung von ALOS PALSAR Winter Kohärenzen und Sommer Intensitäten.- DGPF Tagungsband 18 / 2009.
- Ch. Thiel, C. Schmullius (2009): Examination of Multi-Seasonal ALOS PALSAR Interferometric Coherence for Forestry Applications in the Boreal Zone.

K&C deliverables

1. Completed and Delivered to JAXA

- *Subtask 1: Collecting ground data and deliver to JAXA if requested*

  Ground data available as high resolution EO data (QuickBird and TerraSAR-X), forest inventory GIS data and analogue disturbance data.

- *Subtask 2: Developing methodology for mapping of forest cover, deforestation and other disturbances*

  Three approaches have been considered: 1.) thresholding using one single mosaic (FBD intensities); 2) thresholding using multitemporal data; 3) thresholding using one single mosaic (FBD intensities) plus coherence. Coherence and intensities allowed the separation of more classes (this approach extends the original objective of the K&C task).

- *Subtask 3: Developing methodology for product validation and accuracy estimation*

  Accuracy estimation is based on stratified random point sampling. Reference data is available.

K&C deliverables

2. To be completed during 2010

K&C Booklet contribution with latest results (during KC#13)

3. Completed, but not yet delivered (to be delivered ASAP)

- *Subtask 4: Generating Prototype area maps for: forest and land cover, annual changes in forest cover, maps of deforestation; provide accuracies*

  Annual change maps cannot be provided for the entire prototype area because of gaps in the data coverage. Delays in data processing are encountered following delay of data delivery by JAXA. Some data was made available only recently. Processing problems have been encountered for several strips due to backscatter anomalies at image borders (as reported). Re-processing was necessary to cut out the parts affected by such anomalies. Some strips have been delivered more than once causing additional processing effort. Some strips were too long for being processed at once (additional processing effort); some strips had a wrong track number in the file identifier which caused additional effort in setting up the processing chain; geocoding of the data is considered having insufficient geometric accuracy north of 60° N due to missing of appropriate digital elevation model. As a result of the last two points, of the 150 strips available, 130 need re-processing to cope with all the different.

Subtask 4: …continued

Short description of deliverables

Maps will be generated and accuracy will be assessed as described above.

Regarding mapping by means of “single mosaic FBD intensities” plus coherence, ca. 100,000 km² have been processed and mosaics were generated.

One third of the area has been classified so far.

The annual change map will be created exemplarily for some tracks where annual data is available.

Change indicators will be computed and evaluated, the type of change will be labelled.

•*Remaining Subtasks 5-7*

Internet samples will be presented by the end of this year on the K&C Wiki webpage or the SIBESSC portal (http://www.sibessc.uni-jena.de/).

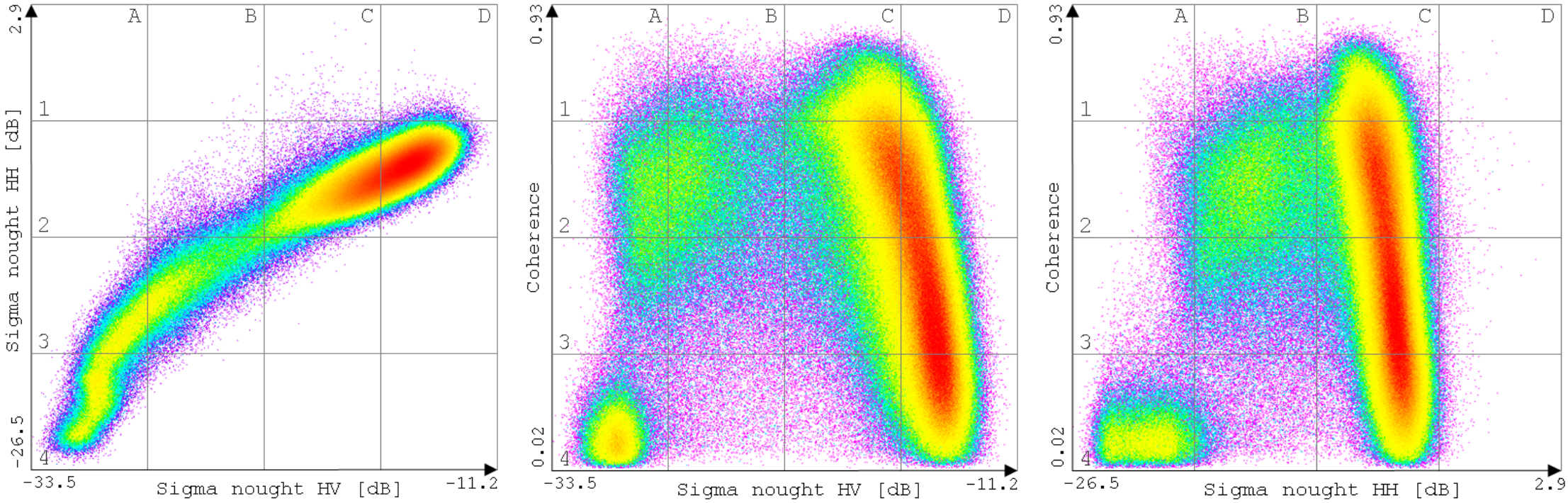


Fig. 2: Feature space plots for subset of prototype area (area includes water, arable land, forest, clear-cuts and fires scars)

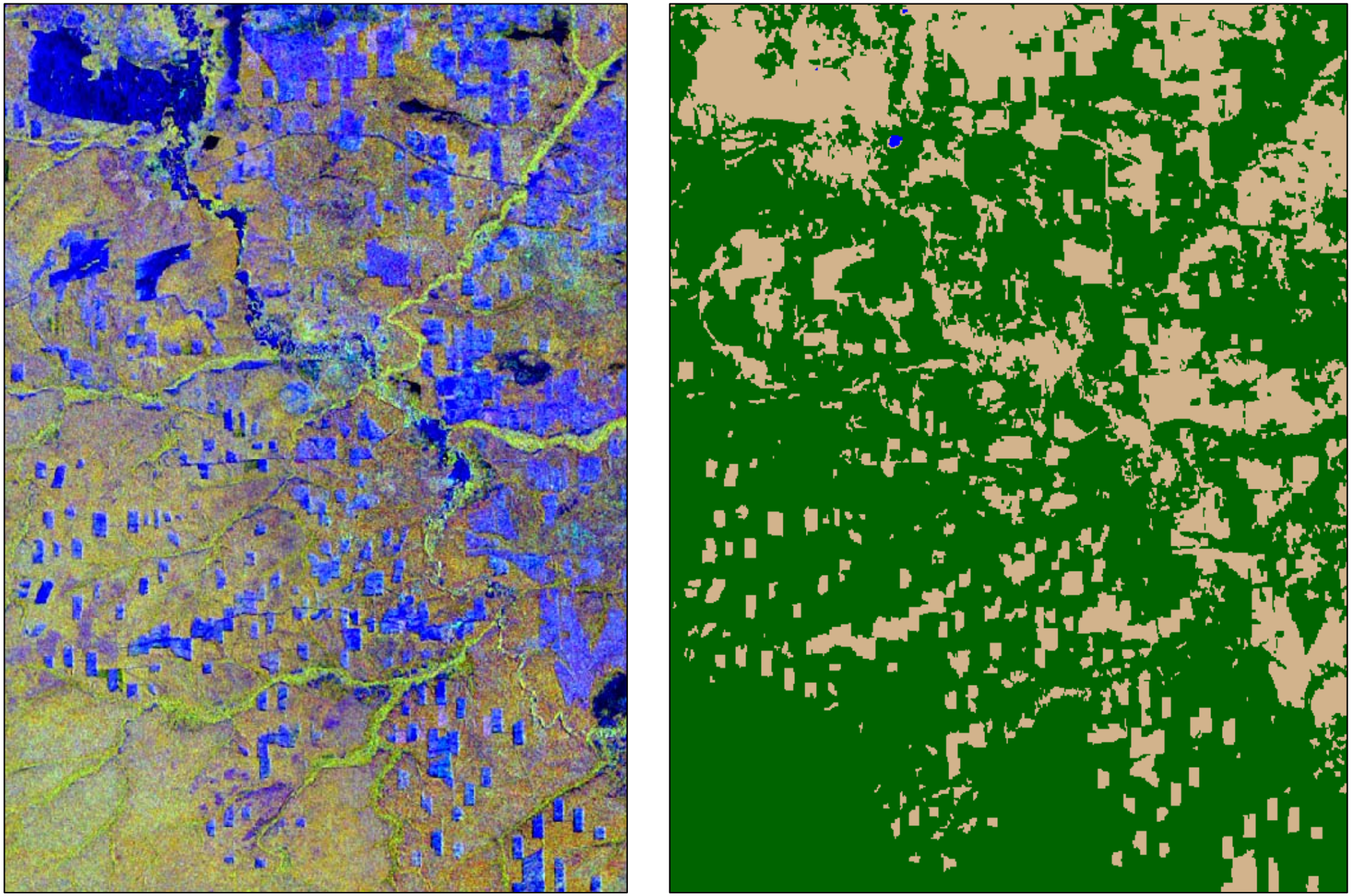
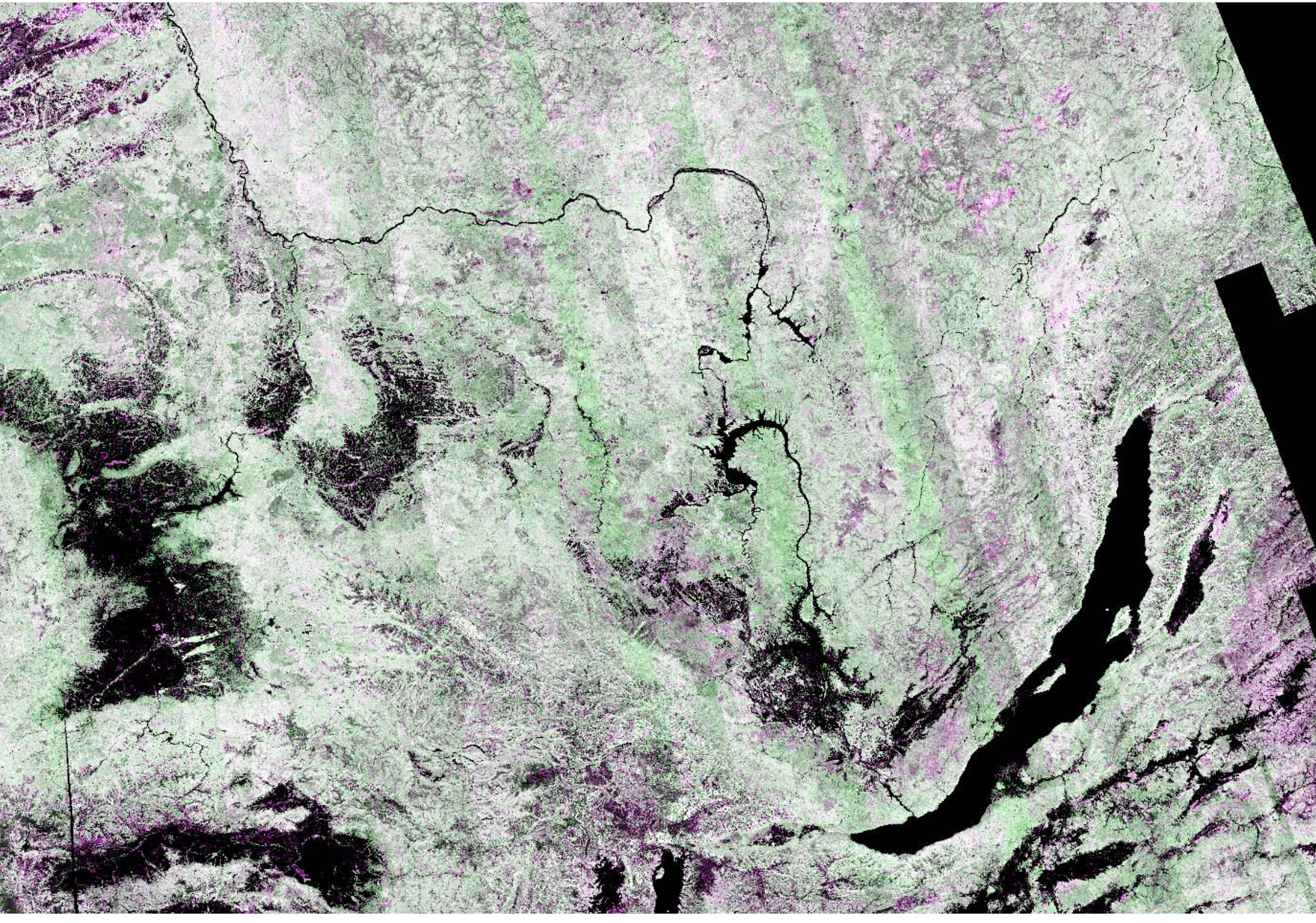


Fig. 4: Left: Composite of HV / HH / Coherence, Right: Land Cover Map (green: forest, tan: non-forest, blue: water)



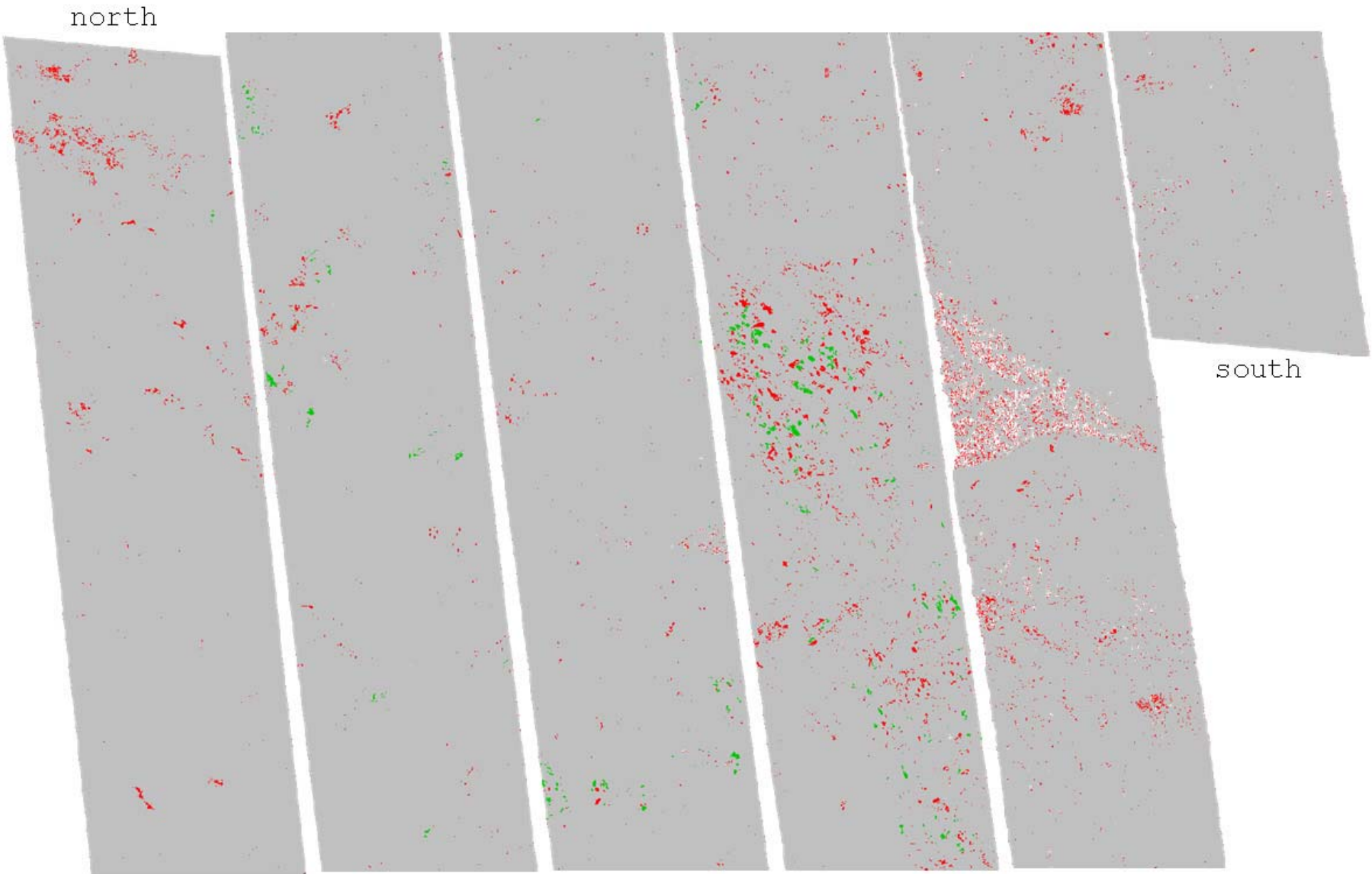
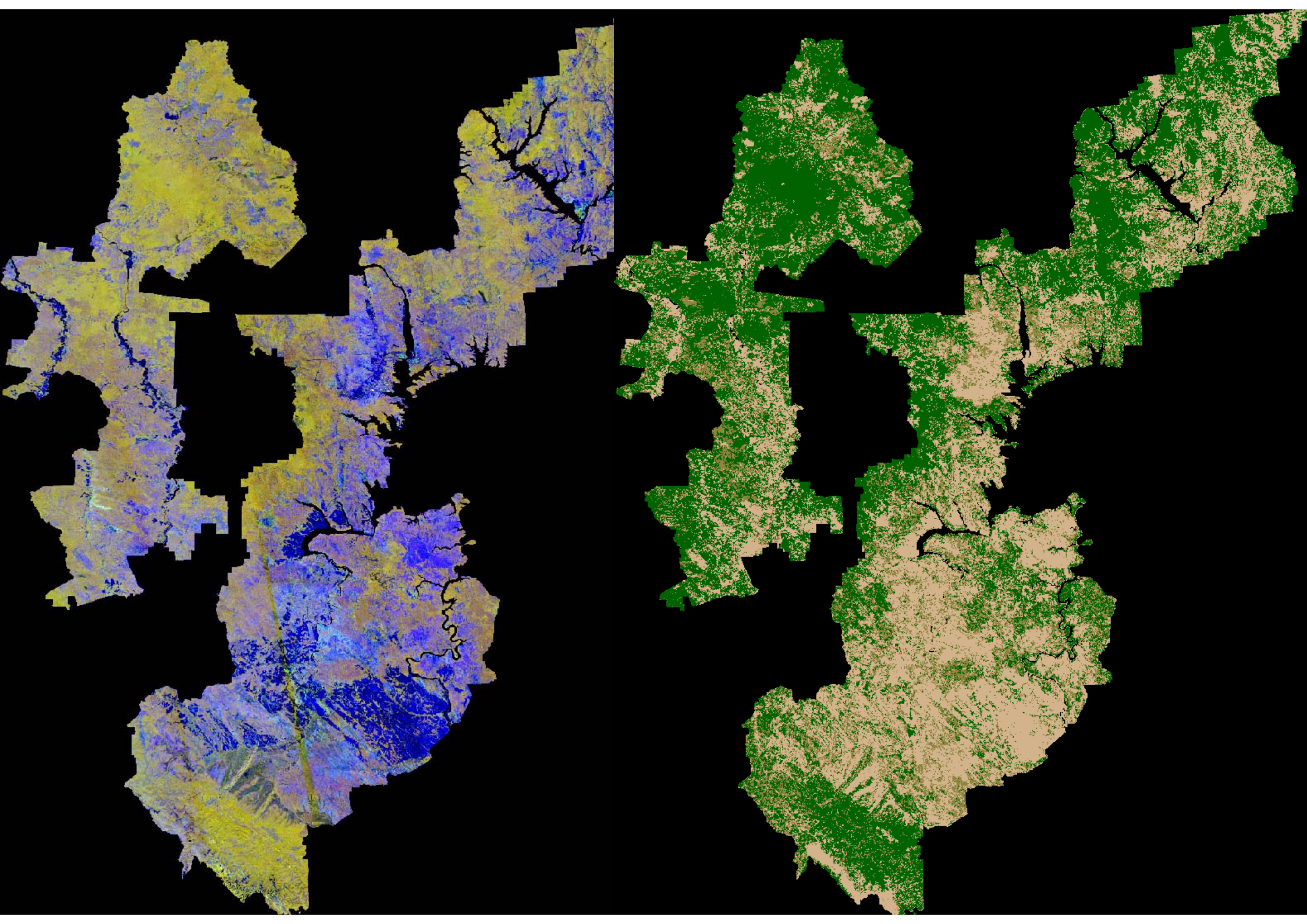


Figure 10: Change map. Colour coding: grey: no change, white: no data, red: decrease of backscatter, green: increase of backscatter. Data taken from track 468, fragmented for better overview,



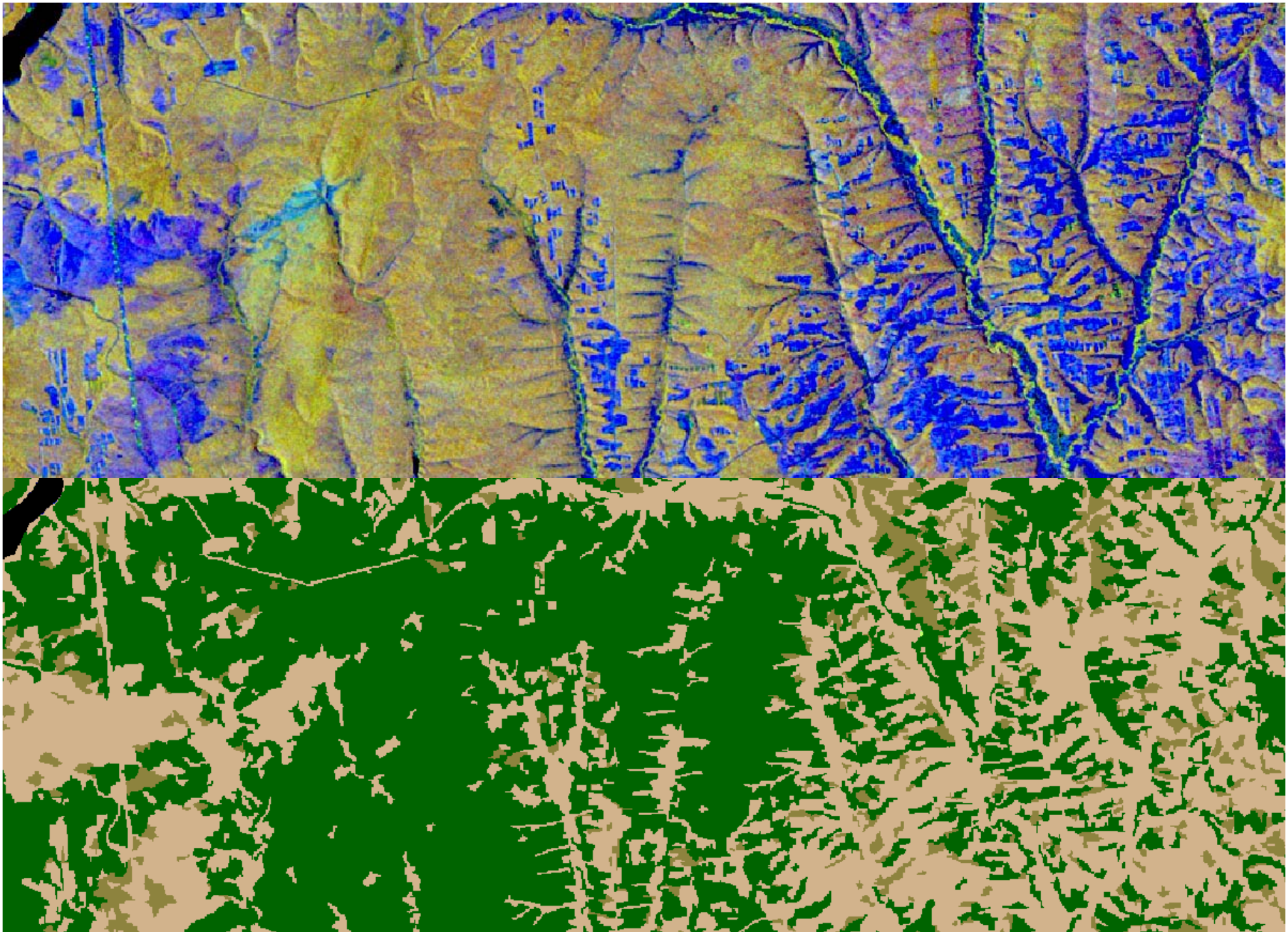


Figure 17: SAR data (HV/HH/Coherence) and forest map for subset (taken from north-eastern part) of the monitoring area; forest: green, very low biomass forest: brownish green, non-forest: light brown.