The Maximum Likelihood classification algorithm has been trained on six classes. To give results that are statistically significant requires substantial speckle filtering in the training images. The classification of the image acquired the 1st August 2007 shows that different land cover types can be distinguished: Rubber, Oil Palm, Peat Forest, and Swamp forest. We are still processing images acquired in 2007 with a repetition time of 46 days over the region. The analysis of eight ScanSAR images acquired in 2007 with a repetition time of 46 days over the region is still in progress with the aim of comparing and combining the information content of multi-temporal HH backscatter with that of dual-polarisation data.

I. INTRODUCTION

THE SENSOR

- The Advanced Land Observing Satellite (ALOS), a new-generation Earth Observation satellite, was launched in January 2006 by the Japan Aerospace Exploration Agency.
- The on-board Phase Array L-band SAR (PALSAR) operates at 1270 MHz and provides enhanced sensor characteristics:
  - full polarimetry
  - variable off-nadir viewing
  - ScanSAR acquisition

THE AREA OF INTEREST

The Riau region in Indonesia

- The region covers about 11 million hectares
- The deforestation rate was very high in the last years due to conversion for farming, grazing, and paper production
- The remaining primary forest mainly consists of swamp forest and there has been extensive conversion to oil palm and rubber plantations. Especially in the south of the region there are many previously cleared areas which now show evidence of tree cover possible of acacia or some other species.

THE DATA AVAILABLE

- The ALOS-PALSAR images consist of high resolution data (ground resolution (Rg x Az) of 12.5 m x 12.5 m) in HH & HV polarisation, with off-nadir angle of 34.4° and swath width of 70 km, and ScanSAR data (ground resolution (Rg x Az) of 100 m x 100 m) in HH polarisation with off-nadir angle of 27.1° and swath width of 360 km. They provide nearly complete coverage of Riau.

III. CLASSIFICATION RESULTS

The Maximum Likelihood classification algorithm has been trained on six classes. To give results that are statistically significant requires substantial speckle filtering in the preprocessing step. The ML algorithm applied on images processed using textural filtering gives poor classification due to the highly non-Gaussian statistics, but it seems likely that texture information can be exploited in more refined classification methods.

- The classification results have been compared with land cover maps from 2006-2007 based on field inventory furnished by the Indonesian WWF section.
- The classification of the image acquired the 1st August 2007 shows that different land cover types can be distinguished: Rubber, Oil Palm, Peat Forest, and Swamp forest. We are still working on quantitative measures of classification accuracy.
- Moreover, land cover change patterns can be revealed: several cleared areas in the land cover map appear to have become Oil Palm plantations.

IV. CONCLUSIONS

- Successful classification of high resolution ALOS images using Maximum Likelihood or Isodata methods requires heavy speckle filtering to make the class distributions close to Gaussian.
- The PALSAR data seem capable of identifying different important cover types, but this still needs quantitative analysis. ALOS-PALSAR data can also be used to monitor land cover change.
- Similar analysis will be applied to the whole Riau region using both high resolution and ScanSAR images and the results will be compared with classifications obtained by JAXA using 50 m mosaics of Riau.
- It seems likely that the texture measurable in the high resolution data will be useful information but we have not properly assessed this yet.