One of the most promising tools for accurate, global scale biomass mapping is P-band synthetic aperture radar (SAR). A new, fully polarimetric P-band SAR satellite system called BIOMASS has been proposed to European Space Agency (ESA) for the 7th Earth Explorer mission. In this paper, a new model for biomass retrieval from polarimetric SAR is presented. A more thorough study can be found in [1].

**DATA**

The data were acquired within two BioSAR campaigns performed in Sweden. The test sites are located approximately 720 km apart and represent two different cases of boreal forest. For both test sites, high quality in-situ and lidar measurements were available. BioSAR 2007 was conducted in Remningstorp in southern Sweden. Remningstorp is a production forest with stand-level biomass up to 300 tons/ha and very little topographic variation. Two objectives of the experiment were to assess the potential of P-band SAR for biomass estimation in boreal forest and to study temporal stability. The latter was addressed with three separate acquisitions from March to May.

BioSAR 2008 was conducted in Krycklan in northern Sweden. Krycklan is representative of higher latitude boreal forests with stand-level biomass reaching up to 200 tons/ha. Topographic variations are significantly larger than in Remningstorp, with stand-level slopes as high as 19 degrees. The main objective of this study was to evaluate the influence of topography. In order to address that, multiple heading data were collected.

All stand-level backscatter data for both Remningstorp and Krycklan are plotted against biomass in Fig. 1.

**RESULTS**

Biomass mapping performance is shown in Fig. 3. For Remningstorp and Krycklan, the SAR-based maps consist of an average of 6 and 4 estimates, respectively. Around 35-50% of all pixels are estimated with relative difference from lidar map lower than 25%.

Three areas of disagreement in Remningstorp have been studied and the following conclusions were made: A remaining understory vegetation boosts HV, isolated trees and double bounce in slightly sloping terrain boosts HV (also, an underestimation in lidar map is observed), C isolated trees and double bounce in flat terrain boosts HH/VV ratio.

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**REFERENCES**


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