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FOREST DRAGON 2: Advances of European Partners During the Fourth Project Year

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The research activities of the European Partners of the FOREST DRAGON 2 project focused on the verification of plausibility, validation and application of the forest growing stock maps produced from ERS-1/2 coherence (1995-1998) and Envisat ASAR ScanSAR backscatter (2005) over Northeast China. An approach to estimate the synergistic effects between the GSV maps and freely available global land use / land cover products (LULC) was developed. Based on a comparative assessment design, the suitability of different LULC products (UMD, IGBP DISCover, GLC2000, GlobCover & MODIS LC) for the synergistic intersection was analysed and quantified. The applied methodology considers problems in terms of legend harmonisation, reference uncertainties, scale issues and different validation concepts. Due to the SAR specific backscatter characteristics, especially areas with agricultural use (e.g. rice cultivation) lead to mis-classifications in the ERS GSV product. The application of the relevant information extracted from the LULC products significantly improved the information content of this classification (increase of overall accuracy up to 7 %).The intersection with the GSV map obtained from Envisat ASAR data using the BIOMASAR algorithm (Santoro et al., RSE, 2011) show the suitability of global LULC products to correct the initial maximum stem volume parameter in the BIOMASAR algorithm resulting in more accurate definitions of GSV levels for forest / non-forest distinction, particularly in transition regions between forest and shrub land. The lack of extensive forest inventory data has hindered thorough validation of the SAR based GSV products why alternative validation approaches have to be considered. To overcome this limitation, a multi-source database was set up including GSV values published in scientific literature, GSV values measured during Forest DRAGON field campaigns as well as various open-source and intra-project products of land cover, vegetation type cover (e.g. MODIS VCF percent tree cover), biomass carbon density and GSV (e.g. IIASA global GSV). The multi-source database was initially created in ArcGIS 10.0 and further translated into a geoportal accessible through the Forest DRAGON 2 homepage of FSU Jena (http://www.forestdragon2.uni-jena.de) To investigate dynamics of forest cover, a GSV change map was created on the basis of the ERS-1/2 GSV map 1995/1998 and the ASAR GSV map of 2005. Due to the fact that the ERS-1/2 GSV product consists of four discrete GSV classes (0-20, 20-50, 50-80, >80 m³/ha) the continuous GSV values of the ASAR GSV map 2005 were reclassified and the change was analyzed on class domains. A first analysis showed that a great amount of changes was induced by fire disturbances or forest growth after fire events. In general the changes related to re-/afforestation were 2.5 times larger than changes due to deforestation. In total, the change map shows a GSV increase over an area of approximately 18 000 km². During the last project year, two M.Sc. candidates from the University of Jena visited the Chinese Academy of Forestry. Joint efforts were spent on collection of on ground measurements to assist the validation of GSV maps and on assessment of detected forest cover changes.

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ERS-1/2   (1995-1998)   ASAR ScanSAR   (2005)

/   SAR

ERS
7%   BIOMASAR

(Santoro   ,RSE,2011)

(MODIS VCF)   (IIASA
)   ArcGIS 10.0
(http://www.forestdragon2.uni-jena.de)
1995-1998   ERS-1/2   2005   ASAR
ERS-1/2   (0-20, 20-50, 50-80, >80 m?/ha) ,
ASAR

2.5

18 000 km2