LAND USE CLASSIFICATION WITH HIGH RESOLUTION SATELLITE RADAR FOR ESTIMATING THE IMPACTS OF LAND USE CHANGE ON THE QUALITY OF ECOSYSTEM SERVICES

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ABSTRACT:

Ecosystems provide several services for human well-being. Quality of these ecosystem services are amongst others affected by agriculture, the main land user in Europe. Thus, it is essential to derive information about land use in agricultural areas. In this research, land use classification of agricultural areas is carried out based on high resolution spotlight TerraSAR-X images (TSX-images) of two different polarisations (HH and VV). The method of the study is to use a stack of several radar images taken during the vegetation season for multitemporal classification of land cover. The different phenology of agricultural vegetation types and their individual phenological development cause different backscatter of the radar signal over time. This phenomenon is used to develop individual signatures for land use classes. Two different study areas are investigated, one in the North East of the city of Hannover called "Fuhrberger Feld" in Lower Saxony and one in the "Gorajec area" in the very South East of Poland. These two areas represent extremely diverse European regions with regard to technological level, population density, cultivation form as well as geological and geomorphological conditions. Thereby, the transferability of the classification method for different regions is tested. The classification results comprise crop types and biotope characteristics. They are used to improve existing procedures for evaluating the quality of two selected ecosystem services, namely soil erosivity and biodiversity. Preliminary results show significant differences in the backscatter of crop types when using a high resolution of about 3 m. Classification results for both study areas will be presented and their accuracy and applicability for ecosystem services will be discussed.

TOPIC: Land cover classification
ALTERNATIVE TOPIC: Microwave remote sensing