

Monitoring land use preparation for early season crop area estimates using ERS-1 SAR data for the Great Driffield site

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Abstract

The paper reports the results of the MARS study contract 10653-94-12 F1ED NL ISP. The contract work was aimed at assessing the usefulness of early season ERS SAR data for delineation of crop areas in the early season (autumn to spring). The use of ERS SAR intensity data in this period is based on the sensitivity of the backscattering coefficient to varying soil surface roughness, and, therefore, to differences in soil tillage practices that precede crop preparation. An extended SAR time series was acquired over the UK Great Driffield site, one of the 60 sampling sites in the operational MARS Activity B program for rapid estimation of crop acreage. Apart from a number of ancillary data sets provided by MARS-AIS, the data was analysed with the help of the results of two dedicated field surveys. Crop separability of a number of important crops was attained, and it was shown that early season SAR data play an important role in the delineation of generic crop classes (winter crops, summer crops, grass land) and the separation within these classes if also summer data are available (e.g. oil seed rape, winter cereals). The classification accuracies were sub-optimal due to the lack of geocoding, which effect was exaggerated by the use of multi-orbit and ascending and descending combinations. Other SAR signal dependencies were enumerated with the help of backscattering models and checked against backscattering signature variation. The encouraging results of this study led to the launch of a more extensive pilot project, with similar objective, in the autumn, winter and spring of 1995-1996 on 20 of the MARS sites. This project is funded by the Directorate-General VI-Agriculture of the European Commission.

Keywords: Agriculture, acreage, crop classification, early season, MARS project