



Assessing the accuracy of crop mapping using satellite imagery for detecting the actual irrigated crop area

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In the last decades, great effort has been made to derive a highly accurate land cover classification at different scales being one of the more relevant challenges of remote sensing and geospatial analysis areas. In this context, we present the Castile and Leon crops and natural land map that is a highly detailed regional land cover layer, obtained through satellite imagery, which distinguishes more than one hundred land cover classes including at least 40 specific crop types. The project began in 2013 by using several satellites, with the production cost greatly reduced since 2016 when Sentinel-2 imagery became freely available and is updated annually. The classification is performed using a machine learning algorithm trained with data retrieved from the Integrated Administration and Control System and some other land use databases available in Spain. This map is also proposed, as an advanced crop map, within Horizon 2020 Project SENSAGRI (Sentinels Synergy for Agriculture), among one of the four advanced proof-of-concept services.

The aim of this study is to assess the capacity to distinguish irrigated herbaceous crops in the Spanish region of Castile and León, by means of the Castile and Leon crops and natural land map (MCSNCyL). In this work two highly detailed (both spatially and thematically) land-cover maps have been compared and assessed their accuracy in two successive years, 2016 and 2017, with very different meteorological conditions and based on different satellite imagery. The resulting map proves to be able to distinguish between the main rainfed crops and irrigated crops in our region. It reaches a good overall accuracy and the stability of the results makes it more feasible. The results show a better classification among irrigated crops in the driest year, as expected since a bigger difference will present each irrigated field in contrast with the surrounding rainfed fields. Furthermore, it allows us to estimate an approximate area covering the main irrigated crops, which is not usually easily available. This latter might be an absolutely key point for policy decision makers concerning water resources management or sustainable agriculture.