



Cropland monitoring using Sentinel-1 SAR data: A case study in the Duxford area, UK

Afrah Daham (1), Arsalan A. Othman (2), Dawei Han (1), and Miguel Rico-Ramirez (1)

(1) University of Bristol, Civil Engineering, Bristol, United Kingdom (ad14446@bristol.ac.uk), (2) Iraq Geological Survey (GEOSURV), Sulaymaniyah office, Sulaymaniyah-Iraq

Wheat farming is one of the most important activities in the agriculture sector, producing staple food for the majority of the world's growing population. Accurate and up-to-date assessment of the spatial distribution of wheat cultivation area is key information required by all the stakeholders including wheat farmers, consumers, and policy makers. Timely assessment with high precision is crucial for market prices control, water resource management and aid supply during humanitarian food crisis. Optical and radar remote sensing data can help map crops, particularly with the availability of free remote sensing data such as Sentinel S-1 (launched by the European Space Agency (ESA) within the framework of the Copernicus program). The advanced data acquisition capabilities of S-1 provide a unique opportunity to monitor different land cover types at high spatial (20 m) and temporal (twice-weekly to biweekly) resolutions. The objective of this research is to monitor wheat crop height from space by using Sentinel-1 SAR images for two different periods in the Duxford area of UK.

In this study, we have processed eight (4 ascending and 4 descending) products to estimate the Differential Interferometry Synthetic-Aperture Radar (DInSAR) of the wheat's height in order to estimate wheat distribution. The VV polarization data of the S-1 SAR images were collected during the wheat growing season and the harvest wheat season of 2015 and 2017. Landsat 8 was also used, mainly to derive NDVI, for a comparison between its observations and the DInSAR results.