

Spatial Variability and Altitude effects of passive chlorophyll fluorescence measurements over La Mancha (Spain) fields

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AIRFLEX is an optical sensor based on the Fraunhofer Line Discriminator principle applied in the atmospheric oxygen absorption bands, that measures simultaneously fluorescence at 687 nm and 760 nm. The sensor was adapted on a Cessna C 208B Gran Caravan aircraft, from DLR (German Space Agency). It has a total field of view of 2° which corresponds to a footprint of 20 m at the altitude of 600m. In addition to fluorescence measurements, two other parameters were continuously acquired: the spatial localisation with the aircraft navigation system, and the image of the target thanks to a digital video camera.

The sensor was flown over cultivated land during June and July 2005, often separated by bare fields with equivalent size. Excellent reproducibility of the measurements was achieved by measuring along the same track of 10 km length. The effect of the altitude on the signals was investigated in the range of 300 to 3000 m.

Although the AIRFLEX data are not yet been fully exploited, one may conclude that the feasibility of passive fluorescence measurements using the oxygen absorption bands is operative up to 3000 m of altitude, with only marginal signal degradation when compared to 300 m measurements. This led us to be confident on the possibility to extend the method to the detection from a satellite platform with a modified version of the sensor.

- Conférence theme: Remote sensing systems (microwave, Lidar, (hyper-)spectral, multiangular, thermal, polarization)