EMS Annual Meeting Abstracts
Vol. 10, EMS2013-261, 2013
13th EMS / 11th ECAM

ChloroMetrica - a DUE Innovations proposal to provide terrestrial chlorophyll measurements to climatology, ecosystem and agricultural users

T.H.G. Lankester (1) and J. Dash (2)

(1) Astrium GEO-Information Services, Farnborough, United Kingdom (thomas.lankester@astrium.eads.net), (2) Geography and Environment, University of Southampton, United Kingdom (J.DASH@soton.ac.uk)

Satellite sensor derived vegetation indices, measures of terrestrial vegetation 'greenness', are utilised for monitoring the function and status of natural and managed ecosystems and their response to changes in inter-annual / long-term climatic condition. This is primarily based on the assumption that these vegetation indices represent a surrogate measure of vegetation photosynthetic capacity and in turn were able to track the amount and condition of vegetation. An accurate measure of vegetation chlorophyll content would enable estimation of the photosynthesis rate through vegetation-light interaction and hence the primary productivity. Unfortunately, traditional satellite derived vegetation indices are not explicitly linked to the chlorophyll content as their design and the availability of spectral bands were not optimised to utilise a specific absorption feature, the 'red edge', in the vegetation reflectance spectra.

The MERIS Terrestrial Chlorophyll Index (MTCI), derived from the spectral reflectance information in the red-edge of the electromagnetic spectrum, was designed specifically to provide surrogate measure of chlorophyll content. Over the last 8 years, numerous field validation exercises, covering a range of vegetation types, have demonstrated a good agreement with canopy chlorophyll content. Through a proposal to the ESA Data User Element (DUE), we plan to develop the calibration equation from the dedicated field work activities (and from other related works) for MTCI to produce the first ever global absolute measure of terrestrial chlorophyll content (in mg per m2). The upcoming European Sentinel 2-MSI and Sentinel 3-OLCI super-spectral missions have the requisite spectral bands in the red edge region to ensure MTCI continuity and the ability to produce absolute chlorophyll content.

The ChloroMetrica DUE proposal would bring together climatology, agri-meteorology and carbon cycle users to address their need for absolute measures of chlorophyll content and its use in vegetation phenology, primary productivity and agricultural management.