THE MULTI-SENSOR LAND CLASSIFICATION SYSTEM LCS: AUTOMATIC MULTITEMPORAL LAND USE CLASSIFICATION SYSTEM FOR MULTI-RESOLUTION DATA

A. Beccati[*a b] M. Folegani[a] S. D'Elia[c] R. Fabrizi[a] S. Natali[a] L. Vittuari[d]

[c] ESA - ESRIN, Ground Segment Department, via Galilei 1, I-00044, Frascati, Rome, Italy
[b] University Of Ferrara, Department of Mathematics, Via Saragat, 1, I-44122, Ferrara, Italy
[d] University of Bologna, DISTART, Viale Risorgimento 2, I-40136, Bologna, Italy
[a] MEEO srl, Research and Development, Via Saragat, 9, I-44122, Ferrara, Italy

Technical Commission VII Symposium 2010

KEY WORDS: Land Cover, Land Use, Modelling, Web based, Global, Multiresolution, Multitemporal, System

ABSTRACT:

Providing land use/land cover change (LULCC) maps through the use of satellite imagery is very challenging and demanding in terms of human interaction, mainly because of limited process automation. One main cause is that most of LULCC applications require multi-temporal acquisitions over the same area, that introduces the need for accurate pre-processing of the dataset, in both geo-referencing and radiometry. Moreover, single multi-spectral images can be hundred of megabytes in size and therefore image time series are even more difficult to be handled and processed in real time. The approach here proposed foresees the use of a robust land cover classification system named SOIL MAPPER® to reduce input data size by assigning a semantic meaning (in the land cover domain) to each pixel of a single image. Land cover transitions and land use maps can be expressed as evolutions of land cover classes (features) on temporal domain. This permits to define 'trajectories' in the features – time space, that define specific transition or periodic behaviour. The target system, named Land Classification System (LCS), provides fully automatic and real time LULCC analysis and includes fundamental sub-systems for accurate radiometric calibration, accurate geo-referencing (with geolocation within the pixel size) and accurate remapping onto an Earth fixed grid. The characteristics of the selected pre-classification system and Earth fixed grid allow general application across different sensors. LCS has been prototyped over 13 years of global (A)ATSR data and foresees integration of over 3 years of regional ALOS-AVNIR-2 data.

TOPIC: Change detection and process modelling
ALTERNATIVE TOPIC: Land cover classification