Use of GEOV1 climatology based on 11 years of consistent observations: identification of trends at the global scale

F. Baret (1), A. Verger (1,2), M. Weiss (1), H. Makhmara (3), R. Lacaze (4), and P. Pacholczyk (3)

(1) INRA, EMMAH UMR1114, Avignon, France (baret@avignon.inra.fr, +33 4 32 72 23 62), (2) Universitat de València, València, Spain, (3) CNES, Toulouse, France, (4) HYGEOS, Toulouse, France

Vegetation plays a key role in the climate system as well as for providing vital food, fiber, fuel and fun to humans. Vegetation is reciprocally subjected to strong climate and anthropogenic pressure resulting in changes that need to be documented through few quantitative diagnostic variables. The leaf area index (LAI) and fraction of photosynthetically active radiation absorbed by the vegetation (FAPAR) have been recognized as essential climate variables (ECV) required for describing the climate system.

Global and frequent remote sensing observations have started in 1981 with the AVHRR series, then relayed since the 2000's by a new generation of sensors such as VEGETATION, MODIS and MERIS with improved spatial, spectral and radiometric performances. Estimates of LAI and FAPAR have been derived in a consistent way from these sensors at a 10 days time step and 1 km (since 1999) to 4 km (since 1981) spatial resolution. The basic principles of these products called GEOV1 are shortly presented and their performances compared successfully with other existing products and ground based measurements using the guidelines proposed by Land Product Validation group within CEOS.

The global changes over the last 10 years are finally analyzed using the LAI product by accumulating the data for each dekad across the available years, and extracting a linear trend while smoothing out the confounding inter-annual variability. Results show that many areas are subjected to a significant trend corresponding either to a change (positive or negative) in vegetation amount or in a shift in the seasonality. These changes are correlated with the evolution of temperature conditions. Conclusions are drawn on the limits and possible improvements of the method used as well as on further confrontations with global vegetation models and consistent continuation of the series with the coming S3, VIIRS and PROBA-V sensors.