Geophysical Research Abstracts, Vol. 7, 10716, 2005
SRef-ID: 1607-7962/gra/EGU05-A-10716

Variographic analysis of Global Burned Surfaces Time Series from Earth Observation data (1982-1999).

César CARMONA-MORENO, Gregoire DUBOIS, Philippe CAPERAN, Alan BELWARD, Jean-Paul MALINGREAU

European Commission, D.G. Joint Research Centre, TP. 440, 21020 Ispra (VA), Italy

Regular monitoring of global burnt surface areas has been identified as an essential climate variable by the Global Climate Observing System (GCOS, 2003) because vegetation fires are important drivers of climate, indicators of possible climate change and have a role to play in climate change adaptation and mitigation strategies. The GCOS's requirements include the need to identify areas around the globe affected by fire, monitoring the occurrence/seasonality of fire activity and inter-annual variability as well as estimating the spatial distribution of burnt surfaces. Accurate descriptions of changes in fire seasonality, frequency, intensity, severity, size, rotation period and changes in fire return interval are also needed for ecological studies (Payette, 1992) because these factors have a strong influence on plant species composition.

Daily global observations from the Advanced Very High Resolution Radiometers on the series of meteorological satellites operated by the National Oceanic and Atmospheric Administration between 1982 and 1999 were used to generate a new weekly global burned surface product at a resolution of 8km^2. Comparison with independently available information on fire locations and timing suggest that whilst the time-series cannot yet be used to make accuracy and quantitative estimates of global burnt area, it does provide a reliable estimate of changes in location, season, frequency and rotation period of burning on the global scale (Carmona-Moreno et al., 2004).

This paper presents the results of spatial-temporal correlations of the global burned surfaces time series using variographic analysis. To begin with, Global Burned Surface time series have been broken down by trimesters and distributed by latitudes (step=1°). Variograms show a strong structural stability of the time series in both spatial and temporal dimensions. The spatial distribution of these data shows three

major latitude regions where fires occur each year (0-32˚N, 40-70˚N and 0-30˚S). The spatial-temporal autocorrelations show a time shift between these three spatial regions by as much as three months.

References

Carmona-Moreno C., Belward A., Malingreau J.P., Garcia-Alegre M., Hartley A., Antonovski M., Buchshtaber V., Pivovarov V. (2004). **Characterising interannual variations in global fire calendar using data from Earth observing satellites**. Global Change Biology (submitted).

GCOS (2003), ***The Second Report On The Adequacy Of The Global Observing Systems For Climate In Support Of The UNFCCC***, April 2003, GCOS-82, WMO Technical Document 1143 (WMO; Geneva), 74pp.

Payette S. (1992). **Fire as a controlling process in the North American boreal forest**. In A systems analysis of the Global Boreal Forest (edited by H.H. Shugart, R. Leemans and G.B. Bonan published by Cambridge University Press, Cambridge, 1992).