



Early drought warming from MODIS

S. García, Z. Hernández-Guillén

University of Cartagena. Cartagena, Spain

(sandra.garcia@upct.es / Fax: 0034968325435 / Phone: 0034968325935)

(zaida.hernandez@upct.es / Fax: 0034968325435 / Phone: 0034968325935)

The drought is one of the most complexes and least well understood of all the natural hazards. Its effects are slowly accumulate during long time periods and can remain for years after concluded the event, being its impacts less obvious and wider than the damages caused by other natural hazards. In addition, the absence of a consensus in its definition and needs increases the confusion on the existence or not of drought.

In the river basins of the Spanish southeastern, more and more affected by the frequent droughts, a methodology of alert based on the integration of data obtained from satellite (MODIS) in combination with climatic observations has been developed. In addition, it allows to analyze the space-temporary variability of the drought at a regional level.

Data of land surface temperature (LST) and normalized difference vegetation index (NDVI) from MODIS available for the period 2000-2006 have been used. The meteorological data correspond to air temperature.

The proposed methodology is based on the interpretation of the space LST versus NDVI; also in the space of the difference LST minus air temperature versus NDVI. The combination of LST and NDVI by scatter plot results in a triangular shape (Price, 1990, Carlson et al., 1994) or trapezoidal (Moran et al., 1994) if the data are represented in a full range of vegetation cover and soil moisture contents.

In this study, for the relation LST and NDVI and Δ LST and NDVI of each date, the spaces have been graphically represented, and the regression lines to the dry and moist edge. The coefficients of both lines have been obtained.

An increase of the values of surface temperature (LST) has been detected (despite

high NDVI values) in periods of hydric shortage, through a slope change of the moist edge of the space LST-NDVI (triangle in the case of the Segura Basin, and trapezium in the Jucar River Basin), depicting positive trends of the moist edge. The persistence of these conditions, positive slope of the moist edge of the space LST-NDVI has been shown to develop the beginning of a drought period. It seems to indicate that the proposed methodology makes an early detection of the drought.