An extended multivariate framework for drought monitoring in Mexico

Roberto Real-Rangel (1,2), Adrián Pedrozo-Acuña (1), Agustín Breña-Naranjo (1), and Víctor Alcocer-Yamanaka (3)

(1) Institute of Engineering, National Autonomous University of Mexico, Mexico City, Mexico (rrealr@iingen.unam.mx), (2) Program of Master and Doctorate in Civil Engineering, National Autonomous University of Mexico, Mexico City, Mexico, (3) National Water Commission

Around the world, monitoring natural hazards, such as droughts, represents a critical task in risk assessment and management plans. A reliable drought monitoring system allows to identify regions affected by these phenomena so that early response measures can be implemented. In Mexico, this activity is performed using Mexico's Drought Monitor, which is based on a similar methodology as the United States Drought Monitor and the North American Drought Monitor. The main feature of these monitoring systems is the combination of ground-based and remote sensing observations that is ultimately validated by local experts. However, in Mexico *in situ* records of variables such as precipitation and streamflow are often scarce, or even null, in many regions of the country. Another issue that adds uncertainty in drought monitoring is the arbitrary weight given to each analyzed variable.

This study aims at providing an operational framework for drought monitoring in Mexico, based on univariate and multivariate nonparametric standardized indexes proposed in recent studies. Furthermore, the framework has been extended by taking into account the Enhanced Vegetation Index (EVI) for the drought severity assessment. The analyzed variables used for computing the drought indexes are mainly derived from remote sensing (MODIS) and land surface models datasets (NASA MERRA-2). A qualitative evaluation of the results shows that the indexes used are capable of adequately describes the intensity and spatial distribution of past drought documented events.