Determining drought scenarios in the region of the North Pacific Basin Agency, Mexico

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Summary

Droughts are meteorological adversity affecting all human activities which directly or indirectly cause the degradation of environmental conditions. Mexico has experimented the negative effects of drought since the pre-Hispanic period to the present and, in particular, the Organismo de Cuenca del Pacífico Norte (OCPN) has been affected by severe droughts as the occurred in 2011-. During this period the runoff in rivers and streams were practically null and very low storage volumes were recorded in the main dams in the region. A temporal and spatial analysis of drought for the period 1978-2016 was carried out using the indices standardized precipitation (SPI) and the drought of Palmer (PDSI) for the region of the OCPN. Drought scenarios were determined at 1, 2 and 3 months, based on temporal multivariate analysis and use of neural networks. The results showed that accurate forecast was obtained by neural network model Perceptron Multilayer two-layer. The statistical parameters used to evaluate the forecasts indicated a close relationship between the observed and forecasted values and acceptable estimation errors. The proposed methods can contribute to the integral management of watersheds for the prevention, mitigation, adaptation and response to drought.

Key words: Neural networks; climate variability; temporal multivariate analysis