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Long Term Rainfall Predictive Model by Using ANN and Preciptation Data Sets Gathered at Multiple Raingauges of the Northwestern Coast of South-America

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Developing and Implementing long term rainfall predictive models is one of the most challenging problems that hydroclimatological scientific community tackles nowadays. Within the hydroinformatics discipline several intelligent systems-based approaches have recently been developed that claim success when applied to hydroclimatological data sets. However, either at regional scales or when the required forecast step is greater than six months, such models do not usually show a proper performance. On the other hand, Regional Hydroclimatological Research Centers such as the "International Center for Research on *El Niño*" (CIIFEN, for its acronym in Spanish) has the imperative need of developing precipitation forecast models. For this case applied to the north-western coast of south America where countries such as Colombia, Perú, Ecuador the reported sensibility to the ENSO is well known. In these regards, this work develops artificial neural networks (ANN) models aimed at forecasting monthly long term rainfall values. Training instances are obtained not only based on point raingauges data sets, but also including rainfall patterns gathered in other stations located at the study zone. In this sense a proper statistical characterization is advanced, in particular spatial-temporal linear and nonlinear correlations in order to obtain proper patterns. The type of calibrated ANN is the multilayer perceptron trained with the delta generalized rule. Results suggest that the ANN-based models applied for the study zone perform well for mostly of stations and that such performance basically

depends on both topological features of the nets and correlation structures among point precipitation data sets.