Frequency analysis of low flows

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Abstract. The main purpose of this research is to present a regional frequency analysis of low flows applied to the upper Colorado region. Low flow information is mainly used in the planning and management of water resources systems. It is important also in designing wastewater treatment plants and industrial economic expansion. Two approaches, regionalizing low flow quantiles and parameters of probability models, were used to estimate 7 day-l0 years low flows at ungauged sites. Low flows characteristics are summarized for continuous records at sixteen sites. At each one of these sites, e low flows ware determined as the lowest stream-flow in 1, 3, 7, 14 and 28 consecutive days. Using the L moments technique, six probability functions were evaluated to establish the most appropriate distribution that fits the low flow data, which found to be Gumbel for maximum or General Extreme Value distribution Type 1 (GEV-1). The suitability of the Gumbel distribution to the low flow quantiles at each site was tested by superimposing the empirical low flow quantiles using the Weibull plotting position formula. Autoregressive model AR(1) and gamma-autoregressive model GAR(1) were applied using different values of the serial correlation coefficient in order to determine how the serial dependence affects the return period.