



## **Evaluation of the return periods of water crises and evaporation in Monte Cotugno reservoir (Southern Italy)**

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In the past water resources management has been dealt and solved increasing water availabilities; today such opportunities have been considerably reduced and the technical-scientific perspectives are addressed above all to improve water system effectiveness and to promote an use of water resources that holds account of the droughts frequency and based on a correct estimate of the hydrologic balance. In this work a study on the water stored in Monte Cotugno reservoir in Sinni river - Basilicata (Southern Italy) - is proposed, estimating water crises return periods and reservoir evaporation. For such purpose the runs method was applied, based on the comparison between the temporal series of the “water volume” hydrological variable and a threshold representative of the “normal” conditions regarding which the availability in excess or defect was estimated. This allowed to individualize the beginning and the end of a water crisis event and to characterize the droughts in terms of duration, sum deficit and intensity. Therefore the return period was evaluated by means of the methodology proposed by Shiau and Shen in 2001, turned out equal approximately to 6 years. Such value was then verified with a frequency analysis of the “water volume” random variable, using the Weibull’s distribution. Subsequently, the Fourier’s analysis in the last twenty years was carried out, obtaining the same result of the previous methods. Moreover, in proximity of the Monte Cotugno reservoir the weather station of Senise is located, managed by ALSIA (Agenzia Lucana di Sviluppo e Innovazione in Agricoltura), that provides in continuous measurements of air temperature and humidity, wind speed and direction, and global solar radiation since 2000. Such parameters allowed to apply five methods for reservoir evaporation estimate selected from those proposed in the literature, of which the first three, the Jensen-Haise’s method, Makkink’s method and Stephens-Stewart’s one are based on solar radiation and temperature, while the Blaney-Criddle’s method is based on temperature and duration of the day, and the Thornthwaite’s method is based only on air temperature measurement.