Evaluation of the self-purification capacity of a river provides required evidence for a sustainable management of the river receiving pollutants. The main target of this paper was to study and predict the seasonal variation of self-purification capacity of Karun River, Iran. Dissolved oxygen, BOD, nitrate and coliforms are the main quality parameters, which were focused in this paper. To achieve this aim, a length of 113 km of the river was simulated, using QUAL2Kw model and calibrated and confirmed involving the field measured data in 2010. The above mentioned datasets were used also to determine the critical periods of self-purification phenomenon for BOD, Nitrate and coliform parameters. Three scenarios were supposed, including decreasing of the waste waters flow rate into the river by 30%, increasing of the river monthly flow by 30% and finally decreasing of the waste waters concentrations by 30%. The above mentioned scenarios were assumed in order to enhance the water quality of the river, in the month with no standard limits. Results indicate that, the decrease of nitrate in January and February and the decrease of BOD for all month except...
October up to 30%, have had the most positive effects on the river water quality. Moreover, the decrease of Dez and Gargar rivers waste water flow rates into Karun River by 30% and also the decrease of contaminate flow rate along the river from Mollasani to Ahvaz, into the river had the most positive effects on the river water quality regarding the coliform parameter.

QUAL2Kw, assimilative, modelling, Karun River, pollutants