

## **PREDICTION OF SO<sub>2</sub> AND PM CONCENTRATION IN COASTAL MINING AREA (ZONGULDAK) WITH ARTIFICIAL NEURAL NETWORK**

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Neural network models have been used for prediction of gas and particulate matter pollution. In this study, artificial neural networks are proposed to predict SO<sub>2</sub> and PM concentrations at two different stations in Zonguldak City which is the main coastal mining area in Turkey. In the Zonguldak, sulphur dioxide has been emitted into the atmosphere with no controls particularly in hard coal mining region. In addition to SO<sub>2</sub> emission, the hard coal mines emits particulate matter which contains hazard heavy metals, into the city's atmosphere. The constructed artificial neural network models involve meteorological parameters and historical data on observed SO<sub>2</sub>, PM as input variables. The models are based on three-layer neural network trained by a back-propagation algorithm. The models accurately match the trend of SO<sub>2</sub> and PM concentrations. The predicted pollutants concentrations fit to the observed concentrations on most of the days. The best results were obtained in training data set. It was observed that the maximum SO<sub>2</sub> and PM concentrations were reached approximately at the period of winter season. For validation of the models, regression method was used with the predicted values as an input variable. The determination coefficients and correlations between observed and predicted values for the pollutants at two stations indicate that the fitted model explains percentage of the variability between observed values and neural network model predictions. The results obtained by the proposed models show that the artificial neural network can be used efficiently for analyzing and predicting an efficient air quality.