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Prediction of Frost Heaving Behaviour of Saline Soil in Western Jilin Province by ANN Methods and Sensitivity Analysis for the Affecting Factors

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In this study, two different Artificial Neural Network (ANN) approaches were used to predict the frost-heaving ratio of the saline soil specimen collected from Nong'an, western Jilin, China. Four variables, including water content, compaction, temperature and soluble salts content were considered to predict the frost-heaving ratio. 360 data points collected from the experimental studies were used to develop the prediction models. The results of the two approaches are compared in order to get a more reliable model. The results indicated that GRNN can be applied successfully for prediction of the frost-heaving ratio for the saline soil from Nong'an. To study the degree of the affecting factors, sensitivity analyses were developed and the results indicated that the water content is the most influential variable on the frost-heaving ratio of the saline soil specimen, while the soluble salts content is the least influential variable. Considering that the soil is carbonate-saline soil the soluble salts affect the frost-heaving ratio least. Thus, in future research, the frost heaving behaviour of sulphate-saline soil and the saline soil with mixed salts will be studied.