World Academy of Science, Engineering and Technology
International Journal of Information and Communication Engineering
Vol:16, No:12, 2022

Prediction of the Crustal Deformation of Volcán - Nevado Del RUíz in the Year 2020 Using Tropomi Tropospheric Information, Dinsar Technique, and Neural Networks

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Abstract : The Nevado del Ruíz volcano, located between the limits of the Departments of Caldas and Tolima in Colombia, presented an unstable behaviour in the course of the year 2020, this volcanic activity led to secondary effects on the crust, which is why the prediction of deformations becomes the task of geoscientists. In the course of this article, the use of tropospheric variables such as evapotranspiration, UV aerosol index, carbon monoxide, nitrogen dioxide, methane, surface temperature, among others, is used to train a set of neural networks that can predict the behaviour of the resulting phase of an unrolled interferogram with the DInSAR technique, whose main objective is to identify and characterise the behaviour of the crust based on the environmental conditions. For this purpose, variables were collected, a generalised linear model was created, and a set of neural networks was created. After the training of the network, validation was carried out with the test data, giving an MSE of 0.17598 and an associated r-squared of approximately 0.88454. The resulting model provided a dataset with good thematic accuracy, reflecting the behaviour of the volcano in 2020, given a set of environmental characteristics.

Keywords : crustal deformation, Tropomi, neural networks (ANN), volcanic activity, DInSAR
Conference Title : ICAGE 2022 : International Conference on Applications of Geomatics Engineering
Conference Location : Cairo, Egypt
Conference Dates : December 15-16, 2022