

# Deep Learning Approaches for Eruption Prediction of Sakurajima

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In this research, we take advantages of deep learning into time series data and apply this technique to sensor data acquired from volcanic monitors.

We focus on two problems: (1) volcanic eruption classification and (2) early prediction of volcanic eruption. The goal of (1) is to recognize the current status of the volcano, while the goal of (2) is to predict the future eruption by detecting the time series prior to the eruption which is the early signal of the upcoming eruption. For (1), the proposed method VolNet based on convolutional neural network achieves an average F-score of 90%. For (2), the proposed method based on Stacked 2-Layer LSTM achieves promising results of 66.1% accuracy. And the accuracy of 4-stage warning system is 51% in the critical stage. We demonstrate the effectiveness of our methods with the largest and the most comprehensive set of volcano sensor time series data.

Keywords: Eruption Prediction, Sakurajima, Deep Learning