# Nowcasting machine learning algorithm for ionospheric amplitude scintillation monitoring: Preliminary Results

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**Abstract**:

Ionospheric scintillations are rapid fluctuations of radio frequency signals amplitude and phase that pass through the ionosphere produced by the effect of various ionospheric phenomena and space weather physical parameters. These affected radio signals (reflected or refracted) have a strong impact on the communication and navigation systems that depend on these signals, for this reason it is important to monitor ionospheric scintillations. A machine learning algorithm has been used to predict the average S4 index for 1 hour based on 4-hour space weather conditions. Data from the Huancayo NOVATEL GPS receiver station of the LISN network from 2015 to 2017 and space weather parameters (Kp, F10.7, Bx, By, Bz, Solar Wind, Dst, F10.7, AE, R) from Omni Web data was used to perform these predictions. Several neural network models have been tested for S4 prediction and we found that the Residual LSTM architecture was the optimal one for predicting the index over multiple samples of the label comparing the absolute mean error of the different models.

**References:**

Machine Learning Techniques for Space Weather, Elsevier, 2018, Pages 279-300, ISBN 9780128117880.

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