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Recognizing of gravity waves from all-sky airglow images using machine learning over a complete solar cycle

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To study atmospheric gravity waves, a large number of airglow images must be processed. In this work we present a program that was developed to recognizing gravity waves patterns in ASAI images. The recognizing procedure contains a classification model based on a convolutional neural network (CNN) and object detection models. Classification model selects clear nighttime images from all ASAI raw data picture. The object detection model locates the extent of the waveform. Then the wave parameters (horizontal wavelength, period, direction, etc.) can be calculated over the range of the wave sample, All data used in this paper based on 557.7-nm airglow images at shigaraki (SGK) (35°N, 136°E,2008-2019(24th solar cycle)), Japan.

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