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Interactive comment on "Backpropagation Neural Network as Earthquake Early Warning Tool using a new Elementary Modified Levenberg–Marquardt Algorithm to minimise Backpropagation Errors" *by* Jyh-Woei Lin et al.

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Dear Reviewer 2 Thank you for you comments. Now I address your comments point-by-point. Author: Lin, Jyh-Woei 26, May, 2018 1. On page 1, no line 13: The word 'a' in the sentence 'a trade-off decision-making process .....' should be capital. ANS: In Abstract, I have change as follows; Abstract. A new Elementary Modified Levenberg–Marquardt Algorithm (M-LMA) was used to minimise backpropagation errors in training a backpropagation neural network (BPNN) to predict the records related to the Chi-Chi earthquake from four seismic stations, Station-TAP003, Station-TAP005, Station-

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Discussion paper

TCU084 and Station-TCU078, with the learning rates of 0.3, 0.05, 0.2 and 0.28, respectively. For these four recording stations, the M-LMA has been shown to produce smaller predicted errors compared to Levenberg–Marquardt Algorithm (LMA). A sudden predicted error could be an indicator for Early Earthquake Warning (EEW), which indicated the initiation of strong motion due to large earthquakes. A Trade-Off Decision-Making Process with BPNN (TDPB), using two alarms, adjusted the threshold of the magnitude of predicted error without a mistaken alarm. This approach was not necessary to consider the problems of characterising the wave phases and pre-processing, but did not require complex hardware; an existing seismic monitoring network-covered researched area was already sufficient for these purposes. In page 6, line 30, the text is also changed as follows; A decision-making process called " Trade-Off Decision-Making Process with BPNN (TDPB)" was performed. In this study, the past records of the Chi-Chi earthquake was examined by TDPB, and then the thresholds and were subjectively determined.

2.The yellow colored spot in figure 1 is too light to be distinguished. ANS: I have also change in the figure caption for Figure.1 with more clear colors as follows; Figure 1 The figure shows the position of Chelungpu fault (No.11) on a map of Taiwan. Slip on this fault caused the Chi-Chi earthquake, which occurred at 01:47:15 on September 21, 1999 (TST), at a depth of 8.00 km, with a Richter magnitude (ML) of 7.3. The epicentre was at the coordinates (23.85° N, 120.82° E) (Orange-colour spot near the Chelungpu fault for No.11). The four corresponding positions of the research stations are shown by a dark blue coloured spot (Station-TAP003), baby blue coloured (Station-TAP005) spot, red coloured spot (Station-TCU084) and dark red coloured spot (Station-TCU078) in this figure. Station-TCU078 is very close to the epicentre. 3.Figure 4 which is mentioned in page 7 can't be found in figure captions. ANS: I have remove this figure. By Supplement file is my revise paper with figures

Please also note the supplement to this comment:
https://www.geosci-instrum-method-data-syst-discuss.net/gi-2018-13/gi-2018-13-

AC2-supplement.pdf

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