For research article

Response to Reviewer 2 Comments

1. Summary

Dear editor,

We would like to thank the reviewer for the comments which were very helpful to improve the quality of the manuscript. We carefully considered all the comments and addressed them in the manuscript. Below, we include our replies to each comment of the reviewer highlighted in green. The modifications in the manuscript are highlighted in red.

This paper determines a procedure for combining multi-sensor data by merging data from different sensors, which measure the same AE sources. The sensors do not depend on each other, but they can be combined to give a more complete image of the AE source in the library. The authors propose a method to reduce the sensor effect. The acoustic emission sources are generated by the pencil-lead break (PLB) procedure on a specimen surface under controlled conditions to emit a wave that sensors can then record. The emitted frequency content of this source is controlled by the length and the orientation angle of the pencil lead break. The paper studies the influence of the sensor effect with different source-sensor distances on the characteristics of the AE signals, obtained by PLB on a 3 mm thick PMMA plate. By comparing the AE results, obtained by five different sensors, the influence of the sensor effect is illustrated. A procedure is proposed to reduce the sensor effect, based on the normalized data, the Krusal-Wallis test, outliers computation, and the Principal Component Analysis. Subset of features is chosen that can be used for all sensors.

Some shortcomings of the paper are the following:

2. Point-by-point response to Comments and Suggestions for Authors

Comments 1: *(Line 197): m must be replaced by mi and σ must be replaced by σi.*

Response 1: We modified the term "μ and σ" by the expression "μi and σi".

Page 7:" μ_i and σ_i are the mean and the standard deviation …"

Comments 2: *(Inscription under Figure 5): The phrase "Waveforms of signals recorded by PKBBI sensor, Micro80 sensor, Micro200HF sensor, and WD sensor plate…" must be replaced by the phrase "Waveforms of signals recorded by PKBBI sensor, WD sensor, Micro200HF sensor, Micro80 sensor, and Nano30 sensor…".*

Response 2: We modified the caption of Figure. 5 according to the reviewer's comments.

Page 11: "Figure 5. Waveforms of signals recorded by PKBBI sensor, WD sensor, Micro200HF sensor, Micro80 sensor, and Nano30 sensor on a plate at a distance. (a) 20 mm,

(b) 100 mm, (c) 450 mm."

Comments 3: *(Inscription under Figure 6): The phrase "FFT of signals recorded by PKBBI sensor, Micro80 sensor, Micro200HF sensor, and WD sensor plate…" must be replaced by the phrase "FFT of signals recorded by PKBBI sensor, WD sensor, Micro200HF sensor, Micro80 sensor, and Nano30 sensor …"*

Response 3: We modified the caption of Figure. 6 according to the reviewer's comments.

Page 13: "Figure 6. FFT of signals recorded by PKBBI sensor, WD sensor, Micro200HF sensor, Micro80 sensor, and Nano30 sensor on a plate at a distance. (a) 20 mm, (b) 100 mm, (c) 450 mm."

Comments 4: *All references must be accompanied by doi, namely Refs. 30 – 39.*

Response 4: We add doi links or url links to all references. Here, some papers don't have the doi links but have the url links, for Ref. [33, 34, 35]. The modified references are shown in the following.

Page 25: "2. Sause, M. In In situ monitoring of fiber-reinforced composites : Theory, basic concepts, methods, and applications Springer series in materials science, 2016; pp. 242, http://dx.doi.org/10.1007/978-3-319-30954-5."

"3. Holford, K.M. Acoustic emission in structural health monitoring. In Key Engineering Materials; Trans Tech Publ, 2009, 413; 15–28, https://doi.org/10.4028/www.scientific.net/KEM.413-414.15."

Page 26: "34. Gorman, M.R.; Prosser, W.H. AE Source Orientation by Plate Wave Analysis. Journal of Acoustic Emission 1991, 9, http://hdl.handle.net/10945/40334."

"35. Hamstad, M.A. Acoustic emission signals generated by monopole (pencil lead break) versus dipole sources: finite element modeling and experiments. J. Acoust. Emiss 2007, 25, 92-106, https://api.semanticscholar.org/CorpusID:157065471."

"36. Morizet, N.; Godin, N.; Tang, J.; Maillet, E.; Fregonese, M.; Normand, B. Classification of acoustic emission signals using wavelets and random forests: Application to localized corrosion. Mechanical Systems and Signal Processing 2016, 70, 1026–1037, https://doi.org/10.1016/j.ymssp.2015.09.025."

Page 27: "37. Singh, D.; Singh, B. Investigating the impact of data normalization on classification performance. Applied Soft Computing 2020, 97, 105524, https://doi.org/10.1016/j.asoc.2019.105524."

"38. Ostertago ́va, E.; Ostertag, O.; Ko ́v ˆac, J. Methodology and application of the kruskal-wallis test. Applied Mechanics and Materials 2014, 611, 115–120, https://doi.org/10.4028/www.scientific.net/AMM.611.115. "

"41. Taghizadeh, J.; Najafabadi, M.A. Classification of acoustic emission signals collected during tensile tests on unidirectional ultra high molecular weight polypropylene fiber reinforced epoxy composites using principal component analysis. Russian Journal of Nondestructive Testing 2011, 47, 491-500, https://doi.org/10.1134/S1061830911070084."

"42. Roundi, W.; Mahi, A. E.; Gharad, A. E.; Rebiere, J.L. Acoustic emission monitoring of damage progression in glass/epoxy composites during static and fatigue tensile tests. Applied Acoustics 2018, 132, 124–134, https://doi.org/10.1016/j.apacoust.2017.11.017."

"43. Godin, N.; Huguet, S.; Gaertner, R.; Salmon, L. Clustering of acoustic emission signals collected during tensile tests on unidirectional glass/polyester composite using supervised and unsupervised classifiers. Ndt E International 2004, 37, 253-264, http://dx.doi.org/10.1016/j.ndteint.2003.09.010."

"44. Gorman, M.R. Plate wave acoustic emission. The Journal of the Acoustical Society of America 1991, 90, 358–364, https://doi.org/10.1121/1.401258."