Authors point-to-point responses to Editor 'Comment on tc-2023-80', 07 May 2024

Please find the author's responses in blue below the editor's comments.

Many thanks for the positive response and additional hints to improve the quality of the manuscript.

My main point for the minor revision is that I think it is important to address the performance of the method as well in the discussion. Both reviewers rightly expected the AWI-ICENet1 to be much faster than traditional methods (as is often a motivation for machine learning methods) so the fact that the method is often (way) slower than traditional retrackers needs to be highlighted and explained/discussed in more detail in the discussion.

For the minor revision, I would like to ask you now to re-upload the:
1. revised version of the manuscript
2. track change version with changes highlighted.

Many thanks for this advise:
We added a small chapter of the Computational performance in the discussion section 4.2.5 to address this issue:

"Unlike many other machine learning applications used in remote sensing, AWI-ICENet1 was not designed to replace manual labour or save time, but to improve observation quality. In fact, our computational performance test results, shown in Table 2, highlight that AWI-ICENet1 requires more processing time than conventional cheap empirical retracking methods. In particular, AWI-ICENet1 requires about 8 and 18 times as much computing time compared to the low computing costs of empirical retracking methods such as TFMRA and TCOG, respectively. However, if the estimation of the LEW is also taken into account in TCOG and TFMRA, the difference in processing time compared to AWI-ICENet1 is considerably reduced. Therefore, we do not consider the higher computational cost of AWI-ICENet1 to be a significant drawback for its use, regardless of the computing infrastructure. Compared to more complicated waveform fitting methods based on analytical descriptions of the waveform, such as dedicated classical ocean retrackers like MLE3/4 (Amarouche et al., 2004; Thibaut et al., 2010), adaptive MLE3/4 (Thibaut et al., 2021), SAMOSA+ (Dinardo et al., 2018) or SAMOSA++ (Dinardo et al., 2021), we would expect that CNN-based approaches can help to significantly reduce processing costs. Re-processing campaigns could benefit from neural network-based approaches. However, for each of the analytical re-trackers mentioned above, a specific CNN model that best represents the analytical solution would have to be trained in advance with a considerable number of waveforms covering the entire spectrum of possible waveforms."

In addition, we uploaded the dataset to PANGAEA and received a DOI: 10.1594/PANGAEA.964596.

Many thanks for handling the manuscript.

Best regards

Veit Helm