Review of manuscript Gomez de la Pena et al. "On the use of Convolutional Deep Learning to predict shoreline change" submitted to EGUsphere

Summary and primary contribution

This study investigates the use of Convolutional Neural Networks (CNNs) and hybrid CNN-Long-Short-Term Memory networks to predict interannual shoreline position. The target observation is a shoreline position at one location derived from 18 years of daily shoreline camera images at Tairua beach, North Island of New Zealand. The drivers include wave peak period, significant wave height and direction and sea level pressure. The results are compared with a subset of the target observation not used for training or tuning and also two models; ShoreFor and SPADS. Using a systematic search and different measures of fitness the authors conclude that CNNs models have the potential to improve accuracy and reliability over current models.

General comments

The combination of different metrics, graphical results (Taylor diagrams) and grid search and ensemble approach to evaluate shoreline models' performance is novel and the use of CNNs is yet not well understood, of interest of the coastal engineering community and therefore suitable for publication on the EGUsphere.

The manuscript is well structured and written in a clear fashion and well referenced.

My main concern is on the lack of some methodological important details (see also specific comments) and most critically on the rationale for constraining the prediction to a single location (not shown) to assess the shoreline predictions. This is important, as the authors indicated the oscillatory nature of the shoreline changes (L370). Should the location being close to a nodal point, the same time series of drivers will have produced virtually no changes in the cross-shore location. The ability of the model capturing the shoreline position, simultaneously at different location is not presented and the claimed improvement over ShoreFor and SPADS remains unclear.

Specific comments

The camera system provides images of a section of the Tairua beach but only the cross-shore position at one location has been used as a target but neither the rationale for choosing this location or a map showing the location is presented.

A short description on the set up used for the ShoreFor and SPADS model need to be included. At present, the manuscript contains very detailed information on how CNNs model has been set-up but no information is provided on the set up of the ShoreFor and SPADS models. To be consistent with authors closing remark (L373), I encourage them to make the model configuration publicly available.

Figure 4 shows both the target and drivers time series, but it is unclear if all time series have the same frequency (daily, hourly, …) and if the shoreline position was corrected for any differences in tidal elevation at the time of the camera image was captured.