Discussion of: Sertel, E.; Cigizoglu, H.K., and Sanli, D.U., 2011. Reply to: Akyilmaz, O., 2010. Discussion of: Sertel, E.; Cigizoglu, H.K., and Sanli, D.U., 2008. Estimating Daily Mean Sea Level Heights Using Artificial Neural Networks. Journal of Coastal Research, 24(3), 727–734; Journal of Coastal Research, 26(6), 1184–1185; Journal of Coastal Research, 27(4), 791–792

Author: Akyilmaz, Orhan

Source: Journal of Coastal Research, 28(2) : 528-529

Published By: Coastal Education and Research Foundation

URL: https://doi.org/10.2112/JCOASTRES-D-11-00173.1

Journal of Coastal Research	28	2	528–529	West Palm Beach, Florida	March 2012

www.JCRonline.org

DISCUSSION & REPLY

www.cerf-jcr.org

Discussion of: Sertel, E.; Cigizoglu, H.K., and Sanli, D.U., 2011. Reply to: Akyilmaz, O., 2010. Discussion of: Sertel, E.; Cigizoglu, H.K., and Sanli, D.U., 2008. Estimating Daily Mean Sea Level Heights Using Artificial Neural Networks. *Journal of Coastal Research*, 24(3), 727–734; *Journal of Coastal Research*, 26(6), 1184–1185; *Journal of Coastal Research*, 27(4), 791–792.

Orhan Akyilmaz

Department of Geomatics
Civil Engineering Faculty
Istanbul Technical University
Maslak 34469
Istanbul, Turkey

This is a reply to the unsatisfactory response of Sertel, Cigizoglu, and Sanli (2011) regarding the authors' formerly published article that focused on the estimation (prediction) of daily mean sea level heights observed at a tide gauge station (Sertel, Cigizoglu, and Sanli, 2008).

The authors have written almost everything other than any scientific response to the criticism in Akyilmaz (2010). The authors indicate that their study is "new and has merit in that daily mean sea level is characterized comparatively with methods of artificial neural networks (ANN), multiple linear regression (MLR), and least squares estimation." First, that statement is untrue. El-Rabbany and El-Diasty (2003) used neural networks and the classical least-squares estimation method to predict the sequential tidal heights observed at tide gauge stations. Moreover, Lin and Chang (2008) successfully applied both neural networks and fuzzy inference systems to predict tidal heights at various tide gauge stations. Furthermore, the Lin and Chang (2008) prediction range is not restricted to the one-day-in-the-future predictions used in Sertel, Cigizoglu, and Sanli (2008). From this aspect, the work by Sertel, Cigizoglu, and Sanli (2008) is not new and cannot stimulate new research in sea-level studies.

Sea-level height is highly dependent on the tide-generating forces and the sea-surface temperature. Unlike the process used in Sertel, Cigizoglu, and Sanli (2008), using the tide-generating potential, which can be computed based on the ephemerides of (primarily) the Sun, the Moon, and the sea-surface temperature data which are comparatively smooth over time—would yield a better model for the prediction of the sea-level height at any location, at any time, regardless of the prediction range.

Even if daily mean sea level could be predicted from previous records, the generation of a daily data series by simply averaging the hourly records within each day, as done by Sertel, Cigizoglu, and Sanli (2008), would not be the correct way to do so. The classical method of averaging data for 24 hours to remove the tidal signal does not provide accurate residual currents in tidally influenced areas because the 24-hour average cuts off all frequencies that are multiples of one cycle *per* day. Therefore, it lets through a fair percentage of other tidal constituents. Several kinds of low-, high-, and band-pass filters may be used to distinguish between tidal and nontidal signals in the data. One of them is the Doodson X0 filter, which is a symmetric convolution low-pass filter that does not lead to distortion because of time lag and is commonly used in oceanography (Doodson, 1928). This technique is capable of quantifying the magnitude of nontidal currents associated with freshwater and wind-driven currents in tidally influenced areas. Such filters improve the accuracy of the predictions by about 20% in the root mean square (0.059 cm *vs.* the 0.071 cm reported in Sertel, Cigizoglu, and Sanli, 2008). Moreover, there is no speculation (the authors used the word *speculation* several times in their response) because, using the same data, we have done the computations, thus the scientific evidence is available. This reply is based on the results of that computation carried out by the discusser.

The authors also state that one of the authors (Cigizoglu) "has specialized in hydrological variable prediction." Looking

DOI: 10.2112/JCOASTRES-D-11-00173.1 received 15 September 2011; accepted in revision 20 September 2011.
Published Pre-print online 15 December 2011.

at the Cigizoglu publications (Cigizoglu, 2005; Cigizoglu and Kişi, 2006; Kişi and Cigizoglu, 2007; Partal and Cigizoglu, 2008; Yagci *et al.,* 2005)—almost all of which have the same topic with small modifications in the methods used, mostly ANN—one can see that Cigizoglu is an expert in rainfall and sediment predictions. It is well known, however, that sea level is something else, and there is no relationship between sea level predictions and predictions about rainfall and sediment.

Some of authors' explanations are in conflict with their original paper; *e.g.,* they say that their main motivation was not to predict or estimate daily mean sea level, but the title of their article clearly denies that because that phrase exists in both the title and the text of the article. It seems that the only motivation for the study was to increase the authors' number of publications with no concern for their scientific quality.

The authors discuss storm surges and the use of their methodology to remove outliers caused by storm surges throughout the daily mean sea level records. This is, indeed, a completely different concept; predicting storm surges requires further hydrological and meteorological data, such as wind speed and coastline configuration. Therefore, such an explanation in their reply is irrelevant.

It is very unfair that the authors have complained about one expression in the discussion by Akyilmaz (2010), namely, "We have used the same data." The use of the subject "I" in a scientific text is not proper. Obviously, the authors are not aware of this fact. On the other hand, after publishing such an article (Sertel, Cigizoglu, and Sanli, 2008), the authors are not in a position to give lessons in ethics.

The authors' statements on early warning systems are also out of context. Early warning systems forecast extreme situations from geophysical phenomena. However, the types of ANNs used in Sertel, Cigizoglu, and Sanli (2008) are supervised networks, that is, the network parameters (the synaptic weights) are estimated through a training procedure based on input–output pairs, which are called *training data*. Thus, the network learns the relationships between inputs and outputs from the training data used. Consequently, the ANN output is always in the range of the data used in training, and extreme situations cannot be predicted. Further geophysical data are required for that issue. This also shows that the authors do not have a sound knowledge of the methods.

One other issue is that, in the past several years, the use of soft computing techniques has become a common way to increase the number of one's publications. Unfortunately, people add some input into a software package (usually MATLAB because it is easy to use—the authors might have done all their computations in a single day with MATLAB software), and as is the nature of the method, the computer produces a result as an output, even if it is trivial. The authors using these techniques do not care or understand the fundamentals of the techniques they use or the underlying physics of the phenomena, and produce publications, such as the article by Sertel, Cigizoglu, and Sanli (2008), which are often called "garbage in–garbage out" models.

Finally, it is convenient to emphasize that the main targets of this reply are the readers and the possible reviewers, rather than the authors of Sertel, Cigizoglu, and Sanli (2008). Sound reviews of manuscripts are important to avoid publication of low-quality research articles in prestigious scientific journals.

LITERATURE CITED

Akyilmaz, O., 2010. Discussion of: Sertel, E.; Cigizoglu, H.K., and Sanli, D.U., 2008. Estimating daily mean sea level heights using artificial neural networks. *Journal of Coastal Research*, 24(3), 727–734; *Journal of Coastal Research,* 26(6), 1184.

Cigizoglu, H.K., 2005. Generalized regression neural network in monthly flow forecasting. *Civil Engineering and Environmental Systems,* 22(2), 71–84.

Cigizoglu, H.K. and Kişi O., 2006. Methods to improve the neural network performance in suspended sediment estimation. *Journal of Hydrology,* 317(3–4), 221–238.

Doodson, A.T., 1928. The analysis of tidal observations. *Philosophical Transactions of the Royal Society of London, Series A: Mathematical, Physical, and Engineering Sciences,* 227(647–658), 223–279.

El-Rabbany, A. and El-Diasty, M., 2003. A new approach to sequential tidal prediction. *Journal of Navigation,* 56(2), 305–314.

Kişi, O. and Cigizoglu, H.K., 2007. Comparison of different ANN techniques in river flow prediction. *Civil Engineering and Environmental Systems,* 24(3), 211–231

Lin, L.-C. and Chang, H.-K., 2008. An adaptive neuro-fuzzy inference system for sea level prediction considering tide-generating forces and oceanic thermal expansion. *Terrestrial Atmospheric and Oceanic Sciences,* 19(1–2), 163–172.

Sertel, E.; Cigizoglu, H.K., and Sanli, D.U., 2008. Estimating daily mean sea level heights using artificial neural networks. *Journal of Coastal Research,* 24(3), 727–734.

Sertel, E.; Cigizoglu, H.K., and Sanli, D.U., 2011. Reply to: Akyilmaz, O., 2010. Discussion of: Sertel, E.; Cigizoglu, H.K., and Sanli, D.U., 2008. Estimating daily mean sea level heights using artificial neural networks. *Journal of Coastal Research*, 24(3), 727–734; Journal of Coastal Research, 26(6), 1184–1184. *Journal of Coastal Research,* 27(4), 791–792.

Yagci, O.; Mercan, D.; Cigizoglu, H.K., and Kabdasli, S., 2005. Artificial intelligence methods in breakwater damage ratio estimation. *Ocean Engineering,* 32, 2088–2106.