

Interactive comment on “Machine Learning Analysis of Lifeguard Flag Decisions and Recorded Rescues” by Chris Houser et al.

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Machine Learning Analysis of Lifeguard Flag Decisions 1 and Recorded Rescues 2 3
Chris Houser, Jacob Lehner, Phil Wernette

Three Costa Rican professionals' integrated evaluation

General comments.

It is well known the difference between a drowning and a life saved is the presence of a qualified lifeguard on the beach. If this one among all his(her) duties is successful on preventing rather than rescueing, much better. The problem is that in reality most of the beaches, including the developed countries are not surveyed and consequently drownings are still a world's annual tragedy. Because of this, the goal and urgent need

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in the world's beaches is the presence of a beach user's safety system; this article, no matter it is just a first approach to lifeguard flag decisions preventive procedure, happens to be in my opinion not only an original first step approach but a fundamental step forward toward the drownings prevention on the beach.

In general the paper is worthy, but it needs more specifications, mainly with some assumptions done in the discussion. I also suggest to include some figures like the map of the site where the study took place and a bathymetry one, if available. The manuscript addresses a very important issue in the beach safety science which is to determine which variables control the decision of posting a flag of a specific color. I really believe that the manuscript contributes significantly as it proposes a new and interesting statistical method that assesses the decisions made by lifeguards. Thus, I would suggest publishing with minor revisions which can be found below. Very interesting paper and conclusions. My only comments are related to explaining more clearly which variables are used by the model and which ones are used by lifesavers.

Specific comments:

Line 25: Which differences? It is not clear

Line 29: this seems strange to me; flag deployed over- estimating the risk and more rescues or drownings present? It seems the beach user does not obey the flag command or, if the sea condition for the user didn't match the warning, then the flag warning was correct!

Maybe I'll understand later on, but I can understand how an overestimation of risk leads to more rescues.

Line 32: So the largest number of rescues is due to people don't believing the criteria of lifeguards when choosing the colour of the flag?

Line 57: In Costa Rica just few beaches do so

Line 69: "...(called a transverse bar and rip morphology)..." I suggest to write the

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reference for these classification of beaches which would be Wright and Short (1984). Line 94: When the difference overestimates and underestimates the risk, or only in one of these cases?

Line 98: it would be convenient and illustrative the inclusion of a view from above of Pensacola beach. Google map shows a large rip current system along the beach.

Line 100: the “worst” or the best for beach drowning?

Line 115: where is this number coming from?

“The innermost bar varies alongshore at a scale of ~1000 m, consistent with the ridge and swale bathymetry, and tends to exhibit a transverse bar and rip morphology immediately landward of the deeper swales.”

I would show a map of the study site, pointing the main access points and other important features. In addition, a bathymetry countour map would be really appreciated. This would be useful for the reader to really comprehend the beach morphology.

Line 120-128: I think that some pictures or bathymetric/topographic plots showing the evolution of the beach during the period described in this paragraph would really help the reader.

Line 134: it would be nice to have on a map the location of these buoys

Line 130-153: The Methodology section must be improved taking into account the following suggestions: • Which exactly are the offshore wave conditions and wind forcing functions used in the model? Is the available data (wave height, period, direction) the same as the data used in the model? • Which exactly are the wave buoys located near the study area? How far are exactly from the shore? How well correlated are the offshore wave parameters from the buoys to the nearshore wave climate? • I would enrich the description of the CHAID technique with references showing cases where this statistical tool has been applied.

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Line 143: Which are exactly the variables the model uses? Only wave and wind forcing? It is not clear. Does the model uses variables related to nearshore morphology? If not, why does the model identifies situations related to morphology not detected by lifesavers? Or maybe is the lifesavers which identifies those situations and not the model? Those things are not clear here and in the discussion section.

Lines 159 “The annual number of rescues and rescue 159 days varied by year with a peak in both the total number of rescues and the number of rescue days”

It would be good to better define the differences between number of rescues and the number of rescue days. It would be also necessary to properly define rescue day.

L 227-229 “While rescues did not occur on a vast majority of the days when the posted and predicted flag were different, they accounted for a disproportionately large number of the rescues.”

Perhaps the term “disproportionately large number” is exaggerated as the number it refers to is just the 60% of the rescues.

L 230-232 “Rather, the results suggest that the difference between the posted and predicted flag colors is associated with the morphology of the innermost nearshore bar which is not captured by a model and forecast based on wind and wave forcing alone.”

This is a very strong statement as it assumes that the decision made by the beach manager are 100% correct and thus the model is “bad” because it does not account for all the information that the manager have like the beach morphology. However, how accurate the beach managers can really discern beach morphology? Is there any statistics available such as successful rates of discerning beach morphology by lifeguards?

L 242 “to the model has the potential to better capture a lifeguard or beach manager’s intuition associated with dangerous surf conditions.”

Again, it is assumed that the lifeguard “intuition” is beyond failure.

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L 258, 276, 283

In these lines phrases such as “erode confidence” are “thrust is eroded” are used. I would suggest to rewriting these phrases and replacing “erode” by other words like “lost” for example.

Please also note the supplement to this comment:

<https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2019-142/nhess-2019-142-RC2-supplement.pdf>

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2019-142>, 2019.