ORAL PRESENTATION

Wave height during the best days for beach attendance varies markedly worldwide - lessons for beach safety knowledge transfer

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Coastal beaches are highly dynamic environments that impose numerous risk factors on its users. Therefore, the design and implementation of beach safety management strategies requires substantial know-how. Since the level of expertise on this field in lifesaving organisations worldwide is highly unbalanced, it is common-practice for the most experienced organisations to share knowledge and provide training to junior institutions. However, local environmental factors, which dictate which risks are more important at a given location, may generate a "management bias" towards the prevention of certain risks that may not be the most relevant at the target location. It is therefore crucial to clarify to what extent best-practices applied in one region can be readily applied to another.

Wave height is a key risk factor at coastal beaches, influencing, among others, the likelihood of rip current formation. At locations regularly experiencing high wave height, lifesavers and beach safety managers are likely to allocate significant attention and resources to tackling its associated dangers, greatly shaping management culture, priorities and personal experiences, and thus significantly contributing for the establishment of the "management bias".

In the present contribution we analyse the link between wave height and the likelihood of beach visitation. Our aim is to characterise wave height during the days with highest beach visitation and use those data to determine if wave height is a risk factor with the same relevance across the globe. To that end we used three years of daily air and sea surface temperatures, precipitation rate and cloud cover data from the Climate Forecast System Reanalysis (NCEP) to compute a daily visitation likelihood index. This index does not account for demographic factors, and instead describes how "pleasant" a day is for beach visitation; assuming visitation is positively correlated with air and water temperatures, and negatively correlated with precipitation rate and cloud cover. Significant wave height data was collected from Aviso for the same time period. Computations were performed for all coastal pixels in a ~2x2° grid, between 65°S and 65°N.

Results show that Africa and Australia are the regions with highest number of "visitable" days, owing to overall lower precipitation and persistent high temperatures. Regarding the wave environment, the highest mean significant wave heights were found around south Chile, Australia, South Africa, Europe and western USA. In order to better estimate whether beachgoers are more or less likely to encounter high surf at a location, we analysed wave height data for the 100 most visitable days for each pixel. We found locations with very high surf during the most visitable days (South Africa, Western Australia, parts of Chile and western USA), and others with smaller wave heights despite their high mean wave height during the three years surveyed (Europe and south Chile). In addition, even regional contrasts could be identified using this method, such as between the Atlantic and Mediterranean coasts of the Iberian Peninsula and between southeast and northeast Australia. Furthermore, some regions with small overall mean wave height were found to exhibit abnormally high surf during the most visitable days (Brazil).

The results here outlined provide a detailed look into how much wave height can be "biasing" beach safety management experts around the globe. This methodology is sufficiently general that it can be applied to study the geographical patterns of other risk factors. By focusing on just the days beach attendance is likely to be higher we were able to find patterns that can assist in improving knowledge transfer strategies, directing them towards the risks that are most important at the location they will be implemented, not the locations the experts originate from.