

Interactive comment on “Dynamicity of multi-channel rip currents induced by rhythmic sandbars” by Yao Zhang et al.

Anonymous Referee #2

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General Comments This paper describes some measurements and numerical modelling relating to rip currents on three (although primarily one) beach locations in China. It is always useful to have scientific studies of rip currents in different wave climate environments so this study is useful. However, the authors make several strong statements that are not warranted. The methodology is very basic and limited and the field surveys are not described. The modelling is more robust. The primary findings support those of existing studies and this should be the main outcome of this study.

I have some doubts about the reliance of two different images of rip currents at these beaches based on ‘seasons’ that are only supported by two years of wave climate data. It is hard to know if the beaches are consistently different in morphology between seasons or if the conditions in the images were simply based on antecedent morphology.

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There is a lot of information provided on beach safety, but no real implications to how the results of this study relate to beach safety in China.

The authors do a good job of writing in English, but there are still numerous examples of incorrect language and grammar, which is completely understandable. It would be useful if a colleague who has English as a first language could give it a good proof read.

I would suggest that the authors provide more detail on the beaches in China and how the beaches in this area are similar/different to other areas and describe the wave climate in more detail. They should also describe the methodology involved in their field surveys and tone down their methodology involving ‘remote sensing’ and the dye release, which only captures a snapshot in time of rip current speed and trajectory. While the authors do a good job of referencing literature, some of the classic papers on rip currents are not included and they should at least describe the types of rip currents present at their beach locations. There is some evidence of an incomplete understanding of the forcing mechanisms driving rip current flow, although this could be language/translation related.

I would suggest that the authors use their results to support existing findings and highlight what is new about their findings.

Some specific comments are provided below (some which relate to the general comments above): - Abstract L9 – a great number of recreational beaches? How many – this is not stated in the paper and the focus is only on 3 locations. - more detail on methods used is needed

Technical Background L29 – should be ‘A rip current. . . L29 –L34 – these statements should have references to some of the classic rip current literature, the most recent review of which is by Castelle et al. 2016 (in the reference list) L63 – please note that Lippmann and Holman 1989 used remote video Argus cameras and not satellite images L69 – should also include the MacMahan et al. 2010 Marine Geology paper

C2

in these references; the Brander et al. 2014 study did not use drifters but this one did: McCarroll, R.J, Brander, R.W., Turner, I.L., Power, H.E., Mortlock, T.R. (2014). Lagrangian observations of circulation on an embayed beach with headland rip currents. *Marine Geology*, 355, 173-188. L71 – many earlier papers that should be cited for measurements of rip flow using fixed current meters L73 – Radermacher references is not in chronologic sequence L80 – needs references to Wright and Short (1984) and Masselink and Short (1993) L97 – should reference this study: Li, Z., & Zhu, S. (2018). Why There Are So Many Drowning Accidents Happened at Dadonghai Beach, Hainan, China: Morphodynamic Analysis. *Journal of Coastal Research*, 741-745. L104 – is it possible to provide numbers or estimates of drowning accidents on recreational beaches in China? L117 – should add that this has implications for beach safety in China

Figure 1 is not necessary

Motivation - there is no real clear aims/objectives of the study; more detail is needed to support the last statement starting on L115

Case Study L121 – are the targeted beaches just the 3 shown in Figure 2 or were there more? Are the southern and northern coasts referred to just in the region of study shown in Figure 3? I would suggest not having the first paragraph but incorporate parts of it where appropriate in the following text. One problem I have is that it is not clear if the beach morphology changes seasonally consistently every year or if they only look different in the images because of normally variable wave conditions. Some more information should be given on the patterns of wave climate by season. L121 – can you describe what the 'labor-intensive field surveys' involved and when/how they were done? L132 – refer to Figure 2b rather than the photo (same for any other instances – refer to Figure) L145 – ok the wave climate information comes here, but perhaps wave climate should be described first before the rip current/beach morphology is described in the previous paragraph L150 – is 2 years enough to be confident about these seasonal trends – the two years should also go in the caption for Figure 5

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L163 – white-cap breakers are just breaking wave activity, often known as 'whitewater' and the intensity will vary based on water depth (tides) and incident wave height. I don't really understand the 'calm' rip current term. These are channelized rip currents as defined in Castelle et al. 2016 L168 – there are many older studies that have shown the relationship between higher rip current flow at low tide L169 – here is where the Brander et al. 2014 paper on dye could be referenced; the dye release is not really an experiment. If it was just done once, it shows very little useful information. How was the velocity of 0.6 m/s obtained?

Numerical Study L179 – how was the bathymetry obtained? Why was this only done for the 10 Mile Beach location? Justification? Figure 7 caption should also explain what boxed areas and numbers (channels) refer to L185 – capitalise Table 1

Discussion and Conclusion L237- the rip currents are not generated by rhythmic sandbars, but are forced by temporal and spatial variability of wave breaking activity over the sandbars. The statement 'The investigation adopted multiple methods such as the widely-used empirical beach state classification formulas, remote sensing image interpretation, and labor-intensive field survey' is over-stated. It's not clear how the beach classifications were used (as a method), the remote sensing interpretation involved describing some Google Earth images and the field surveys are not described. L245- it was shown to flow faster at low tide, but 'hazard' depends on many other factors as well L266 – the statement 'The scientific findings provide fundamental advance...' is also too strong. Most of these findings support previous findings. I'm not sure what the advances are?

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