

Review of EGUSPHERE-2026-2285 — Research article: An Ensemble-Based Coastal Flooding Index For Early Warning Applications

September 22, 2026

1 General remarks

The manuscript aims at two quite distinct tasks: one is to evaluate behavior of ensemble reduction and the other is to evaluate feasibility of a Coastal Flood Index CFI during two high SSH events in northern Adriatic, specifically Jesolo.

The paper is pretty straightforward, generally well written and the images are helpful. Nevertheless i think some additional modifications would be very helpful before the paper is considered for publication.

My major remark occurred to me during reading of the discussion. The authors mention that CFI is difficult to compare to observations because of i) lack of them and ii) lack of knowledge of uncertainties in bathymetry and topographs and coastal structure characteristics. I completely understand this remark. However, it also exposes a serious objection to the usage of CFI index: let's imagine an ideal modeling scenario where the authors can generate CFI index daily operationally for the entire basin. If CFI index is so difficult to compare to observations, what will this number then mean to local authorities? I suspect local Civil Rescue can either rely on CFI index or it cannot. I think it is imperative for the authors to give some thought into what CFI operational predictions, of which this paper is a "proof-of-concept", will mean to responders and local public on the ground. If CFI cannot be made to correspond to local observations, then i see this as a big problem for this metric.

2 Specific remarks, p = page number, L = line number

- p5 L130: how is still-water shoreline position defined? As the line where $m_{sl} = 0$?
- p5 L131: can you include an equation or explanation of how is $R_{up,2\%}$ defined?

- p6 L141: you write that high water and wave setup increase the "mean sea level". What is meant by this? Is this correct? If it is - over what temporal period is "mean" sea level computed here or elsewhere in the paper?
- I generally quite dislike the usage of parameters α, β and τ in the manuscript. I couldn't really follow the manuscript until i translated those symbols into height-references. I strongly suggest the authors to rethink whether current α, β, τ notation is truly instrumental to the paper. If i understand correctly, we have this correspondence which is much clearer to me:

CFI	α, β, τ notation	h_1, h_2, h_B, h_C notation	Interpretation
0	$\beta < 0$	$h_1 < h_B$	run-up lower than berm, no flood
1	$0 \leq \beta < \tau$	$h_C > h_1 > h_B$	run-up floods the beach but not inland
2	$\beta \geq \tau$ and $\beta - \alpha < \tau$	$h_1 > h_c$ and $h_2 < h_C$	overtopping of coastal defense but no overflow
3	$\beta \geq \tau$ and $\beta - \alpha \geq \tau$	$h_1 > h_c$ and $h_2 > h_C$	overtopping and overflow of coastal defense

Table 1: An alternative naming of the cases. Also: in the manuscript you refer to these cases (1,2,3a,3b) but they are never clearly defined. Please define them explicitly.

- Formulas 6a and 6b seem unclear. What is n ? Doesn't $\sum_{i=1}^n w_i$ simply give us N ? Where does CFI come into this probability estimation p_{CFI} ? What is n_{CFI} . Please define all terms clearly.
- Why do you only show temporal evolution of $\beta > 0$, namely CFI=1? Why not also other CFI cases? Once again - define cases, please. Does "case 1" correspond to CFI=1?
- p19 L190-1: the authors write they did not focus on forecast accuracy. I agree that forecast accuracy of the modeling chain is beyond scope, but i have to reiterate my major objection. I really miss some sort of comparison of computed CFI and actual situation of the ground. I suggest that the authors check if there are any testimonies that could help them qualitatively reconstruct the actual situation in Jesolo, perhaps through webcams or local population or civil rescue experience. Was the beach flooded and where? Was inland flooded and where? Is there any footage that could help the authors comment on the value of CFI during those storms? If this cannot be done even qualitatively for the special situation and two events in the manuscript, then i worry about the relevance of this index.