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Discussions

Interactive comment on "Scotland's Forgotten Carbon: A National Assessment of Mid-Latitude Fjord Sedimentary Carbon Stocks" *by* Craig Smeaton et al.

Anonymous Referee #1

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Smeaton et al. applied geochemical and geophysical methods to investigate the carbon stock in five representative fjords in Scotland and then used these five fjords using seismic and geochemical data and further modeled these five fjords. Results suggested strong similarity in estimated and calculated carbon stock numbers. They further applied this model to upscale to the national level and calculated the carbon budget in all Scotland fjords. This manuscript presented an interesting case study and also a valuable methodology advisable for future studies. I believe this manuscript is suitable for publication after minor revision. I only have one major concern about the manuscript, or maybe because I did not understand the methodology clearly, which requires further clarification. My understanding is that authors used seismic and car-

bon data to estimated carbon stock in these five fjords and then correlate them with parameters such as rainfall, catchment area, etc. These parameters were further used separately to calculate the carbon stock in each fjord. In my opinion, I believe it could generate a much more reliable number if the authors could incorporate all the parameters into one equation, such as carbon stock = a*precipitation*catchment area*runoff*tidal range. I am sure the equation could be further optimized based on the available data from these 5 fjords. This method has been largely used by Syvitski et al in modeling sediment discharge from global rivers. Besides that, I only have several minor comments: Line 180: change to . . . . Identified in Table 1. Line 206: a reference would be good. Line 224: as mentioned in the major comment and repeat again here: What if you combine all the parameters together, such as OC = a* tidal range*precipitate*catchment area*runoff. You could also modify the equation based on the best fitting. I think in this way, you could generate a more reliable OC and IC number. Line 254: . . . . . available to test. . . . . Line 265: change carbon data to carbon concentrations? Lines 272-273: How do you conclude without glacial samples from all fjords? Line 283: If sills are a major reason affecting IC storage, then how it is possible to factor sills into the numeric model? Maybe I am confused here, but as it was mentioned earlier, the IC is modeled using fjord area and length. Line 295: change my to by Lines 334-336: any reference? Line 370: also depend on how deep is the seagrass habitat deposits Line 288: any reference?

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