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Interactive
comment

Interactive comment on "The UKC3 regional coupled environmental prediction system" *by* Huw W. Lewis et al.

Anonymous Referee #1

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General comments This paper describes the UKC3 system developed as part of the UK Environmental Prediction collaboration and how it has evolved from the previous UKC2. A rather substantive set of diagnostic results are presented. Notably, the impact of the increased resolution of the atmospheric forcing and the addition of the 2-way coupling to a model is presented. Results are very much encouraging and the authors have listed way to achieve further progress. The paper goes in quite some details of how the system can be set-up and at times, it reads quite like a manual rather than an scientific paper. Nevertheless, I still consider that such a description is quite valuable, in particular noting the very collaborative nature of this system development. As research is moving more and more in fully coupled system, this paper is a nice complement to research carried out elsewhere.

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[Discussion paper]

Specific comments p 13, line 13: could you elaborate a bit more why the NEMO turbulent kinetic energy budget due to wave processes are not included in UKC3? p 15, line 14: Are tau_wav and tau_wave:ocn computed from the wave model respective source term and if so, what was done for the contribution for frequencies above the last discretised frequency? The approach in Breivik et al. 2015 is to assume a balance between input and dissipation in the high frequency range. This is an assumption and truly speaking, it is not really correct as the nonlinear source term also contributes to flux of wave momentum and energy. Accounting for the nonlinear source term contribution and possible alternative methods to evaluate the momentum and energy fluxes are currently being investigated (Bidlot personal communication). p 15, line 29: the Stokes drift at other water depths than the surface could easily be computed. It has been deemed too expensive, hence the use of parameterisations to recover the Stokes drift profile. So I would change "known" to "usually available" Figure 5: Mean wave period reported by buoys tens to be based on the T02 (i.e. the second moment).According to the CEFAS WaveNet web page, they report "Average (zero crossing) wave period", which is T02. They also provide frequency spectra, so it is well possible to re-compute using any method. But then, one should make sure to use the same frequency range. Please clarify.

Technical corrections p16, lines 6 and 7: Phillips 2015 -> Breivik 2016 Appendix A: last entry: omega_p : units 1/s , name wave peak angular frequency p31, line 4: absorbed by the waves -> absorbed and/or released by the waves Table 9: wave-wave nteraction -> wave-wave interaction Figure 1: maximum wave period : do you mean Tp, the peak wave period ? Figures 2, 3, 9, 11, 13: (a,d,j) -> (a,d,g,j)

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