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Interactive comment on "Modelling of sediment transport and morphological evolution under the combined action of waves and currents" *by* Guilherme Franz et al.

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We are grateful to the referee for his comments and contributes to the manuscript improvement. The manuscript was thoroughly revised to address the referee comments. Our answers to the main questions raised may be found below. Other corrections were performed directly on the manuscript (new manuscript attached as supplement file).

The acceleration factor of 365 allowed us to simulate many years of morphological evolution of a schematic beach with constant wave conditions in a feasible computational time. The bathymetry results reached an equilibrium condition, demonstrating the model stability. A discussion on the effect of the acceleration factor in model results

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was presented previously in Franz et al. (2017). The acceleration factor is user-defined, depending on the variability of forcing conditions and speed of morphological changes. The morphological changes should not be speeded up (acceleration factor = 1) to simulate extreme events that occur within few days, as for the case presented for the Costa da Caparica.

The wave-induced forces computed by the SWAN wave model are provided to the MOHID hydrodynamic model in order to simulate wave-related phenomena, such as wave-induced currents. On the other hand, the MOHID hydrodynamic model can return water levels and currents to the wave model. The water level variation caused, for instance, by the tidal motion changes the breaker zone and shoreline position, affecting waves and sediment transport. The morphological evolution also modifies the currents and waves. Due to the interdependence of the physical processes involved, SWAN and MOHID models must be coupled, and the different fields computed by SWAN (e.g., wave-induced force) must be updated in MOHID, as well as the different fields computed by MOHID (e.g., water level, bathymetry) must be updated in SWAN, with an adequate frequency for each application.

In order to demonstrate the importance of the maximum bottom slope criterion, bathymetry results of a simulation without considering bed slope corrections was added to the manuscript (Fig. 1), as suggested by the referee. Thus, the effectiveness of this method is demonstrated in a clearer manner.

References

Franz G., Leitão P., Pinto L., Jauch E., Fernandes L., Neves R.: Development and validation of a morphological model for multiple sediment classes, International Journal of Sediment Research, 2017.

Please also note the supplement to this comment:
http://www.ocean-sci-discuss.net/os-2017-8/os-2017-8-AC2-supplement.pdf

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