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Internal Model Variability of a Regional Coupled Wave-Atmosphere Model

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In this study (Wiese et al., 2020) ensemble simulations are performed, in order to assess the significance of the impacts of wave-atmosphere coupling on simulations of both waves and atmospheric models on a regional scale as well as to quantify the internal model variability of both the regional atmospheric model and wave-atmosphere coupled model system. Comparing the magnitude of the internal model variability of the atmospheric model with the internal model variability of the coupled model system shows that the internal model variability can be reduced in the coupled system. While this effect is more pronounced during extreme events, it is still present in a general assessment of the mean internal model variability during the whole study period. Moreover, the impacts of this wave-atmosphere coupling can be distinguished from the internal model variability of the atmospheric model since the effects of the wave-atmosphere interaction are larger than the internal model variability. This study shows that in operational and climate research systems the internal model variability of the atmospheric model is reducible when the ocean waves are coupled to the atmosphere. Clear influences of the wave-atmosphere interaction on both the atmosphere and wave models can be detected and differentiated from the internal model variability. Furthermore, the results of the coupled system have a better agreement with observational data than the results of the reference set up.

References:

Wiese A, Staneva J, Ho-Hagemann HTM, Grayek S, Koch W and Schrum C (2020) Internal Model Variability of Ensemble Simulations With a Regional Coupled Wave-Atmosphere Model GCOAST. *Front. Mar. Sci.* 7:596843. doi: 10.3389/fmars.2020.596843