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Amplification of the Storm Surges by Wind-Wave-Current Interactions at the North-Eastern Coast of the Bay of Biscay.

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The storm surges coming ashore in the north-eastern Bay of Biscay provoke extensive flooding of its low-lying coasts. We present the results of hindcasting of several storm surges observed in this region during the winter 1999-2000. The numerical model employs the TELEMAC and TOMAWAC software to simulate the surge, tide and wave propagation. A high resolution finite element grid is used and the model is nested to a larger scale model of the surge, tide and wave propagation on the European Shelf. It is demonstrated that the wave-wind-surge interactions resulting in the wave-dependent surface and bottom stress turn out to be crucial for the accurate simulating of the surge peaks in the region and, consequently, must be included in the flood forecasting systems. It is also shown how the specific coupling between tidal and wind-induced currents in shallow embayments of the NE Bay of Biscay results in the surge oscillations with the period of several hours but different from that of the tide.