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Numerical simulation of the resonantly excited capillary-gravity waves HIDESHI HANAZAKI, MOTONORI HIRATA, SHINYA OKINO, Kyoto University — Capillary gravity waves excited by an obstacle are investigated by a direct numerical simulation. In the flow without capillary effects, it is well known that large-amplitude upstream advancing solitary waves are generated periodically under the resonant condition, i.e., when the phase velocity of the long surface waves and the mean flow velocity agrees. With capillary effects, solutions of the Euler equations show the generation of very short waves further upstream of the solitary waves and also in the depression region downstream of the obstacle. The overall characteristics of these waves agree with the solutions of the forced fifth-order KdV equation, while the weakly nonlinear theory generally overestimates the wavelength of the short waves.

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