1077-35-990 **Catherine Sulem*** (sulem@math.toronto.edu), Department of Mathematics, University of Toronto, Toronto, ON M5S2E4, Canada. *Water waves over a rough bottom in the shallow water regime.*

This is a study of the Euler equations for free surface water waves in the case of varying bathymetry, considering the problem in the shallow water scaling regime. In the case of rapidly varying periodic bottom boundaries this is a problem of homogenization theory. In this setting, we derive a new model system of equations, consisting of the classical shallow water equations coupled with nonlocal evolution equations for a periodic corrector term. Solutions of the latter can exhibit the effect of Bragg resonance with the periodic bottom, which leads to secular growth and can influence the time interval of validity of the theory. We justify the derivation of our model with a rigorous analysis of the scaling limit and the resulting error terms. The principal issue is that the shallow water limit and the homogenization process must be performed simultaneously. Our model equations and the error analysis are valid for both the two- and the three-dimensional physical problems.

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