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Internal breather transformation in shallow sea

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We address the propagation and transformation of internal breather – like wave in the shallow sea with taking into account the Earth rotation and variable background. He study is done numerically using an idealised three-layer stratification under the inclined bottom and the average summer density stratification and bathymetry in the southern part of the Baltic Sea. The focus is the changes in the breather properties when the water depth increases. The simulations are performed in parallel in the framework of the weakly nonlinear Gardner equation and the fully nonlinear Euler equations. The amplitudes of breathers in these frameworks are slightly differed one to another when the Earth's rotation is neglected, whereas a decrease in the amplitude is faster in the fully nonlinear simulation. The impact of the Earth's rotation substantially depends on the spectrum of the initial breather. The evolution of narrow-banded breathers is almost the same for rotating and non-rotating cases but amplitude of breatherswith a wide spectrum substantial changes in a case of the background rotation. The propagation of a narrow-banded breather along a path in the Baltic Sea over a location where the cubic nonlinear term in the Gardner equation changes its sign reveals fast disintegration of the breather into a precursor soliton and a transient dispersive wave group.