



Height transfer over the sea using the short and long-term tide gauge data

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Estonia has many islands usually 10 km from mainland. We need long-term tide gauge data to connect the islands' heights with the mainland's vertical datum. Unfortunately we often do not have long-term tide gauge data on both coasts or the time series have a lot of gaps. In Estonia the state vertical network is being reconstructed and with this work the biggest islands Saaremaa and Hiiumaa will be connected with the mainland's vertical network. For that purpose we have analyzed short and long-term tide gauge data from permanent and temporary stations. We have used different instruments for short-term data collecting (automatic tide gauge, GPS, Robotic total station, laser). For long-term data series the automatic stations have been used with storing interval of 5 minutes. Different methods and time spans were analyzed for height transfer. The measurements have shown that it is possible to use short-term tide gauge time series as well. The main problems are the wind and the water tilt components. But using calm days' data it is possible to get good results for distances between two coasts less than 20 km. So we have realized that it is possible to tie the vertical heights with the accuracy of 1-2 cm from mainland to Estonian Islands.