

Vertical Reference Frames in Slovakia and their Reciprocal Differences

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SUMMARY

Numerical expression of vertical differences among vertical reference frames used in Slovakia and neighbouring countries requires common practice based on the need of exchange of geodetical data within different international projects, where different international institutions take part in. The presented article describes definitions and realizations of three vertical reference frames: Adriatic (zero levelling point in Trieste, Italy), Baltic after adjustment – Bpv (zero levelling point in Kronstadt, Russia) and European (zero levelling point in Amsterdam, The Netherlands), transformation relations among them and numerical computation of vertical differences among them in the area of border rivers Morava and Danube between Slovakia and Austria.

In this area the mapping and inspection of the river's bed is regularly carried out by hydrological companies of both states responsible for water management on both border rivers (Danube and Morava) by using integrated measuring systems mounted on a measuring boat and consisting of multibeam echo sounders, velocity sensor, motion sensor with gyro compass and GNSS positioning system. The acquired data are then exchanged between Slovakian and Austrian hydrological companies responsible for maintaining the Danube river safely navigable in their areas of responsibility. Based on the acquired data, they produce (among other things) river's charts, since the Danube river as a river of European meaning is a strategic water way for cargo transportation among several EU countries and has big economic importance. Hence, height information acquired in different national vertical reference frames during mapping of the river's bed must be clearly and precisely transformable within different vertical reference frames used in the area of interest to avoid any confusion in the evaluation of acquired data and production of river's charts.