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Alternative Approach for the Determination of the Austrian Gravimetric Geoid

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The determination of the gravimetric geoid faces a problem that the absolute geoid differences between the gravimetric and GNSS/levelling derived geoids usually contains medium to short wavelengths. It is believed that this behaviour is directly connected with the used remove-restore scheme in the geoid determination process. Accordingly the main aim of this paper is to determine a better remove-restore scheme that can be used in the geoid computation process. Such a scheme should result in an absolute geoid difference between the gravimetric and GNSS/levelling derived geoids that doesn't have a short/medium wavelength structure. The developed scheme uses the window remove-restore technique (Abd-Elmotaal and Kühtreiber, 2003) that removes all long, medium and short wavelength components from the observed gravity signals and uses these reduced anomalies for the needed interpolation process on a grid. Then a partial restore step is performed to the gravity anomalies at the grid involving only the short and medium wavelengths. These restored gravity anomalies are then used to generate a short/medium geoid component employing 1-D FFT technique. Finally the long wavelength component is restored generating the full gravimetric geoid. For comparison purposes, the traditional window remove-restore technique is used to compute another gravimetric geoid for Austria. Both geoids generated in the current investigation are compared to the GNSS/levelling derived geoid. The results show that the proposed approach gives a better geoid accuracy compared to the GNSS/levelling derived geoid.