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Completed in Spring 2020: AAGRG ´s new recompilation of the Alpine gravity field

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The AlpArray gravity research group (AAGRG) focuses on compiling a homogeneous surface-based gravity dataset across the Alpine area, on creating digital data sets for Bouguer-, Free Air- and isostatic anomalies. In 2016/17 all ten countries around the Alps have agreed to contribute with point/gridded gravity data and/or gravity data processing techniques to recompilation of the Alpine gravity in an area from 2° East to 23° East and 50° North to 42° North. For this recompilation, the group was able to rely on existing national data. For the Ivrea zone in the western Alps, newly surveyed data were also integrated into the database.

The AAGRG decided to present the data set of the recalculated gravity fields on a 2 km x 2 km and 4 km x 4 km grid for the public. The final products will also include the calculated values for mass corrections of the measured gravity at each grid point. This allows users to use later customized densities for their own calculations of mass corrections between the physical surface and the ellipsoidal reference. The densities used are 2 670 kg/m³ for landmasses, 1 030 kg/m³ for water masses above and -1 640 kg/m³ below the ellipsoid. The correction radius was set to the Hayford zone O2 (167 km). In the future, the calculation of long-distance effects of topography/bathymetry and its compensating masses (roots) are planned. The new Bouguer anomaly will be station completed (CBA) and compiled according to the most modern criteria and reference frames (both location and gravity). The concept of ellipsoidal heights implicitly includes the geophysical indirect effect. Atmospheric corrections are also considered. Special emphasis was put on the numerous lakes in the study area. They partly have a considerable effect on the gravity of stations that lie at their edges (for example, the rather deep reservoirs in the Alps). In the Ligurian and the Adriatic seas, ship data of the Bureau Gravimétrique International were used. Although not unproblematic, these data got the preference over satellite data.

It is the aim of the work of the AAGRG to release a gravity database that can be used for high-resolution modeling, interdisciplinary studies from local to regional to continental scales, as well as for joint inversion with other datasets.

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