## Reconciling petrological data with geophysical rock parameters in the Central Eastern Alps

Sandra Wind[1,2], Romain Bousquet[2*], Hans-Jürgen Götze[2], Sabine Schmidt[2]
[1] - Department of Earth and Environmental Sciences, University of Ottawa, Canada; [2] – Institute of Geosciences, Christian-Albrechts University, Kiel, Germany; [*] romain.bousquet@ifg.uni-kiel.de

Intensely studied regions as the Alps allow interdisciplinary approaches for better understanding the complex structure of the lithosphere in orogens. For this reason, a geophysical 3D-density model of the Eastern Alps has been reworked from the petrological perspective. By modelling the metamorphic density of rocks using the Theriak-Domino software package the influence of temperature, pressure and chemical composition on the density has been analysed. Density-isopleth-plots of orthogneisses, metabasites, ultramafics and metapelites, which are typical rocks of the Tauern Window, have been calculated showing characteristic density trends for each rock type, depending on stable mineralogical phases and changes of reactions influenced by the chemical composition.

To further investigate the influence of the chemical composition on rock densities various Zentralgneiss samples were analysed. Chemical compositions of 45 Zentralgneiss samples from the literature were used in addition to five reworked and newly measured samples. By the usage of the corresponding thin sections, information on the metamorphic grade, weathering state and water content were gained. For the used temperature and pressure conditions a complex relationship between the density and composition was observed, depending mainly on an increased iron content.

Based on the petrological findings a geophysical density model has been reinvestigated using the IGMAS+ software. With respect to the results of the TRANSALP working group and information about the Moho depth, a good correlation between the measured and modelled gravity field was reached in the new petrological 3D-density model.

This model has been used to further analyse the impact of the Zentralgneiss unit on the short waves of the modelled gravity field, resulting in a shifting to a lower gravity anomaly of -15 % and +8 % for the calculated maximum and minimum density. In this study, we emphasize the importance of multidisciplinary approaches to enable well-established density models for gravity modelling and lithosphere analyses.