

Ber. Inst. Erdwiss. K.-F.-Univ. Graz	ISSN 1608-8166	Band 20/1	Graz 2014
PANGEO AUSTRIA 2014		Graz, 14. September 2014 – 19. September 2014	

Vortrag zur Verleihung des Hans Höfer von Heimhalt-Preises

Provenance and geochemistry of the Gosau Group around and beneath the Vienna Basin

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Bulk rock geochemistry and heavy mineral analysis of outcrop, core and cutting samples of the Upper Cretaceous to Paleogene Gosau Group were performed to evaluate differences and similarities, to reconstruct facies, depositional environment and provenance of successions beneath and at the margins of the Vienna basin. As Gosau sediments partly act as seals for gas reservoirs beneath the Neogene Vienna Basin, knowledge of stratigraphy and structure of these units is essential for hydrocarbon exploration.

Bulk rock and stable isotope geochemistry demonstrate differences between hemipelagic to pelagic samples from the Gießhübl and Studienka basin compared to marginal-marine to non-marine samples from the Grünbach and Glinzendorf basin. Geochemical proxies for paleosalinity were used to differentiate between marine and limnic intervals. Enriched Cr and Ni concentrations document ophiolitic detrital influence in mainly non-marine parts of the Glinzendorf Syncline.

Evaluation of heavy mineral assemblages and chemical analysis of single heavy mineral grains provide a provenance concept of that area. Garnets with higher proportions of pyrope (and grossular) may report erosion from relics of a metamorphic sole, and chrome spinels of a mixed harzburgite/lherzolite provenance in the Coniacian to Campanian suggest dominant sediment transport from the Tethys suture situated south of the NCA. A mélange of high metamorphic and ophiolitic nappes from the hanging wall of the northwards moving thrust complex onto the Austroalpine realm acts as source. From the Maastrichtian on only almandine-rich garnets, which are interpreted as southern, metapelitic provenance, can be observed. Moderate chrome spinel contents represent ultimate erosion of ophiolitic structures.