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# Intraplate sedimentary basins on accretionary crust – A global analysis

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Intraplate sedimentary basins often show structural styles and subsidence patterns not conforming to the current understanding of rift basin evolution. The modelled tectonic subsidence for these basin often yields lithospheric stretching factors significantly larger than inferred from the observed structural deformation. This is likely caused by a complex interplay between the different properties of the underlying crust and lithosphere, mantle dynamics and far field plate boundary forces. One of the key factors likely responsible for this style of extension is the basin-underlying substrate.

At many convergent margins, crust is created by accumulation and accretion of material from a subducting plate onto the overriding plate. Once this crust is preserved though subsequent tectonic events it is often referred to as “accretionary crust”. After a consolidation phase which can last several hundred million years it will eventually become continental crust. In this context, we investigate accretionary crust which has been created in the Phanerozoic. Both, the point where accretionary crust becomes stable continental crust and the specific characteristics distinguishing these crustal types are poorly understood. Using this definition, large parts of Asia, the Hercynian-Appalachian belt in Europe and North America and also younger Pan African crust of the Gondwana continents is formed of accretionary crust. Sedimentary basins on this type of crust hold nearly 2/3 of the global hydrocarbon resources.

Based on the publicly available data set for crustal thickness CRUST2 (http://mahi.ucsd.edu/Gabi/rem.html) and Etopo elevation data we have compiled crustal and sediment thickness grids for sedimentary basins on accretionary crust on a global scale. The data has then been used to derive beta factor and tectonic subsidence grids, as well as crustal buoyancy, for each basin. Further, we computed differential

beta and tectonic subsidence grids in order to estimate the misfit between models derived from either crustal thinning or sediment thickness. The resulting compilation of parameters obtained from this work will be used to develop a classification scheme for accretionary crust. for modelling extensional processes utilising the FEM code ELLIPSIS 2D/3D and SNARK in an interactive computational environment to further evaluate the role of crustal heterogeneities, and mantle dynamics as extensional driving force.