The Global Rifts database - Analysis of Mesozoic-Cenozic global rift patterns

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Rift basins and passive margins are an archive of extensional processes affecting the shape and integrity of lithospheric plates. We present a new geospatial database of global rift structures (GloRiDa - Global Rifts database) based on a compilation of rifts. We analyse the spatio-temporal associations between rift activity during the Mesozoic and Cenozoic and tectonic parameters such as magnitude of rifting, duration and time of occurrence, lithospheric and crustal substrate, and proximity to plate boundaries. The analysis is carried out using a recently developed data mining framework for the open-source plate tectonic reconstructions software "GPlates" to analyse complex spatio-temporal associations between different data sets. In addition we utilise a new global sediment thickness compliation to extract kinematic information from those rift basins and integrate our results into plate tectonic models with deforming plates. We find that there are distinct changes in the ratio of failed versus successful continental rifts over the past 250 Million years as well as in rift lifespan relative to tectonic environment.