Sea-level indicatorsasproxydatafor relative sea-level change

Milena Latinovic[1,2], Volker Klemann[1], Maik Thomas[1,2]

1. GFZ German Research CentreforGeosciences, Potsdam, Germany
2. Free University, Berlin Germany

Observationsofsea-level variationsallowthevalidationofnumericalmodels usedtoreconstructpastandpredictfuturesea-level change. Sea-level indicators (SLIs) areusedasthemainsourceforderiving relative sealevel (RSL) variations duringpreviousepochsforwhich tide-gauge andsatellitemeasurementswere yet not available. However, thelevelingof an SLI relative topresentsealevel does not provide a directmeasureofformer RSL, but only an indication accordingtotheconditionsunderwhichthe sample was deposited. This informationdepends on the sample type and on itsenvironmentandhastobe mappedto RSL by an appropriatetransferfunction. The respectivedatahasto beextractedby an objectiveprocedurefromprimaryinformationusuallyprovided in geologicalorpaleontologicalliteratureof different primaryfocus, qualityand detailedness. In additiontotheheightinformation, also theprecisionofdating variesbetween different indicatorsand in caseofradiocarbon-dated material, a furthercalibrationofthedatedagehastobeapplied.
In ordertoimprovethereliabilityofsea-level indicatorsforsea-level reconstructions, thevisualizationframework SLIVISU isdevelopedatGFZPotsdam. Itallowsaccessto a relational databasesystemthatcontains compilationsofsealevelindicatorsobtainedfromtheliteraturewherethe respectivemetainformationisstored. First, theradiocarbondated material is calibratedconsideringinformationfromthesample'smetadata. Thenlikelihood functionsarederivedincorporatingtheindicativemeaningasavailableerror information in ordertoevaluate model-basedsea-level predictionsagainstthe respective SLI. This procedureisaccompaniedbyapplyingthevisualanalytics tool SLIVISU.
Depending on thestatisticalsignificance, theanalyzed SLIs will serveas validationdatafortheviscoelasticlithosphereandmantlemodel VILMA, partof the German Paleo-ClimateModelling Initiative PalMod.