



Fuzzy logic as an alternative tool for the interpretation of sea-level indicators with respect to glacial-isostatic adjustment

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An important constraint for the inference of mantle viscosity and loading history of the last glaciation is the variation of the Holocene relative sea level (RSL) height following the last Pleistocene deglaciation. As a measure of this variation, sea-level indicators (SLIs) like peat, shells or driftwood which are related to the former RSL height are used. Usually, a nominal RSL height and age is derived from the particular SLI where the uncertainty due to the type of the SLI is expressed by a standard deviation and, so, interpreted in terms of probabilities. In contrast, we express the depositional conditions of the SLI by fuzzy sets which defines a more realistic relation between the observed height of the SLI and the former sea-level height in terms of possibilities. Fuzzy logic then allows a systematic classification of the SLIs available, the validation of Holocene RSL height change and the inversion of the viscosity structure of the earth's mantle as for glacial changes. We show the properties and advantages of this method by application to different regions of the earth.