An open source geophysical software for studying speleothem growth bands and comparing with a reference curve: Mirone

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Speleothem growth bands are commonly referred as one of the parameters that are used for paleoclimate reconstructions. Accordingly, this work presents a new tool for detecting these bands based on the gray-scale image of the speleothem using the Mirone open source geophysical software. This program has initially been developed for working on georeferenciated images for geophysical studies, as for instance for recognizing paleomagnetic inversions from deep-sea sediments. This recognition based on gridded images is very similar to what is needed for the recognition and detection of speleothem growth bands. The detection is made by localizing the minimum gray values on the color profile extracted automatically from the speleothem photography just by tracing a line on the image. As the minimum values are pointed on the profile, the corresponding locations appear with a dot symbol on the speleothem gray-scale photography. This process can be repeated as often as wanted and bands can then be individualized and their width measured. The overall process can be defined as friendly mostly if the image is already georeferenciated and in gray-scale. Nevertheless, Mirone software also allows preparing the image into geotiff format, which can then be directly used for digitally assisted detection of the speleothem growth bands. Further, data treatment can be made based on the gray-scale profile of the speleothem as for instance comparing it and wiggle fitting with any other reference curve.