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Exploiting the similarity of soil moisture time series based on the matrix profile

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A frequent goal in the analysis of geoscience time series is the quantification of the similarity between two (or more) time series. Although easy to formulate and conceptually simple, the task is hindered by the heavy autocorrelation usually exhibited by geoscience time series, which is reflected in complex temporal patterns on multiple (and often interacting) time scales. In this contribution the similarity between time series is addressed from a time series data mining perspective based on a recently proposed robust and efficient algorithm for the computation of the matrix profile (Yeh et al, 2016). The approach is demonstrated in the assessment of the similarity of high-resolution (30-minutes) time series of soil water content measured at different depths (5, 10 and 15 cm) from the Eastern North Atlantic (ENA) ARM facility in the Graciosa island (Azores).