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Visibility Graph Analysis of Geophysical Time Series – Potentials and Possible Pitfalls

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Recently, complex network approaches to time series analysis have been developed and successfully applied to geophysical records. In this paper, the visibility graph approach is re-considered, which has been found useful as an alternative tool for describing the fractal properties of a time series. The interpretation of various graph-theoretical measures in the context of visibility graphs, their mutual interdependence, and their sensitivity in the presence of missing values and uncertainties (posing typical challenges in geophysical time series analysis) are thoroughly discussed. The obtained results are illustrated for some exemplary re-cords from different fields of geosciences.