



Advanced functional network analysis in the geosciences: The pyunicorn package

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Functional networks are a powerful tool for analyzing large geoscientific datasets such as global fields of climate time series originating from observations or model simulations. pyunicorn (pythonic unified complex network and recurrence analysis toolbox) is an open-source, fully object-oriented and easily parallelizable package written in the language Python. It allows for constructing functional networks (aka climate networks) representing the structure of statistical interrelationships in large datasets and, subsequently, investigating this structure using advanced methods of complex network theory such as measures for networks of interacting networks, node-weighted statistics or network surrogates. Additionally, pyunicorn allows to study the complex dynamics of geoscientific systems as recorded by time series by means of recurrence networks and visibility graphs. The range of possible applications of the package is outlined drawing on several examples from climatology.