



Nonlinear Time Series Analysis in Earth Sciences – Potentials and Pitfalls

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The application of methods of nonlinear time series analysis has a rich tradition in Earth sciences and has enabled substantially new insights into various complex processes there. However, some approaches and findings have been controversially discussed over the last decades. One reason is that they are often based on strong restrictions and their violation may lead to pitfalls and misinterpretations.

Here, we discuss three general concepts of nonlinear dynamics and statistical physics, synchronization, recurrence and complex networks and explain how to use them for data analysis. We show that the corresponding methods can be applied even to rather short and non-stationary data which are typical in Earth sciences.

References

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