



## **Study of Environmental Data Complexity using Extreme Learning Machine**

Michael Leuenberger and Mikhail Kanevski

Institute of Earth Surface Dynamics, University of Lausanne, Lausanne, Switzerland (michael.leuenberger@unil.ch)

The main goals of environmental data science using machine learning algorithm deal, in a broad sense, around the calibration, the prediction and the visualization of hidden relationship between input and output variables. In order to optimize the models and to understand the phenomenon under study, the characterization of the complexity (at different levels) should be taken into account. Therefore, the identification of the linear or non-linear behavior between input and output variables adds valuable information for the knowledge of the phenomenon complexity.

The present research highlights and investigates the different issues that can occur when identifying the complexity (linear/non-linear) of environmental data using machine learning algorithm. In particular, the main attention is paid to the description of a self-consistent methodology for the use of Extreme Learning Machines (ELM, Huang et al., 2006), which recently gained a great popularity. By applying two ELM models (with linear and non-linear activation functions) and by comparing their efficiency, quantification of the linearity can be evaluated.

The considered approach is accompanied by simulated and real high dimensional and multivariate data case studies. In conclusion, the current challenges and future development in complexity quantification using environmental data mining are discussed.

### References

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