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'Internet of Things' for environmental sciences and education

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The collective term 'Internet of Things' (IoT) encompasses a variety of technologies and methods providing novel opportunities for data acquisition and control in environmental sciences. Availability of cost effective components as well as support of large open source communities allow scientists to gain more flexibility and control over their experimental setups. However quality of measurements, stability of instruments as well as real costs for development and maintenance are often underestimated challenges. The presentation introduces current best practices of IoT principles in scientific applications. Examples of low cost sensors, low power electronics, wireless data transmission protocols, time series databases as well as real-time visualization are presented and discussed. Furthermore light is shed on non-technological issues of the 'do-it-yourself' or 'maker' approach such as social and psychological aspects. The 'make-share-learn' paradigm of the maker culture can be utilized to raise awareness. It provides significant opportunities for environmental education and community building which constantly gain more importance in the context of climate and environmental change.