Real-time in-situ monitoring of nitrate concentration in soils for minimized fertilizer application (MoNiCon)

Initiative: "Experiment!" (beendet)

Ausschreibung: Explorative Phase

Bewilligung: 01.03.2021

Laufzeit: 1 Jahre 6 Monate

Projekt-Website: https://www.mrt.uni-bayreuth.de/de/index.html

To date, large areas of farmland are fertilized without knowledge of the actual state of the soil which causes overfertilization and nitrate pollution of the groundwater. Electrical impedance spectroscopy (EIS) lends itself to the in-situ characterization of the composition of materials. Different material systems can be classified based on characteristic features of the impedance spectra. However, it is not at all clear if one can also extract quantitative information on species concentrations outside controlled laboratory environments. Soils resemble mixtures of sand, clay, and organic material in their composition and texture. This raises an intriguing question: could EIS be applicable in harsh and time-varying field environments to solve environmental problems? If the research results are positive, a demonstrator that can be attached directly to agricultural equipment will be developed in order to determine the nitrate contamination of the soil during field cultivation so that farmland can be fertilized only where required and to the extent required.

Projektbeteiligte

Prof. Dr.-Ing. Gerhard Fischerauer
Universität Bayreuth
Fakultät für Ingenieurwissenschaften
Lehrstuhl für Mess- und Regeltechnik
Bayreuth

Open Access-Publikationen

Evaluation of electrical impedance spectra by long short-term memory to estimate nitrate concentrations in soil
Investigation of long short-term memory artificial neural networks as estimators of nitrate concentrations in soil from measured electrical impedance spectra

Es werden die Institutionen genannt, an denen das Vorhaben durchgeführt wurde, und nicht die aktuelle Adresse.

24.04.2024

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