

X-Ray Tomographic Characterization of Root Growth in Granular Media

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Plants are able to respond to their environment in many different ways. Especially the interactions between roots and soil are versatile. Now soil consists of individual particles and can be considered as granular medium. Therefore it can be expected that effects like dilatancy should occur during root growth. In light of the adaptability of plants, it would be interesting to find out what plants “know” about such physical effects. Have roots e.g. developed a mechanism to react on dilatancy?

In order to analyze root growth in granular media, chick peas have been planted in growth containers filled with an artificial soil of glass beads. In regular intervals the containers have been scanned using X-ray computed tomography. The tomograms have been processed to determine the position of roots and particles. Based on those tomograms the local packing fraction in the granule was calculated in dependency on the distance to the root. The objective hereby was to determine whether physical effects can be observed when the root tip enters the granular soil.

In this talk an overview over the experimental procedure will be given and results as well as potential improvements of the set-up and further ideas for experiments about this topic will be discussed.

