Root meets clays: Tree root plasticity in podzolized soil

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Root functional traits could vary among plant species. Root traits are known to respond to a decrease in nutrient availability along with soil aging and plant succession, while root plasticity of single tree species to soil aging is still unclear on a soil profile scale. We investigated whether trees develop finer root architecture along with soil aging in coniferous forest dominated by single species (*Pinus sylvestris*) in Estonia. We measured depth distribution of root biomass and traits (specific root length and tissue density). We compared ca. 100, 300, and 500 years old soils (podzols) on two coastal dune chrnosequence that differ in abundance of soil clay or Al and Fe oxides; Hiiumaa island (facing Balt Sea) and Juminda (facing Finland Gulf), where ridge-swale topography has been developed by isostacy. On Juminda chronosequence where oxalate-extractable P (oxide-bonded) is accumulated in the shallow subsoil, fine roots are concentrated in oxide-rich soil horizons. On oxide-poor Hiiumaa chronosequence where P is translocated in the deeper soil, fine roots are concentrated in organic horizon. Tree roots could change root distribution and surface area depending on extent of P occlusion in clays or leaching in soil aging. Tree community shift toward finer root architecture along with migration of Al and Fe oxides or selection of individuals with finer root structure could occur.

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