



## **Quantifying the relationship between climate and soil**

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Climate is one of the most important soil forming factors, yet described quantitative relationships between soil and climate are scarce. This limits our ability to project changes in soil distribution under future climate scenarios. The goal of this work was to describe global quantitative relationships between soil subgroups as currently available from ISRIC (International Soil Reference and Information Centre) and climate data as currently available from CHELSA (Climatologies at high resolution for the earth's land surface areas). By calculating basic population indices (Shannon index and mean taxonomic distance) using Koppen-Geiger classes we identified a soil spectrum that ranged from soils with very strong climate links (e.g, various Chernozems, Podzoluvisols, Ferralsols) to soils with non-existent climate links (e.g, Lithosol and various Andosols and Fluvisols). After removing the latter soils from further analysis, PCA and fuzzy clustering were used to split the resulting dataset in several clusters to reduce the overall variability. Finally the quantitative relationships between soil and climate variables were analyzed using GLM-type regression methods.