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Quantifying paleosol development during three interglacial periods in the Chinese Loess Plateau by soil-climate modeling.

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The Quaternary loess-paleosol deposits in the Chinese Loess Plateau (CLP) provide complete records of paleoclimates for better understanding differences in paleosol development. However, soil properties are overwritten due to climatic conditions in later periods; therefore the true paleosol development cannot easily be quantified. Only a calibrated soil model allows interglacial soil simulation in the CLP over long timescales. Therefore, our objective is to quantify the degree of paleosol development in three different paleosols in the CLP: S2, S4 and S5-1 using a calibrated process-based soil development model, SoilGen2.

The variations of paleosol development were compared by clay% and calcium carbonate content% and anorthite content (kg/m^2) in the simulated paleosol.

Our results show that paleosol development is stronger in S5-1, S4, S2 in the studied paleosols in decreasing order of intensity. Each paleosol showed distinct variations in clay migration and decalcification processes under varying climate and dust deposition at the time of development. The model correctly simulated the two-sub paleosol units in paleosol S2. In conclusion, the results indicate that the (calibrated) SoilGen2 model combined with modeled climate can quantify and describe the paleosol development in the CLP fairly.