



## **Palaeosols as geomorphic backbones in landscape development**

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Landscapes in SE Spain are strongly affected by calcretes. Calcretes are especially found in many geomorphic positions, often attached to a backwall which are part of hill or ridge systems. These calcretes which can be perceived as palaeosols with a petrocalcic nature and that are typical for soil formation processes under a non-leaching semi-arid or sub-humid environment. Different phases of calcrete development have existed over time which is expressed by their reoccurrence at up to six geomorphic levels in the landscape. They develop on both calcaric and non-calcaric rocks and are often disconnected from their original back wall by backward gully erosion. They have typical low angular concave surfaces and be followed over long distances in the landscape . They can be related to different paleo-geomorphic surfaces corresponding to former base levels of erosion, which were later dissected through regional uplift or tectonic activity or climate change. Especially the highest paleosols are badly preserved and only parts of the lower sub horizons of the petrocalcic are preserved in these cases.

The lithified petrocalcic horizons can be several meters thick and also shows a very high spatial heterogeneity in thickness or degree of induration. In lower landscape positions they are often seamless connected to river terraces which can also be lithified at their surface. In these positions also other types of paleosols occur where luvisols and stagnosols are overprinted with calcic properties, indicating changing climatic conditions during their formation, from leaching wet conditions earlier in late Pleistocene to non-leaching conditions under current conditions. Even spodic horizons can be observed at some locations in sandy and gravelly river terraces, often overlain by current calcic horizon development in the topsoil.