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Aggregates stability changes along climatological gradients in Tarija (Bolivia) and Alacant (Spain)

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Soil structure has been used as indicator of the degree of ecosystem degradation and soil erodibility. Aggregate stability can be used as an indicator of the soil structure quality and the influence of the influence of climate on soil properties and processes. Climate determines the vegetation cover, the hydrological and erosional processes and the soil properties, then measurements of aggregate stability will shed light on the ecosystem functioning. Moreover, human activities such as grazing and agriculture disturb the aggregate stability This is why soils developed under different climatic conditions have been selected along climatological-altitudinal gradients in the south-east of the Iberian Peninsula (NW of the Betic Range, Alacant) and the south of Bolivia (Andean Range, Tarija). On both sites, the study was carried out on natural (climax vegetation) and anthropic transects, where cultivated soils in Bolivia and soils degraded by forest fire, clear-cutting and afforestation in Alacant were selected. The results demonstrate that in the natural transect the climate determine the quality of the soil aggregates: the soils developed under wet climates are more stables than the soils developed under arid climates. However, the soils degraded by the human use shows a similar relationship (cultivated fields in Bolivia), or a very complex behaviour due to the different land uses along the anthropic transect in Alacant. As a general conclusion, the human use determines a strong reduction of the aggregates stability in semiarid environments. On the NW of the Betic range and the eastern part of the Andean Range, in the south of Bolivia, the human use results in the degradation of the natural ecosystems due to the reduction of the aggregate stability. Aggregates are more stable under wet than dry conditions which confirm that a reduction on soil water available will result in more erodible soils.

Key words: Climate, Gradients, Soil, Aggregates, Spain, Bolivia