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## **Quantifying the importance of ephemeral gully erosion with the AnnAGNPS model in an olive orchard microcatchment in Spain.**

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**Abstract.** High erosion rates can be expected in agricultural regions in Spain with olive trees, which are very important to the Spanish economy. On the other hand, erosion due to ephemeral gullies and gullies in cultivated areas in the Mediterranean area is known to be one of the major processes of land degradation and contributes significantly to global soil loss. However, under olive crop use, studies are scarce due to most having been done at the plot scale. The study of gullies in an olive crop microcatchment of 6.1 ha using aerial orthophotography was performed. The results of the application of the AnnAGNPS model on this microcatchment, with enhanced ephemeral gully components, provides an examination of the contribution of ephemeral gullies to total soil loss, producing values between 26% and 56 % of total annual sediment discharges. The predictions of the model showed orders of magnitude comparable to soil losses in the observed gullies, which allow a positive evaluation of the enhanced ephemeral gully components within AnnAGNPS. The acquisition of data and the simulation of gully erosion processes at the microcatchment scale should be incorporated into current hydrological applications as well as into the levels of tolerance of the

landscape for erosion. Finally, since the protection of natural cover and the influence of non tillage does not seem enough to reach acceptable levels of erosion according to the results of the model, new measurements of conservation such as the use of stiff grass hedges close to the gullies especially in autumn are suggested in the catchment.