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How relevant is the interannual vegetation's dynamic in the water cycle at catchment scale?

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To effectively analyse a portion of the Earth's surface from a hydrological perspective, it is important to understand that water cycle and vegetation dynamics are strongly connected. Vegetation holds an important role in land surface water balance, in particular considering that vegetation physiology and spatial parameters are dynamic in time.
A traditional hydrological model considerates vegetation as a static parameter through years, representing very well observed streamflow. Nowadays, the tendency is to include the vegetation as a state variable. In this way, we obtain a better simulation of both, blue water and green water, as well as the ratio between them.
Applying the hydrological distributed model TETIS, this work presents the comparison of considering static vegetation or dynamics vegetation. The study catchment was characterized by a good availability of input data in the analysis period (from 1990 to 2011) and it is mainly covered by forested areas. The selected basin is the upper part of the Turia River, up to the Benageber Reservoir, analyzing if is relevant to use dynamics vegetation instead of static vegetation for the water resources evaluation in semiarid Mediterranean catchments.
Both model variations were applied in three different scenarios: a dry year, a normal year and a wet year. In each scenario the model was applied considering both static vegetation and vegetation dynamics. At the catchment scale, considering vegetation as an stationary parameter both, green water and the ratio between blue and green water, were underestimated.
Consequently, not considering the vegetation's dynamic in semiarid conditions can produce the underestimation of the amount of green water, which introduces a higher uncertainty in the resulting water balance in present conditions but also in future climate change scenarios.