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Using internal catchment information for improving TOPMODEL parameter description in a small Mediterranean mountain catchment.

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Three methods were updated or developed in order to use point observations of diverse catchment variables to get the distribution functions of the TOPMODEL parameters that drive the behaviour of the saturated store. These methods use (i) daily discharge measurements made during recession periods for the recession m parameter, (ii) simultaneous measurements of recession discharge and depth to the water table in one piezometer for the transmisivity To parameter, and (iii) simultaneous measurements of recession discharge and the extent of saturated area also for the To parameter. Using these methods, a better constraining of the parameters and more robust discharge simulations were obtained than using the common calibration with continuous discharge records. The advantages of these methods are that they do not need any permanent instrumentation in the catchment, and that they may be applied without running the whole model, and therefore precipitation and climate data are not needed. Conversely, the piezometer representativeness of the whole water table may limit the quality of the results obtained with the second method, and the information on parameters is obtained during recession periods and therefore its validity during floods must be assumed.