

## **Regional drought monitoring of Mediterranean oak savanna ecosystem using thermal-based evapotranspiration anomalies**

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Drought is a recurrent natural hazard in the Mediterranean region, likely to be worsened under the conditions of climate change, and one of the diagnosed factors jeopardizing the conservation of Mediterranean oak savannas in the Iberian Peninsula, an ecosystem known as dehesa in Spain and montado in Portugal. The vegetation layers of this agroforestry systems cope with water stress using different tolerance and escape strategies, some of them affecting their optical properties and the reflective and thermal regions that would allow stress detection with remote sensing. However, the slow-onset nature of drought, the large extension of savanna areas and their complex canopy structure pose additional difficulties to the already challenging monitoring of drought and its damage assessment.

In this work, the thermal-based Surface Energy Balance System (SEBS) was applied to monitor the evolution of monthly relative evapotranspiration anomalies, for the period 2000-2015, over the oak savanna area of the Iberian Peninsula (around 3 million ha). The model was validated using data from two sites equipped with eddy covariance systems over representative dehesa ecosystems for a total of five years. The main droughts occurred in this period were characterized at the annual and monthly time scales, analyzing their effects on vegetation properties and its productions.

Keywords: drought, evapotranspiration anomalies, SEBS, dehesa, oak savanna