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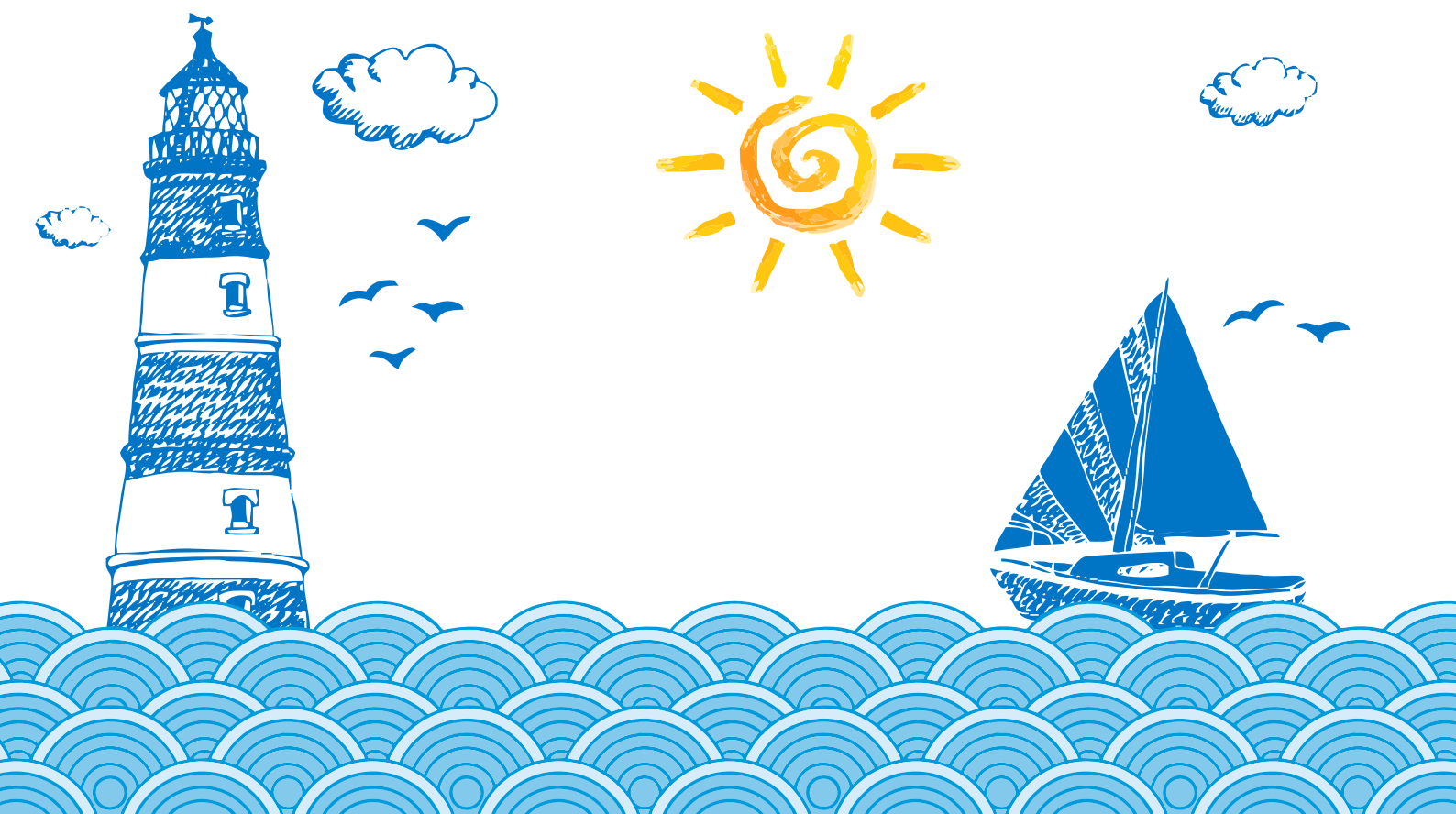
Groundwater Management and Governance

Coping with Uncertainty

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Water isotope monitoring to study transpiration and trees drought responses on Mediterranean karst

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Karst environments are questioning because although they have dry, stony soils seemingly unfavorable to vegetation, they are often covered with forests. How trees can survive in environments that are hostile to vegetation is a key issue for scientists. This study uses xylem water isotopes and midday and predawn water potentials of branches to assess the origin of transpired water. The monitoring was carried out during the summers 2014 and 2015 in two contrasted Mediterranean forest ecosystems. The results show that the three monitored tree species (*Abies alba* Mill, *Fagus sylvatica* L and *Quercus ilex* L.) have developed adaptation strategies against water stress including a more intense exploitation of groundwater reserve in the karst unsaturated zone (vadoze zone) during the driest years. *Quercus ilex*, a species well adapted to water stress and growing in the driest site uses the groundwater resource very early in the summer season. Conversely, the two other species less submitted to drought, exploit groundwater resource only during severe drought. These results open up new perspectives to better understand eco-hydrological equilibrium and improve water balance modeling in karst forest settings.