Mediterranean forests provide multiple challenges and opportunities to dendroecology. I will cover some of these questions by presenting three examples we have studied. These study cases include different stressors such as drought-induced dieback affecting silver fir forests, winter drought involving Scots pine stands, and defoliations caused by the pine processionary moth. Tree rings allow addressing these disturbance factors following a retrospective approach. However, I will emphasize that such observational studies must be complemented by other sources of information (e.g. xylogenesis) to fully understand how trees react to their surrounding environment.