



## **Mediterranean forest ecosystem under changing precipitation regimes: the responses of soil respiration**

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In order to predict long-term trends in C sequestration by terrestrial ecosystems in a changing environment, it is important to understand the response of soil C dynamics to environmental parameters. Soil respiration is the main process through which soil can release C to the atmosphere and it is strongly correlated to soil water and temperature. Climatic changes are likely to have a strong impact on Mediterranean ecosystems, which are expected to experience large changes in precipitation patterns leading to an intensification of drought stress. In the framework of the European project MIND, a large scale throughfall manipulation experiment has been established in a *Arbutus unedo* coppiced woodland, at Tolfa-Allumiere, central Italy. The manipulation consisted of two treatments: a dry, with 20% of the throughfall being removed, and a wet one, where soil moisture was kept above deficit by targeted irrigation. Soil respiration has been continuously monitored, using an innovative automated chamber system, from April 2004 to September 2005, as well as, they were soil moisture and temperature. Results showed a strong relationship between soil respiration and temperature up to 18°C, temperature above which other factors (i.e. soil moisture and available substrate) exerted a limiting effect. Moreover, the intense monitoring revealed a high respiratory contribution of the dry treatment, after a rain event, to the overall respiration during the summer period, due to the so called “birch effect”. The responses of soil respiration to changing soil water regimes will be reported in terms of short-term (i.e. immediate response to the rain event) as well as long-term (i.e. annual budget of soil CO<sub>2</sub> efflux) and implications discussed.