**Effects of meteorological changes and nitrogen addition on the soil processes: the modulator role of biological soil crust**

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Despite climate change and atmospheric nitrogen (N) deposition are two of the most important and concomitant global change drivers, the effects non additive that they can generate on soil processes are still unpredictable. We aim to assess how the combined effect of soil N additions and expected changes of precipitation pattern and temperatures will affect CO2 fluxes and N cycle in a Mediterranean shrubland. Given the ecological and functional importance that the biological soil crust (BSC) has proved to have in our study site and its dependence on meteorological variables, we hypothesize that it has a modulator role in the soil responses.

The study site is dominated by *Juniperus phoenicea* for about 53%, other shrubs cover another 27%, and the remaining 20% is bare soil with a well developed biological crust. In April 2012 a N addition experiment was set up. Eight plots of 36 m2 were selected in order to systematically include at least one entire plant of *Juniperus phoenicea* and a portion of soil covered with BSC not smaller than 6 m2. Four of the plots are periodically treated with 7.5 kg N ha-1 at the beginning of each season. Since April 2013, CO2 fluxes in the bare soil are being measured in both the intact soil and after removal of the BSC. Measures are performed in both the control and N-treated plots. In each plot, soil temperature and moisture content are measured every 30 minutes. Soil CO2 fluxes are measured weekly. Such design allows estimating the contribution of the BSC to soil CO2 fluxes, to determine how this contribution changes as a function of temperature and soil moisture, and to distinguish the N effect on the BSC respiration from that of the deeper soil layers.

It is planned to treat the plots with stable N isotopes to determine the N cycle in both treatments.