Soil community responses to climate extremes at different elevations across seasons

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Extreme heat events are getting more frequent and severe due to climate change, with the potential to induce large ecological responses. The magnitude of ecological responses may depend on the spatial and temporal interactions between the climatic event and natural communities. For instance, it is likely to observe variable responses to heat events at different elevations due to their distinct biological and climatic features. Since phenological patterns vary across elevational gradients, the timing of heat events could exert distinct ecological effects at high and low elevations. Yet, the ecological significance of the timing of heat events at different elevations has been rarely assessed. To this end, we tested how soil communities at high- and low-elevation sites respond to extreme heat events in different seasons (spring, summer and autumn). In a laboratory experiment using field-collected intact soil cores, we simulated heat events characterized by statistical extremity (i.e., a week at the 99th percentile of the site-specific daily average temperature) to generate similarly unusual climatic conditions across seasons and elevations. We measured the responses of soil invertebrates (Collembola), fungi and plants at the end of the extreme event and after a 5-week recovery period. Our preliminary results show that collembolan abundances were most sensitive to extreme heat from the low elevation sites during spring. However, this immediate decline was followed by compensatory population dynamics allowing them to a full recovery. We further aim to provide insights into soil community responses by linking collembolan responses to fungal and plant responses to extreme heat.