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Investigating the causes of heather die-off during summer 2018: an ecotron study

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The dry heathland ecosystem develops in sandy soils under the temperate climate of North-Western Europe. The dominant plant species in this ecosystem (heather: Calluna vulgaris) is therefore characterized by a fair ability to tolerate drought stress. Spring and summer 2018, however, were exceptionally dry and hot, and a significant proportion of heather cover died off in August in the National Park Hoge Kempen (Belgium). The same phenomenon was observed in an ecotron experiment. There, 12 heathland soil-canopy columns (2 m diameter, 1.5 m deep), extracted from the park in 2017 were exposed to ambient weather conditions, and atmospheric (temperature, CO_2, radiation, relative humidity) and soil variables (temperature, water content, electrical conductivity, water tension, lysimeter weight) were continuously monitored. Heather mortality was around 85 (+/- 10) % for five of the columns, while it reached only 26 (+/- 12) % for the other seven, reproducing what was observed in the field. Clustering analyses on the measured soil variables revealed that these two groups could already be discriminated before the drought and heatwave. Here, we investigate if soil parameters can explain the observed difference in heather mortality.