

# How Will Forests Smell in the Future?

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How will total VOC emissions, and emission profiles change under elevated CO<sub>2</sub> in a mature temperate woodland?

What are VOCS?

- Volatile Organic Compounds (VOCs) are predominantly biogenic in origin.
- They play important roles in plant **communication** and plant responses to **biotic** and **abiotic** stress.
- They are important drivers of atmospheric chemistry, governing the chemical **formation** and **loss** of tropospheric **ozone** and **aerosols**

Elevated CO<sub>2</sub> and VOCs

- **Isoprene** is the dominant VOC emitted from vegetation, and is the major emission of *Q.Robur*.
- Elevated CO<sub>2</sub> has been shown to have **inhibitory** effects on isoprene emissions **per leaf area**, and has been shown to decouple VOC emissions from photosynthesis.
- However the increase in **leaf area** has been shown to **offset** this when considering **total canopy emissions**.
- Understanding this dynamic work in a **mature woodland** is the aim of this research.

Summer 2019

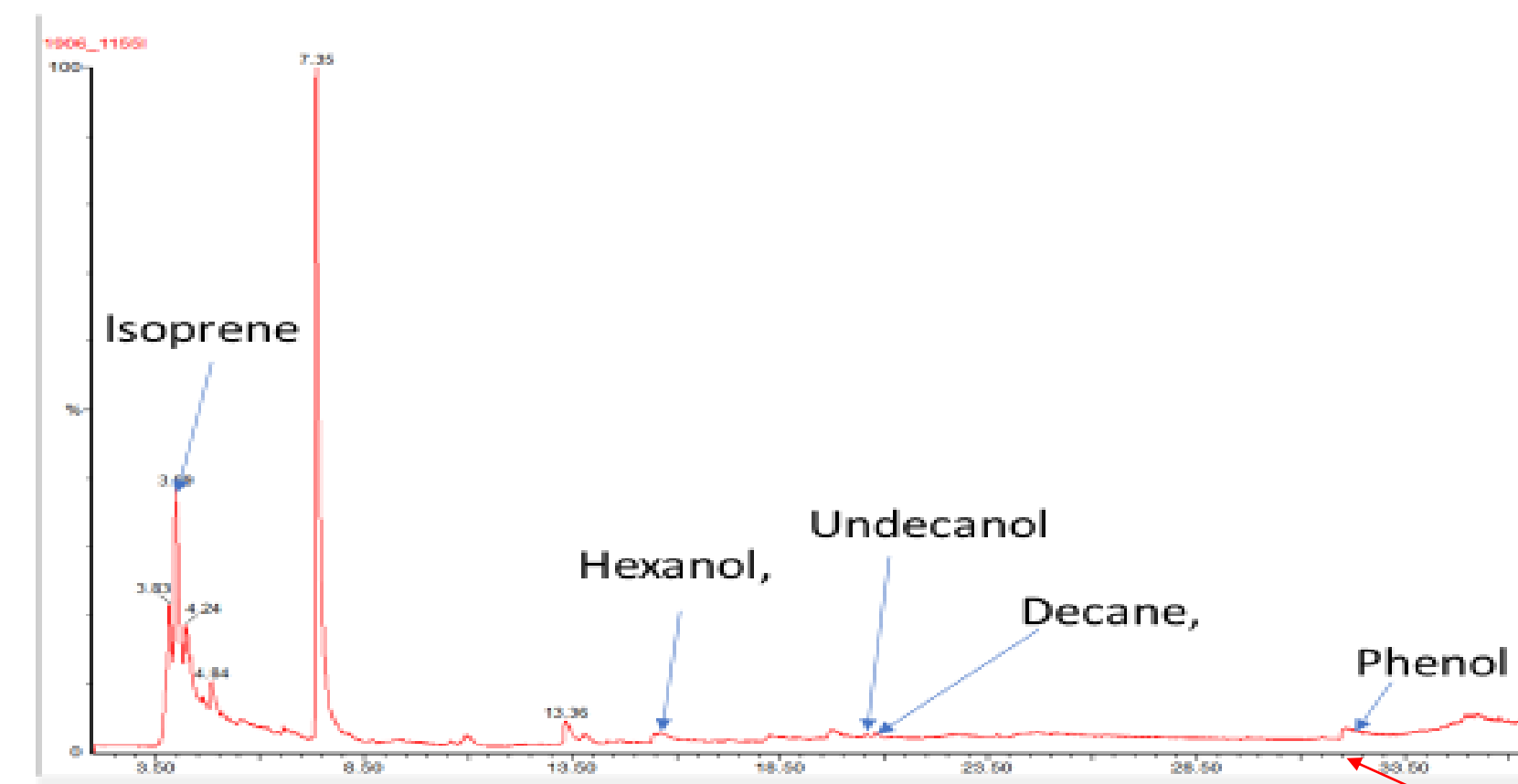
- Leaf level samples were taken from Oak, Sycamore, Hazel and understory species in arrays 5 and 6.
- Alongside this whole air samples and **soil samples** were taken.
- All samples were analysed using GC-MS for identification and quantification of VOCs.
- **Preliminary** analysis of all the species has been undertaken.
- Initial analysis shows that understory and soil emissions are **diverse**, whilst Oak is mainly emitting **isoprene**.

2020 Plans

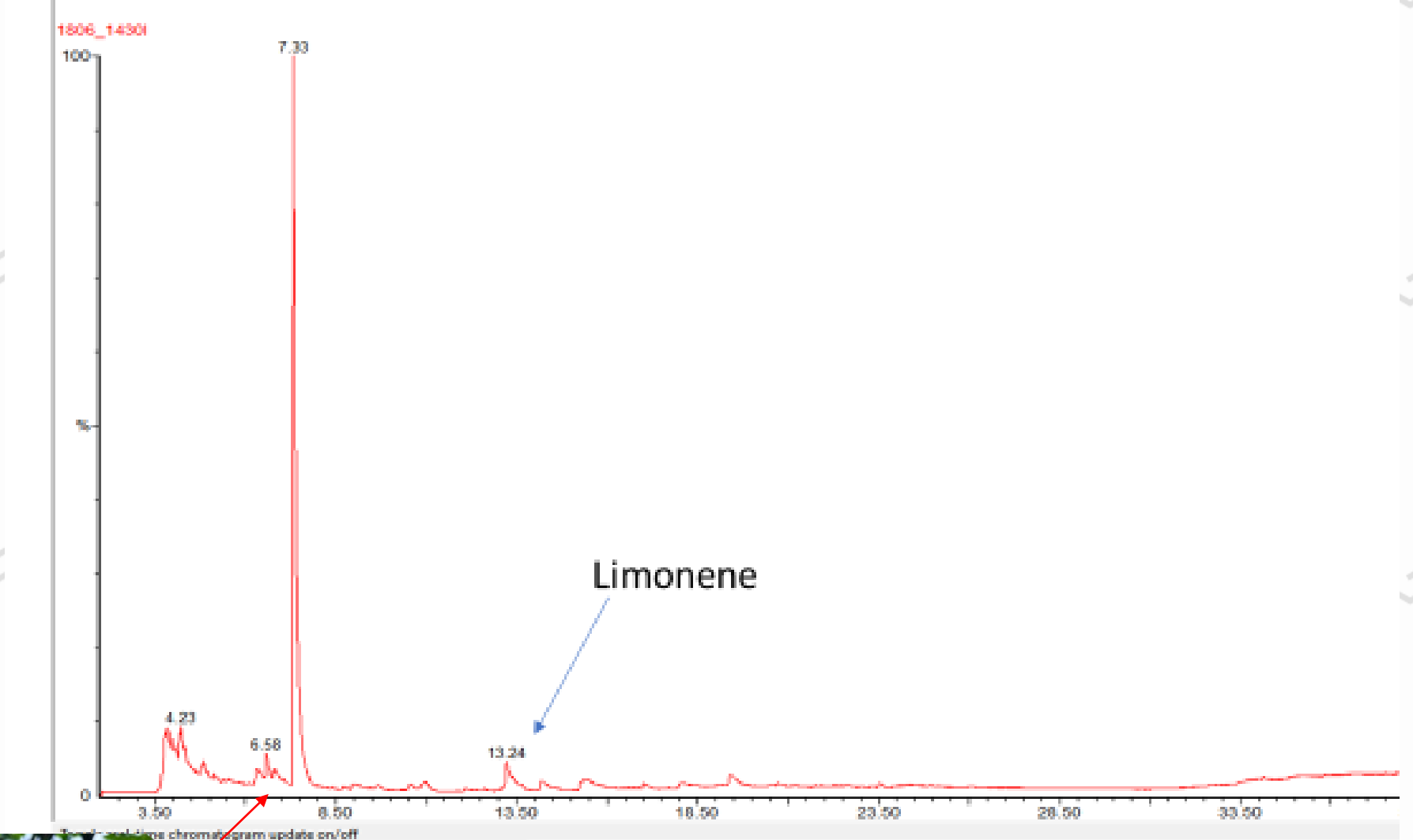
- **Continuous** measurements of VOC concentrations using PTR-MS.
- Extensive soil surface and understory sampling.
- Continue leaf level oak sampling from the canopy.

## Preliminary Compound Identification

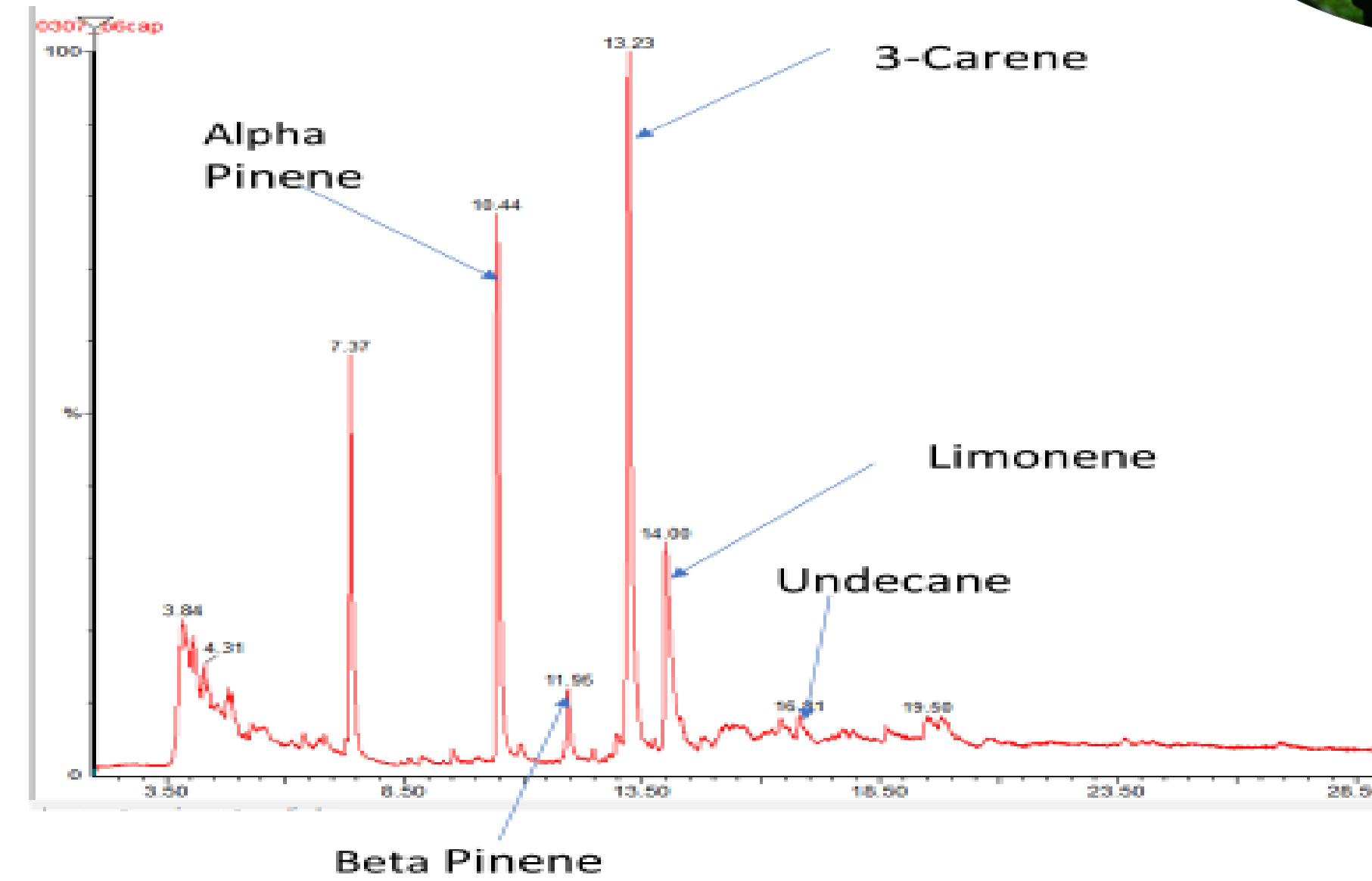
### Oak Emission Profile



### Sycamore Emission Profile



### Soil Profile



### Bramble Emission Profile

