

New insights on links between InSAR data products and ecohydrological parameters on raised peatlands

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Greenhouse Gas Emissions

The **GHG emissions from peatlands** are poorly known.

Peatland GHG emissions ↗ **Climate Models**

In particular at large scale.

Greenhouse Gas Emissions

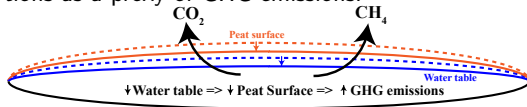
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Peat surface motions

Some studies propose to use the peat surface motions as a proxy of GHG emissions.



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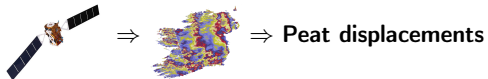
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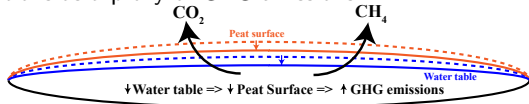
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The InSAR is a lost cost method to map the ground surface displacements using Radar satellites.



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Introduction

Interferometry of Synthetic Aperture Radar (InSAR) to monitor the peat ecohydrological parameters

Greenhouse Gas Emissions

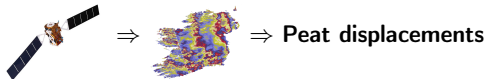
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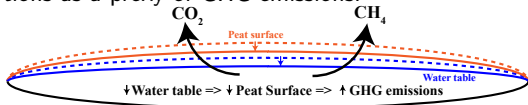
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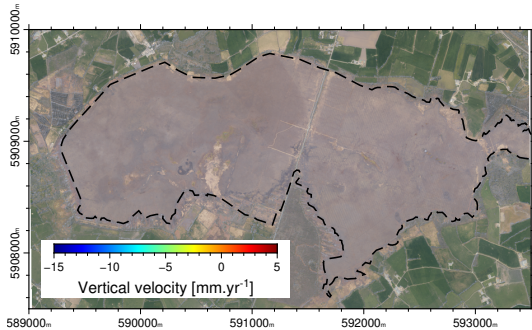
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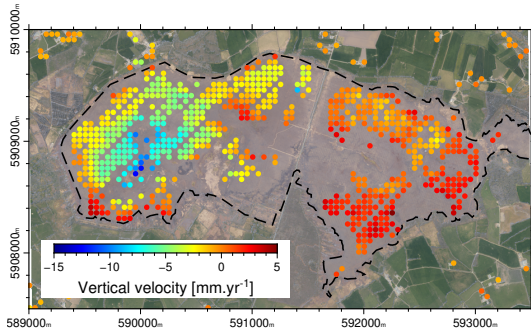
InSAR applied on peatlands

The peatlands are vegetated, theoretically not suitable for InSAR. **And the links between InSAR estimates and peat ecohydrological parameters remain uncertain.** $\Rightarrow$ **Comparison between InSAR estimates, in-situ data and field observations.**

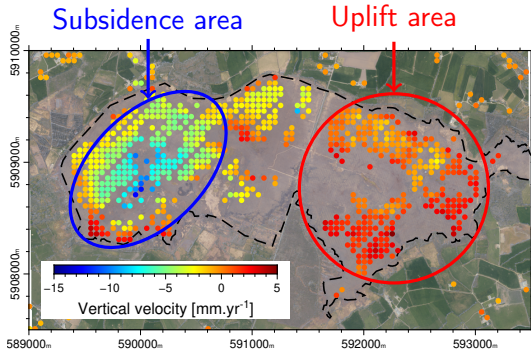
Peat surface displacements and water table Clara Bog (Co. Offaly, Ireland)



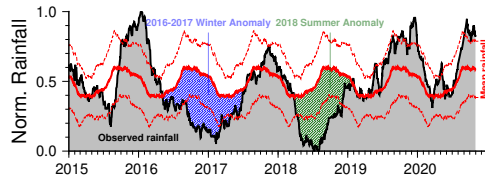
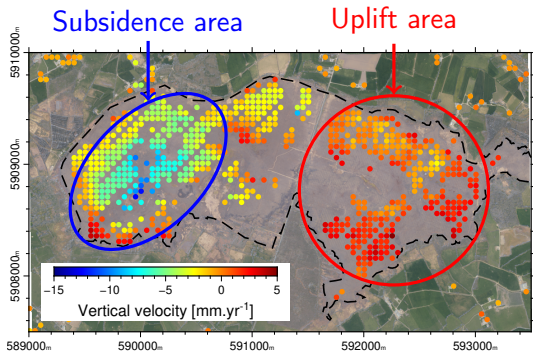
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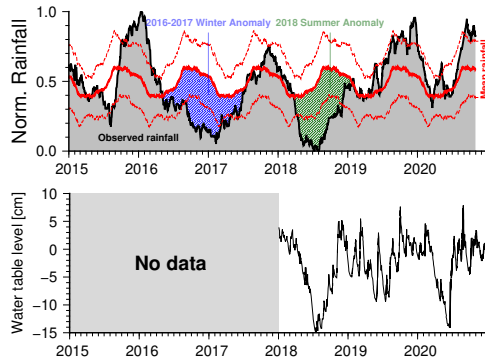
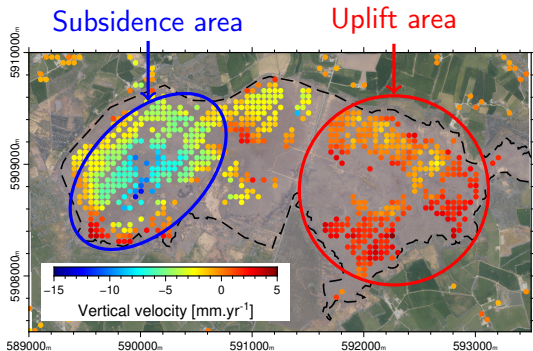
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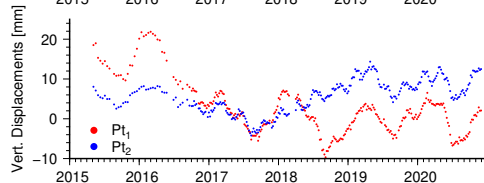
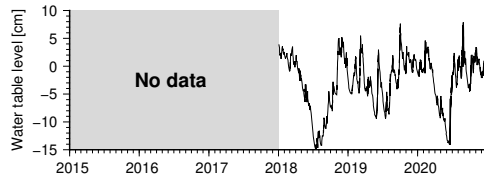
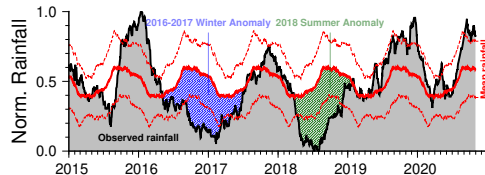
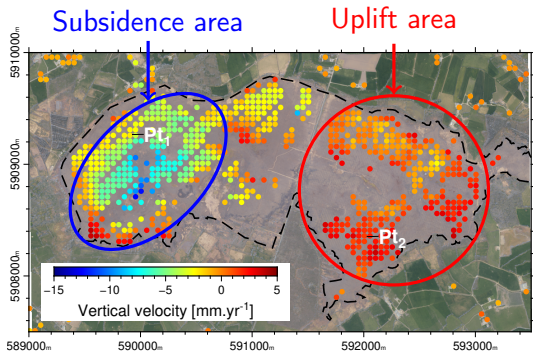
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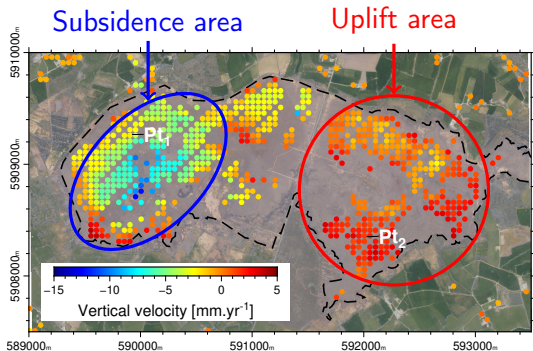
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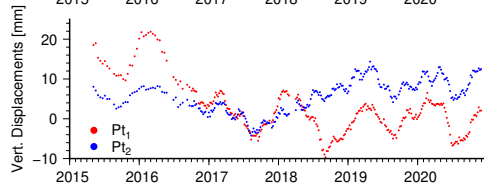
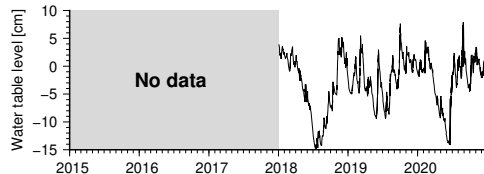
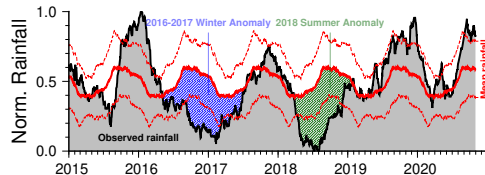
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Annual oscillations of displacements superimposed on multi-annual trends: oscillations related to **shallow water-table levels**, **weather conditions** and **weather anomalies**.



Soil moisture changes and InSAR estimates (1)

Ballynafagh bog (Co. Kildare, Ireland)

Photographies of Ballynafagh bog after the wildfire of July 2019.

Sub. Marginal Ecotope



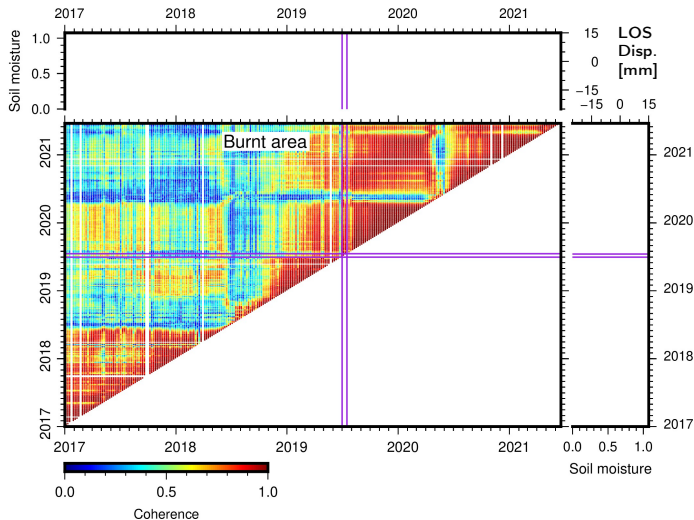
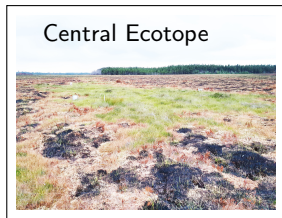
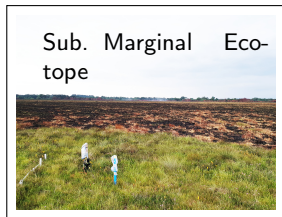
Central Ecotope



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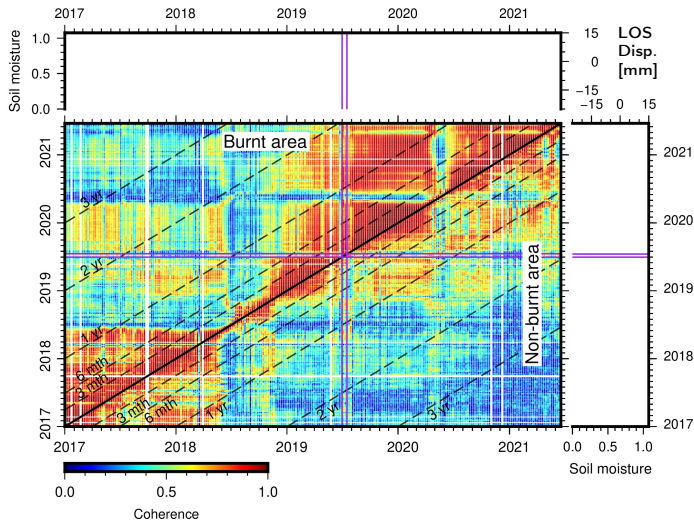
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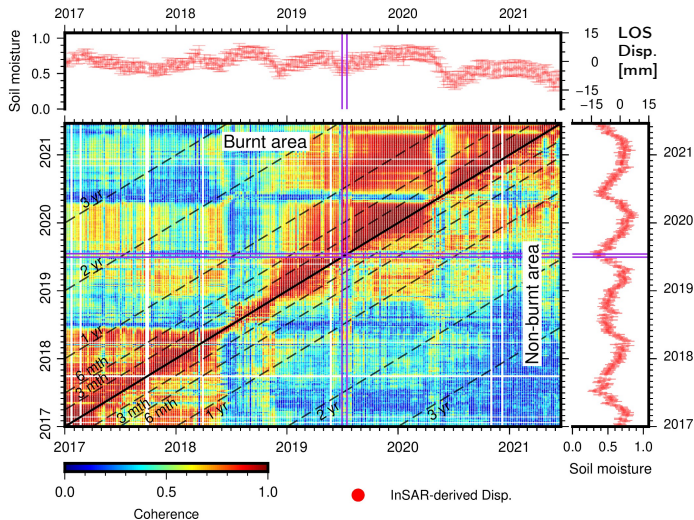
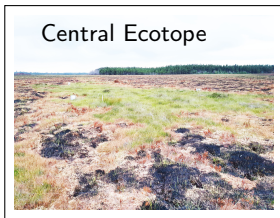
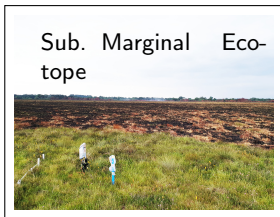
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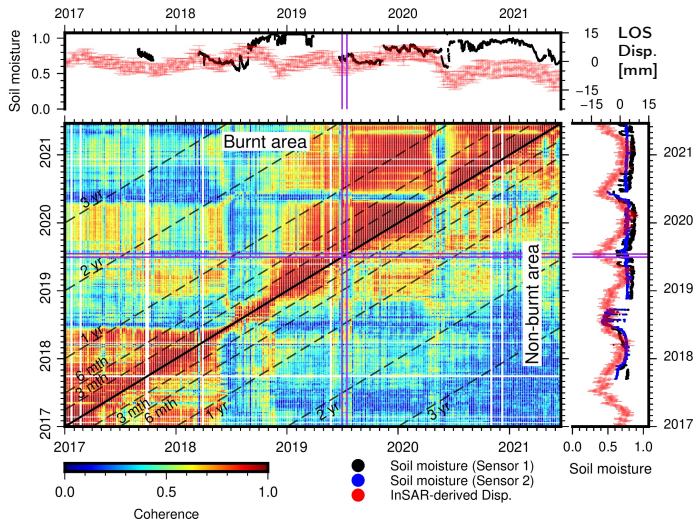
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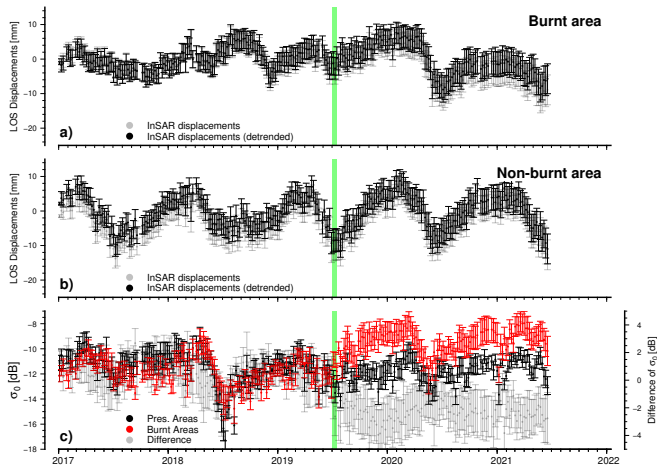
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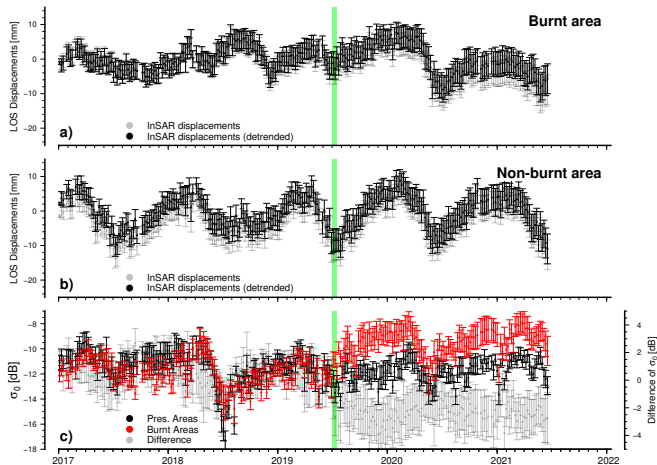
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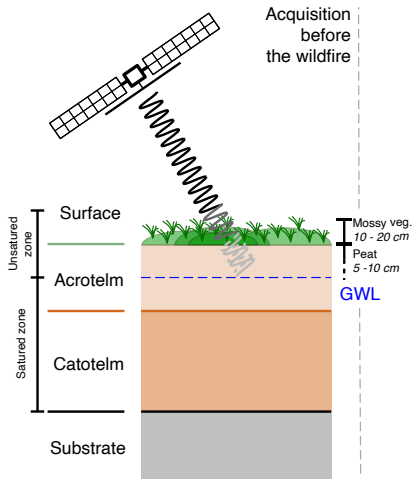


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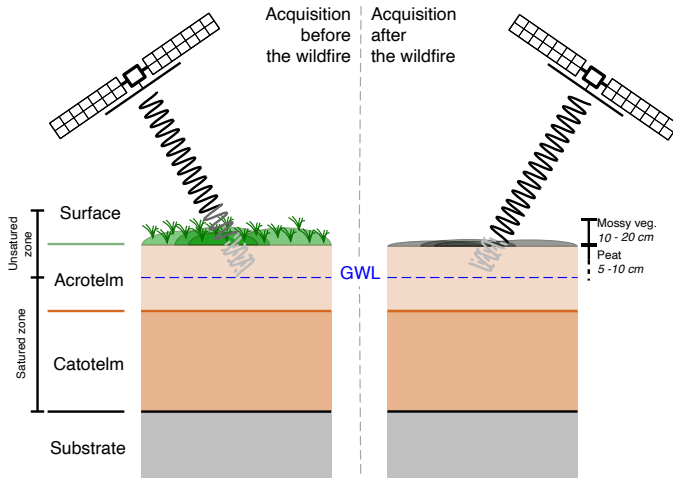


InSAR coherence is directly linked to soil moisture changes and InSAR estimates are not affected by fire: **penetration**; whereas SAR intensity is affected by fire.

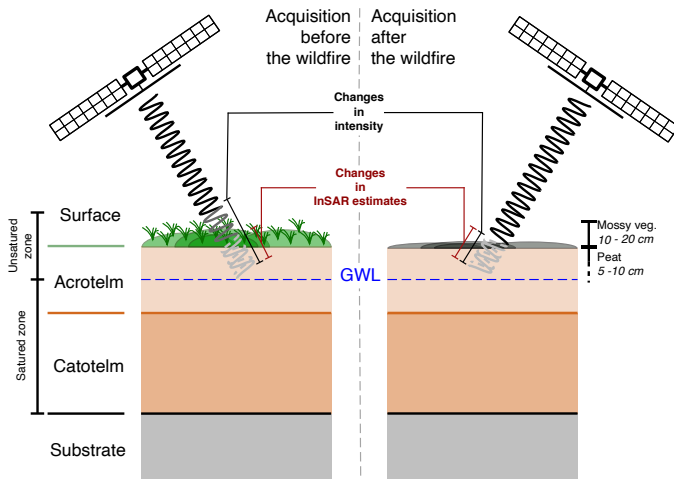
Interpretation and conclusions

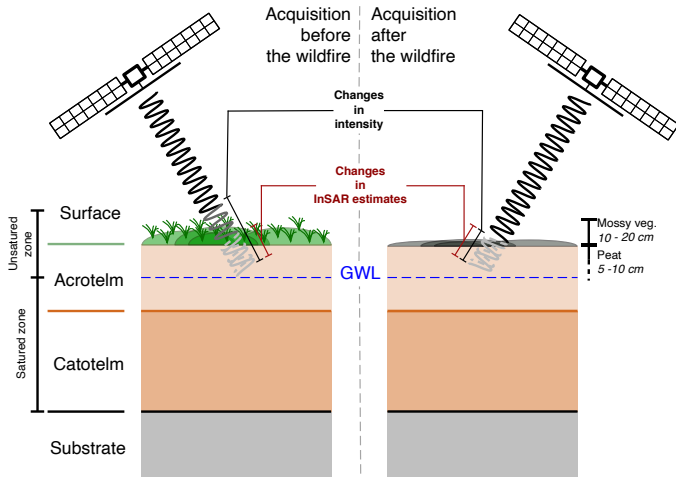


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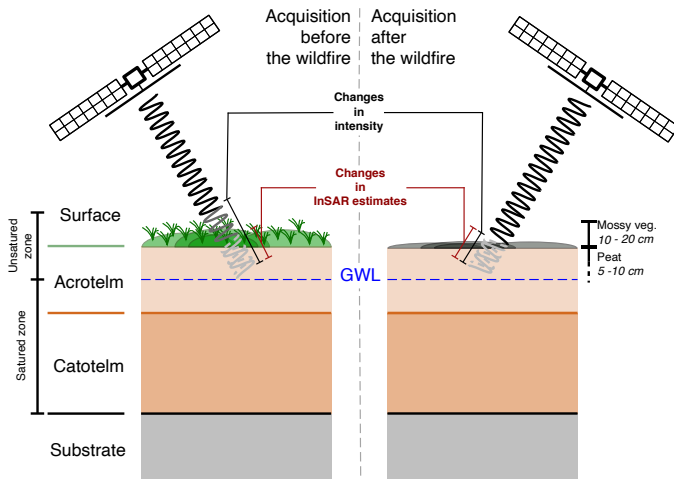
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InSAR-derived displacements

InSAR-derived motions of peat surface correlated with variations of shallow water table and weather conditions.

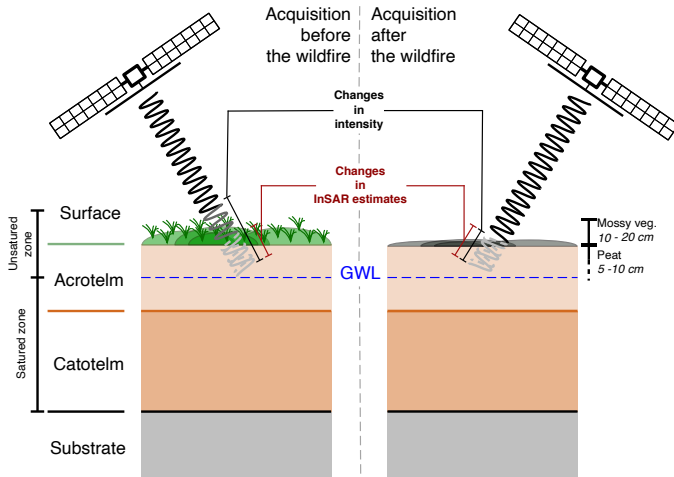


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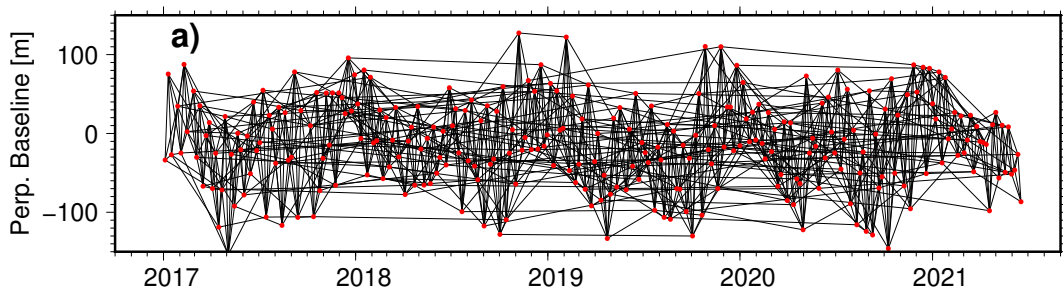
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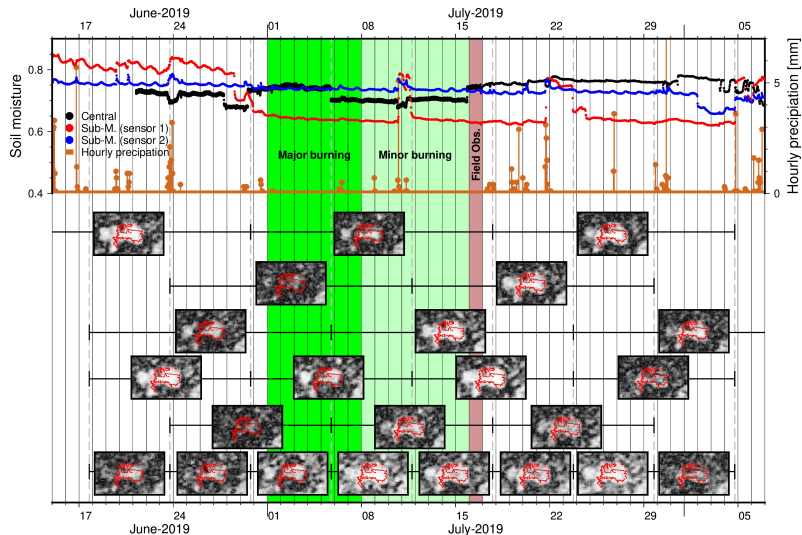
SAR Intensity

SAR intensity related to both changes in soil moisture and vegetation.

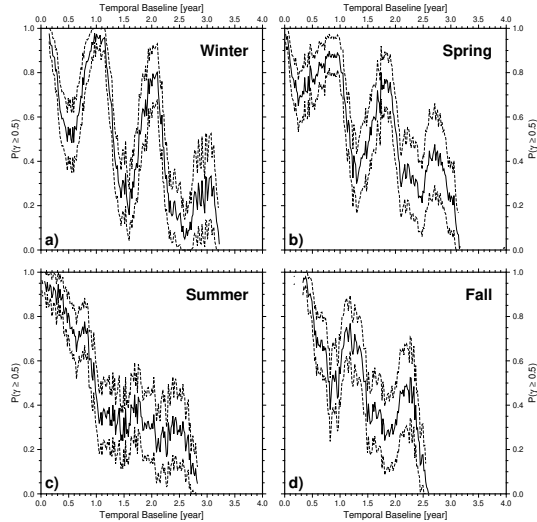
Figures



Temporal evolution of the InSAR coherence



Probabilities on InSAR coherence



Closure phases

