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Speleothem paleoenviromental reconstructions: novel proxies and applications

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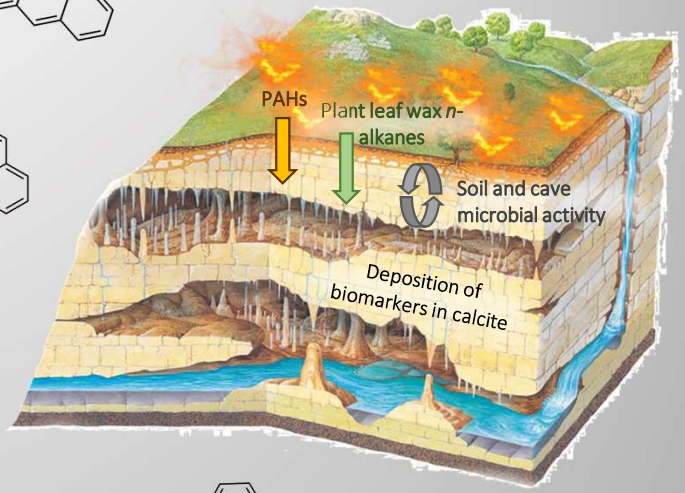
Roma, 22 – 24 settembre 2021

Development of a High-Resolution, Multi-Century Paleo-Fire Reconstruction from Tropical Australian Stalagmites

- Polycyclic Aromatic Hydrocarbons (PAHs) in stalagmites as a **novel proxy** for paleo-fires
- Add also linear alkanes for **vegetation** type and abundance
- Existing records are sparse, low resolutions, not continuous
- Develop a **new analytical method** for organic compounds in inorganic matrix



- Low amount of organic material
- Low concentrations
- High contamination risk
- High amounts of extractable material needed

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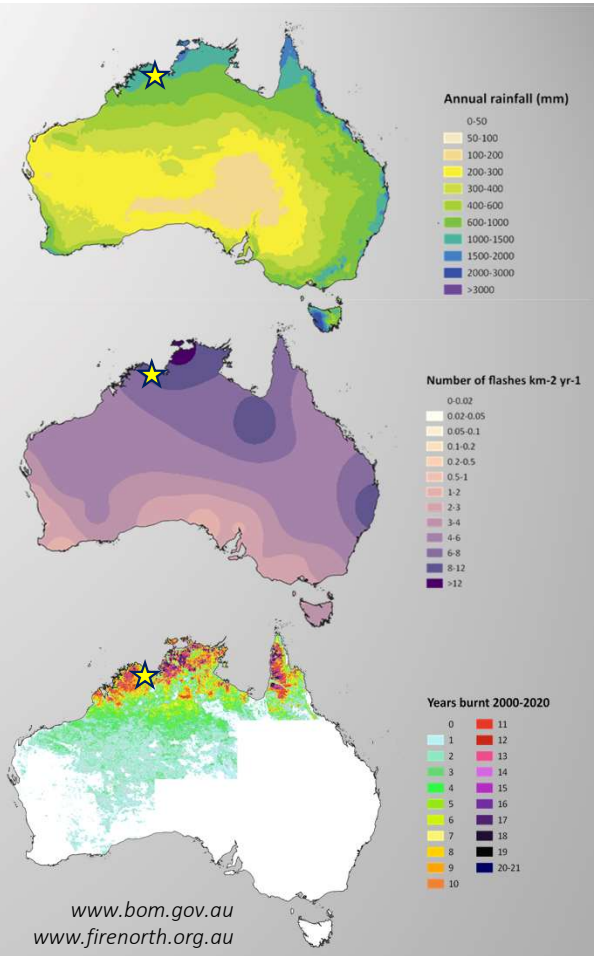
Cave KNI-51

- Kimberley region, **tropical Western Australia**
- **Shallow soil**, organic poor and sparse, exposed and fractured limestone
- Aragonite stalagmites with **fast growth rate** (1-2 mm/yr)
- **High-resolution** U-Th dating
- **High-resolution** $\delta^{18}O$

+ Biomarkers

Fine scale, high resolution **climate-fuel-fire** dynamics in the last millennium



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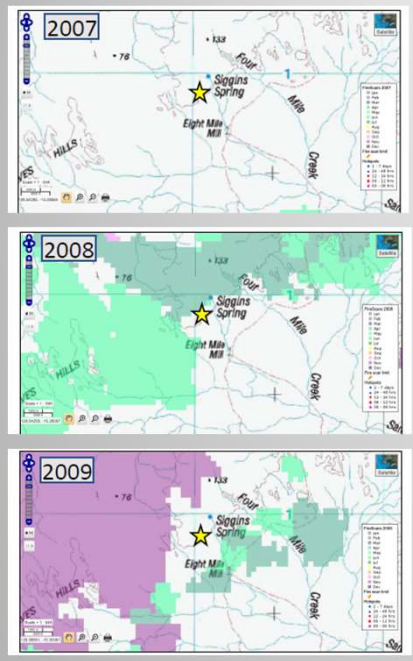
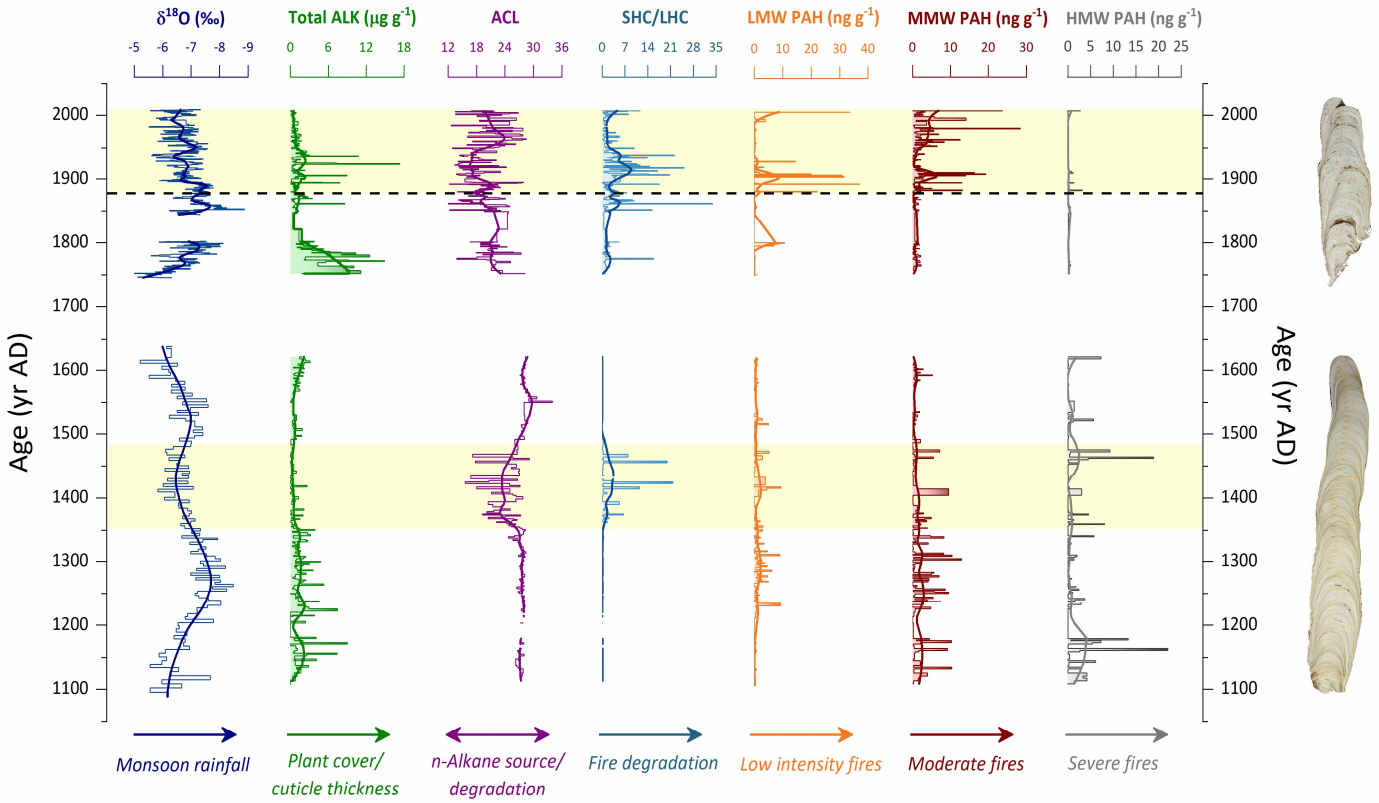
Satellite fire scars by month





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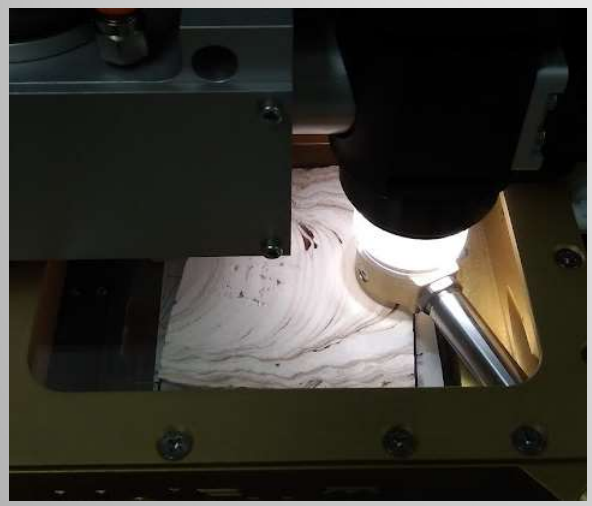
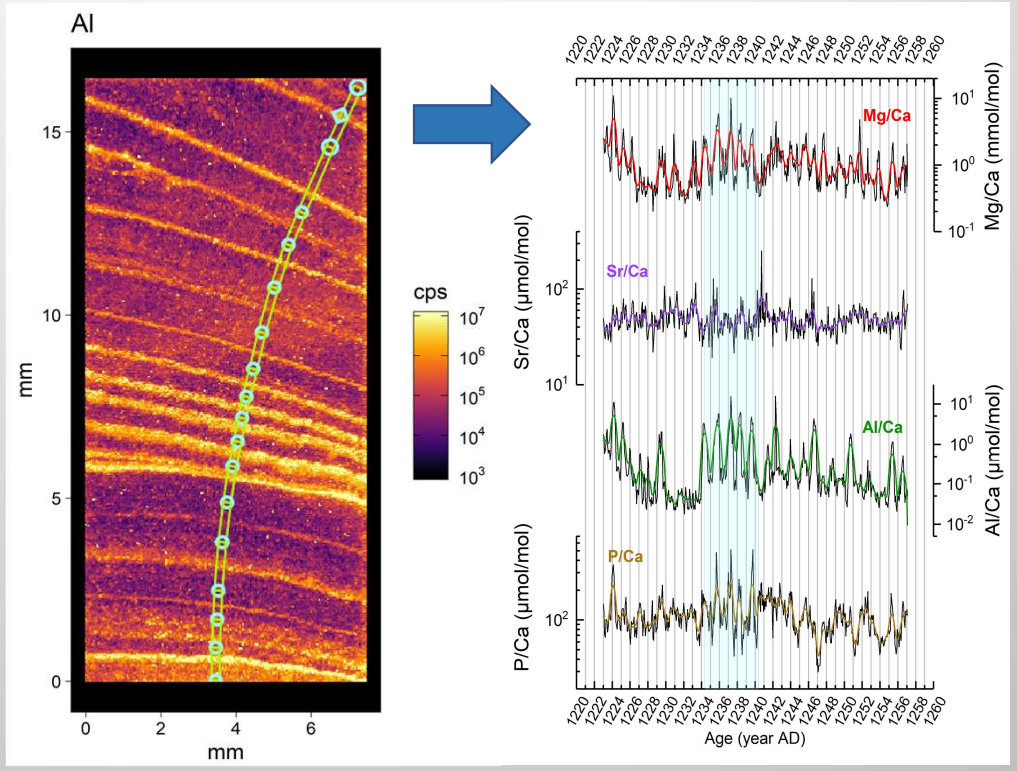
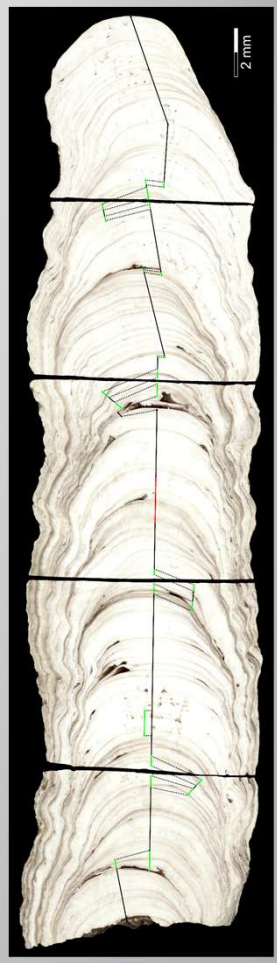
- Combine to **trace elements** as traditional geochemical proxies…
- … but in high (sub-annual) resolution thanks to LA-ICP-MS imaging

KNI-51-16-4







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