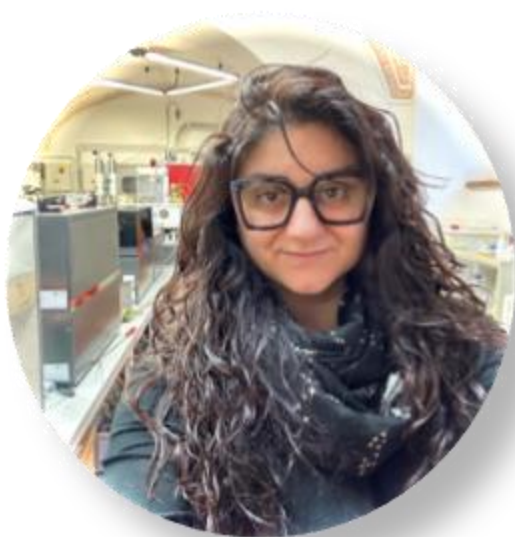


Comparing C and N stable isotopes analysis between urban and peri-urban Mediterranean parks along a latitudinal transect

I. Tunno¹, A. Scartazza², M. Micali¹, S. Portarena³, C. Calfapietra³, G. Guidolotti³, D. Papale¹



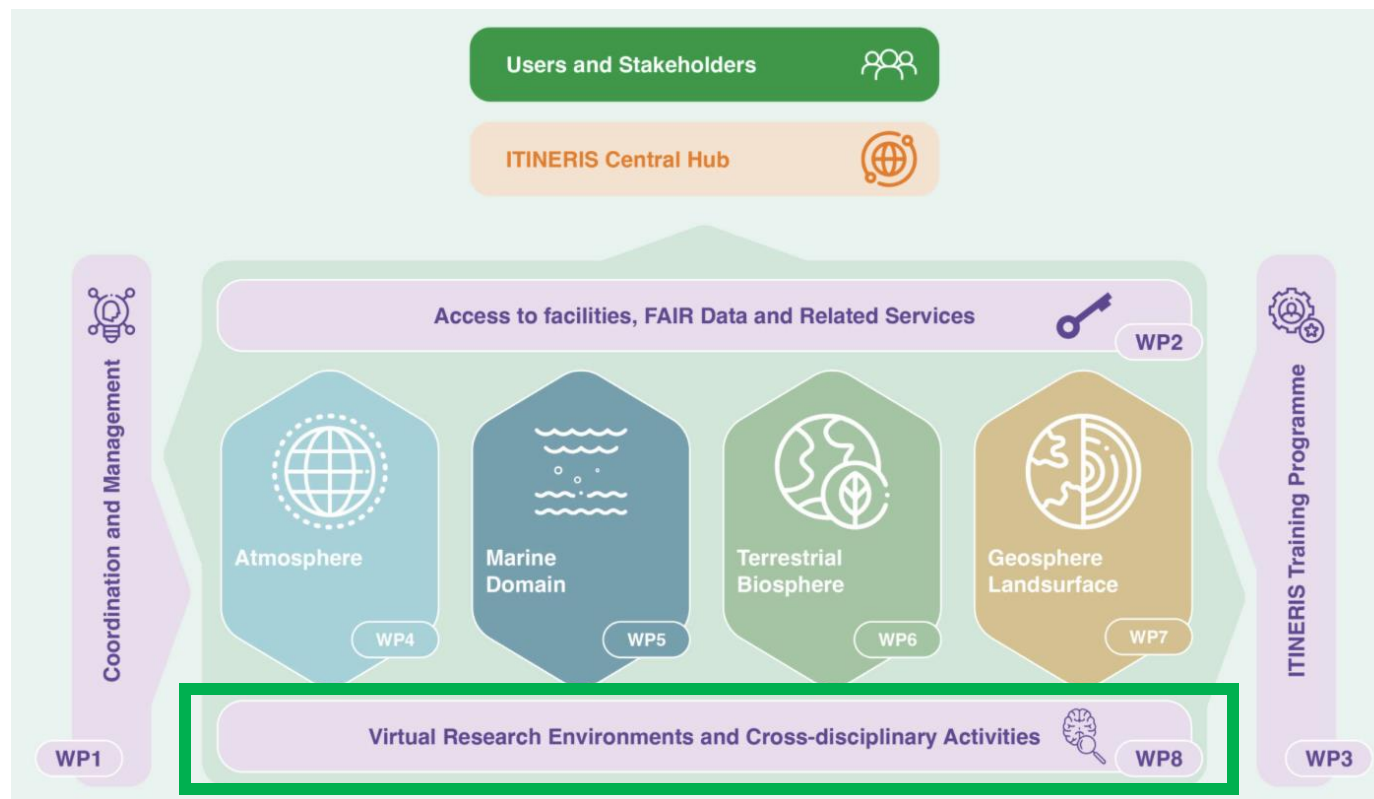
¹CNR – IRET Montelibretti (RM) Italy,

²CNR – IRET Pisa (PI) Italy,

³CNR – IRET Porano (TR) Italy

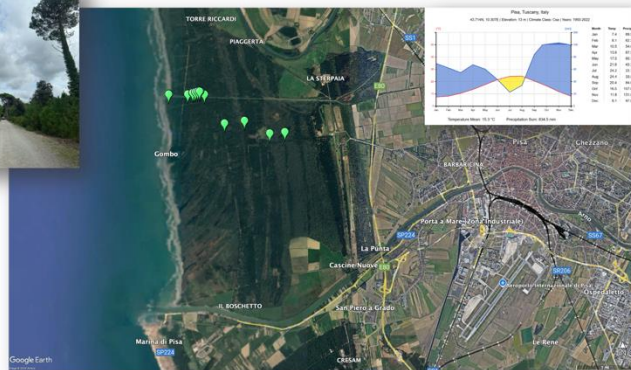


Italian integrated environmental research infrastructures system



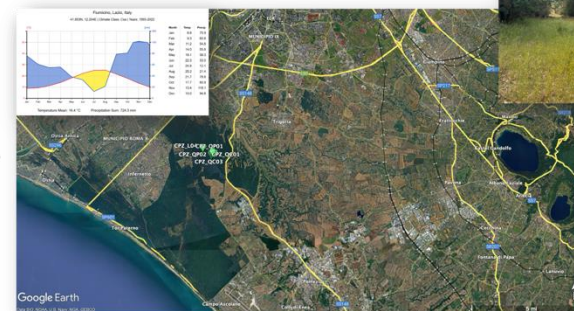
<https://itineris.cnr.it/about-itineris/the-project/>

Study areas



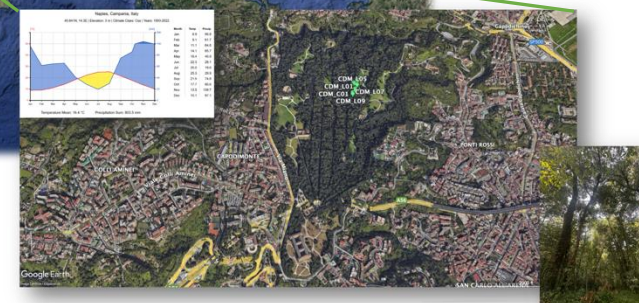
San Rossore (SRS) – Pisa
4m asl, ~8 km from Pisa is a peri-urban park, natural reserve since 1979 and used for recreational purposes for centuries. The vegetation is represented by a mixed deciduous and evergreen species.

Castel Porziano (CPZ) – Rome
25m asl, ~25 km SW of Rome, presidential estate and hunting reserve since 1949. Due to its proximity to Rome, it has been impacted by human activities since Roman time.



Capodimonte (CDM) – Naples
149m asl, is an urban park established in 1700's as a hunting reserve and has been used for recreational activities since then. The vegetation is represented by mixed native and introduced species planted over the centuries.

Among the study areas this site is the most impacted by human activities.



The three sites were selected among the ICOS (Integrated Carbon Observation System) network



Consiglio Nazionale
delle Ricerche

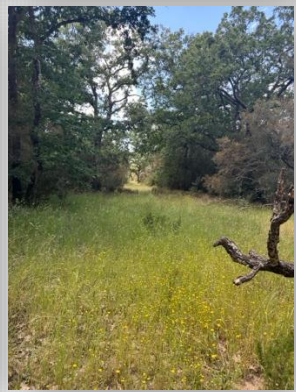
CNR IRET Conference

Rome, February 18th-19th, 2025

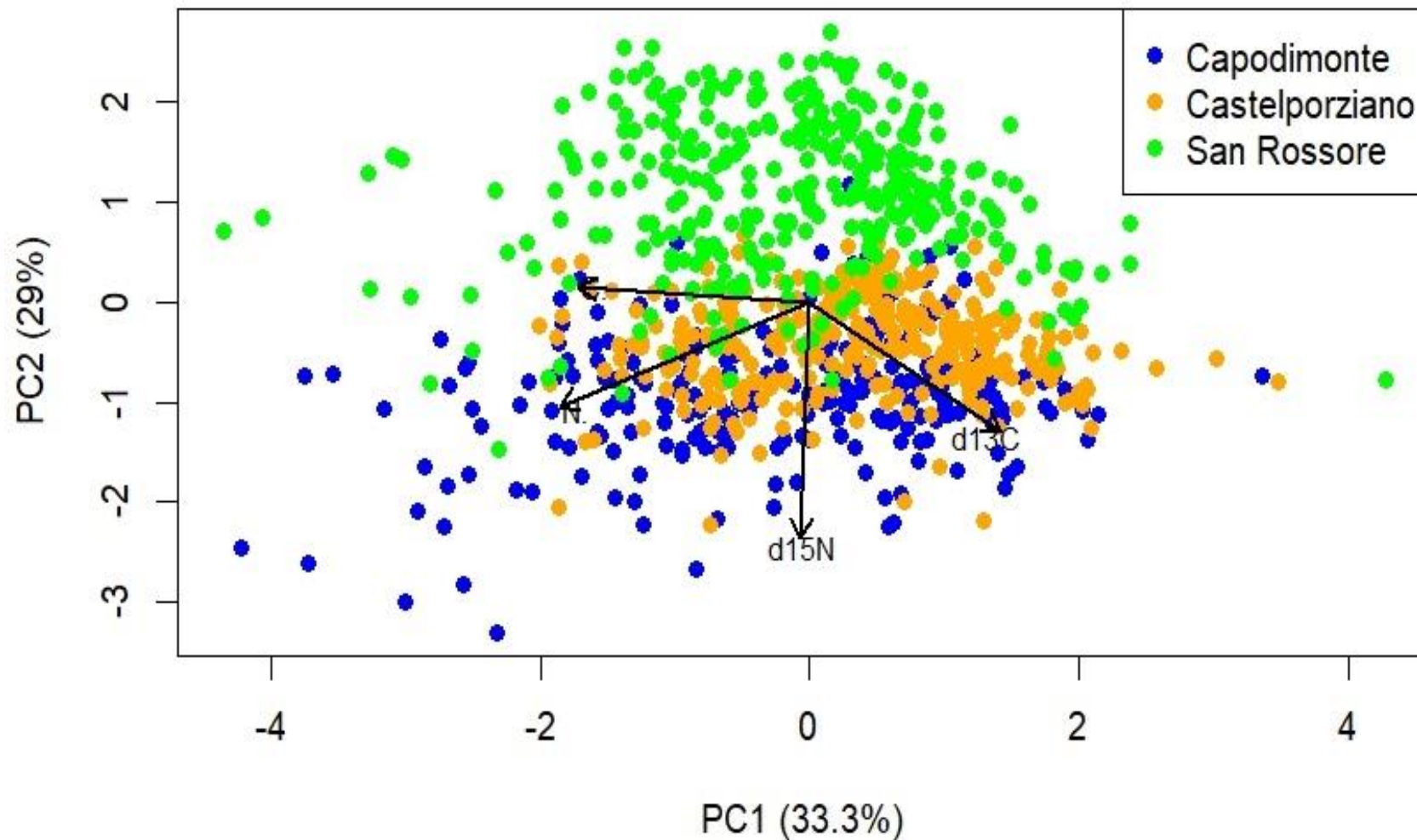


Sampling

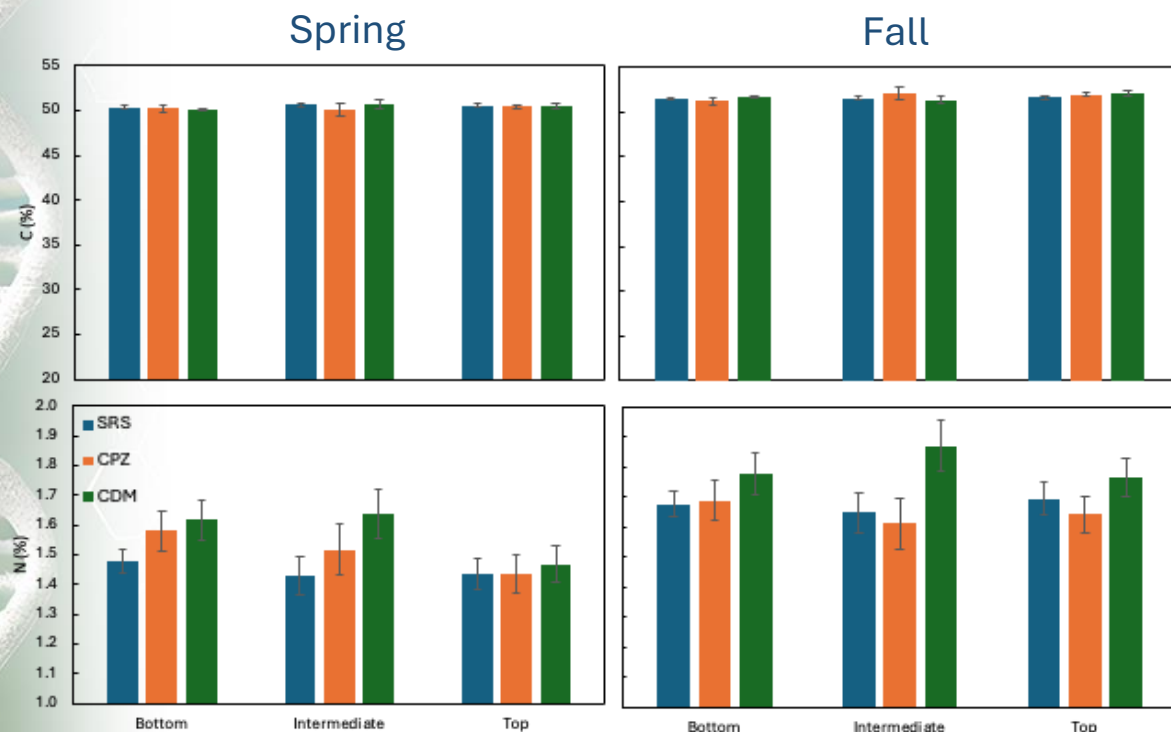
- 2 sampling campaigns (May-Jun and Oct-Nov 2024)
- 3 sites (Capodimonte, Castel Porziano, San Rossore)
- 8 species
- 41 trees
- ~300 samples (vegetation + soil)
- ~1300 subsamples
- ~1000 C %, N%, $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ analysis



Sites separation along the latitudinal transect

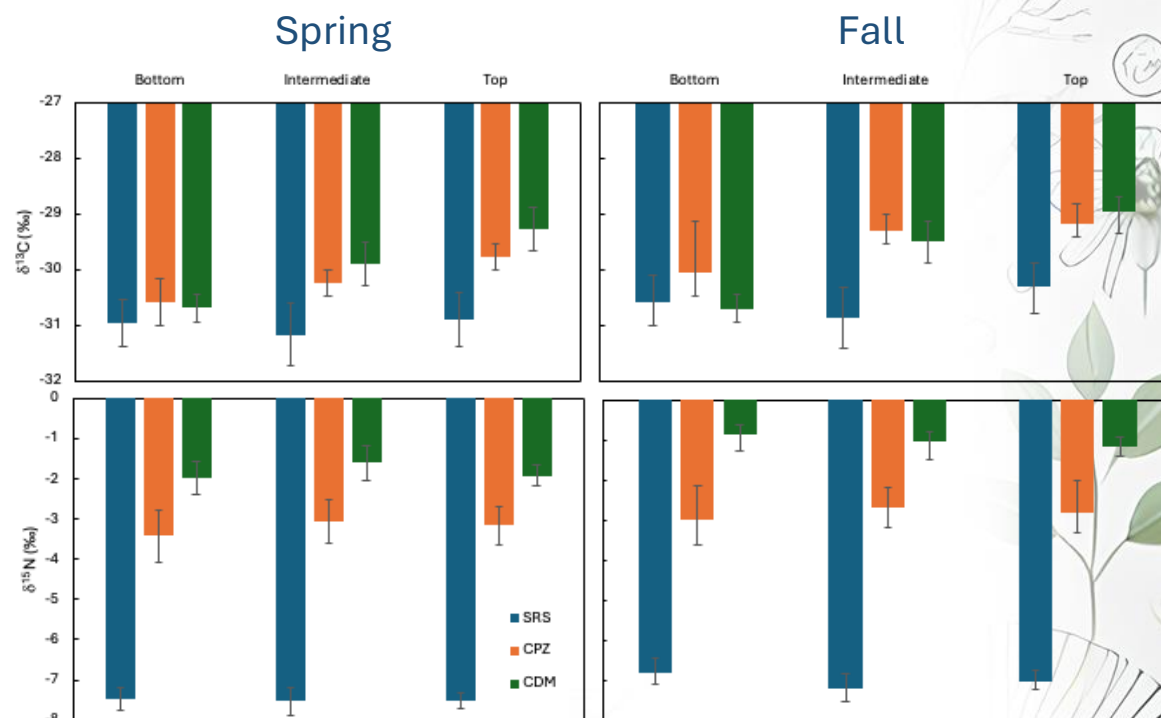


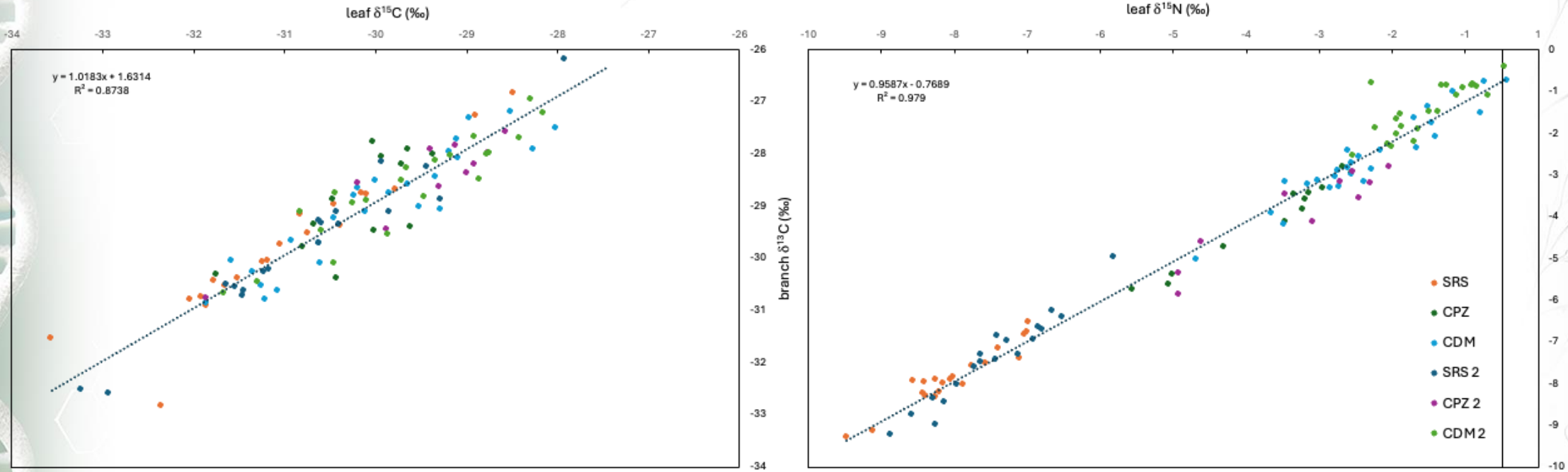
Holm oak (*Quercus ilex*) was chosen as potential bioindicator of environmental changes.



- San Rossore, the most northern site, appears to be less exposed to summer water stress and consequently shows more diluted $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values
- Leaves during the fall showed higher $\delta^{13}\text{C}$ and N concentration compared to spring

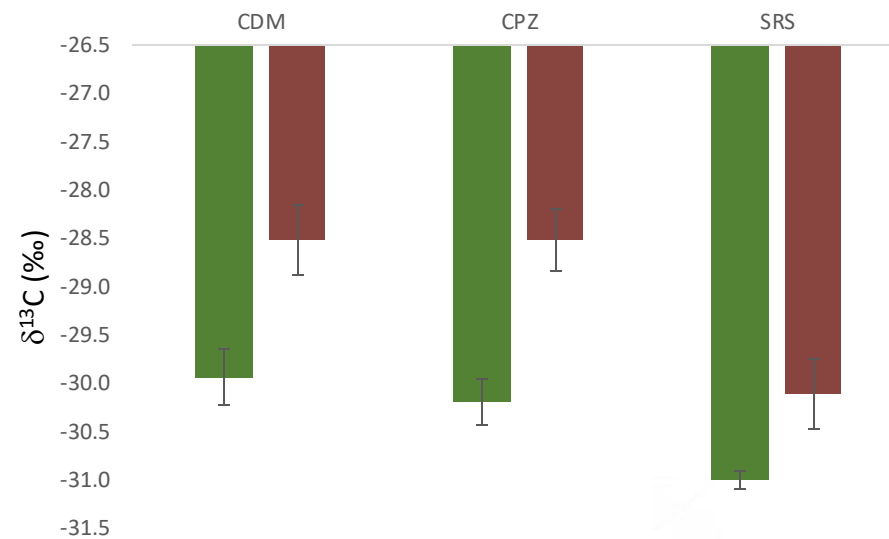
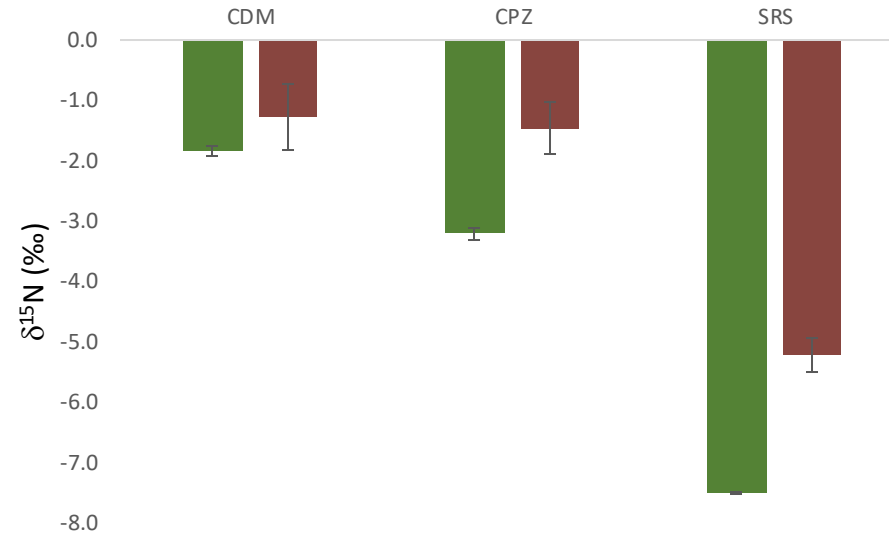
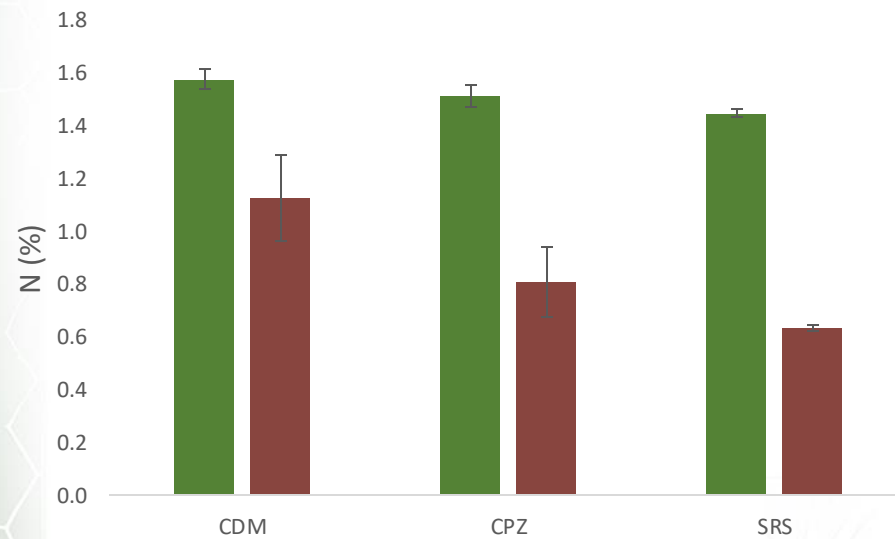
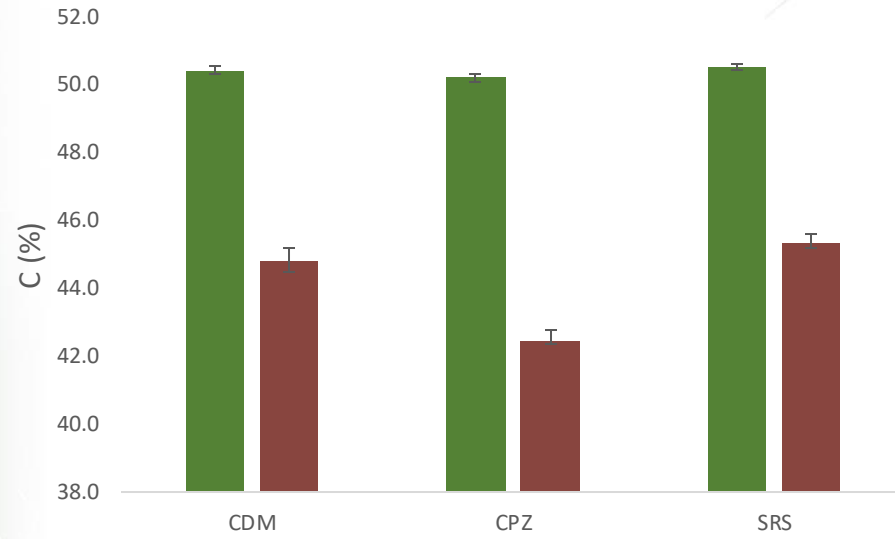
- Differences in C and N concentrations and isotope compositions were observed along the latitudinal gradient and seasons
- Capodimonte, the most southern site, reveals an enrichment in $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ in leaves compatible with a response to hot and dry climate, and a much higher degree of anthropization
- Castel Porziano shows a similar trend but with lower $\delta^{15}\text{N}$ and N concentration



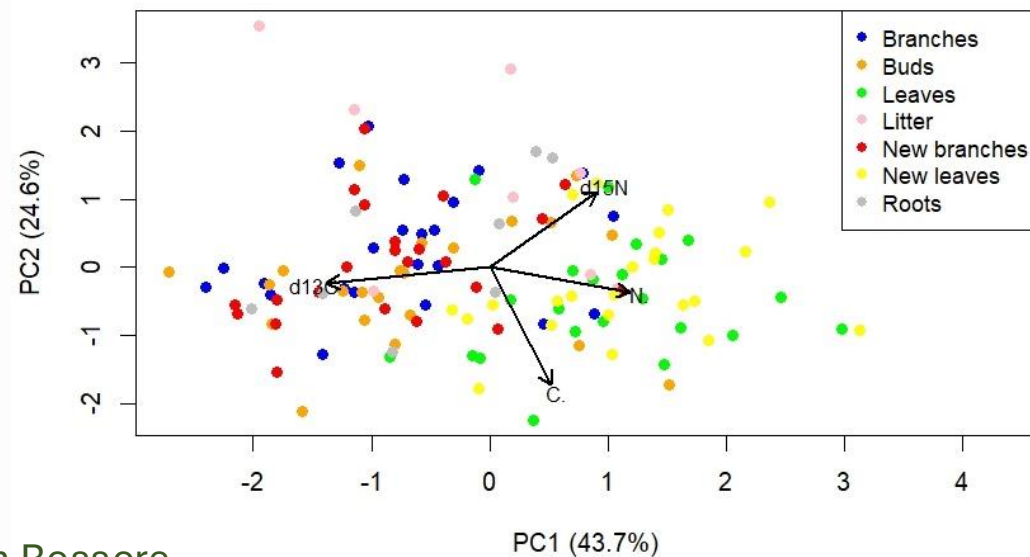
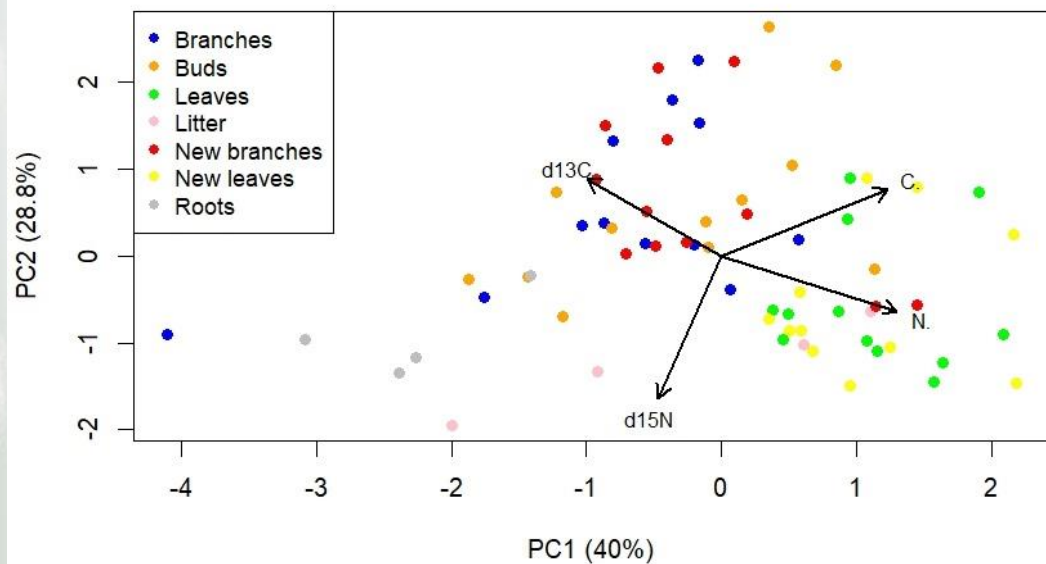


Linear relationships of C and N isotope compositions between leaves and branches show that branches were about 1 ‰ enriched in $\delta^{13}\text{C}$ compared to leaves

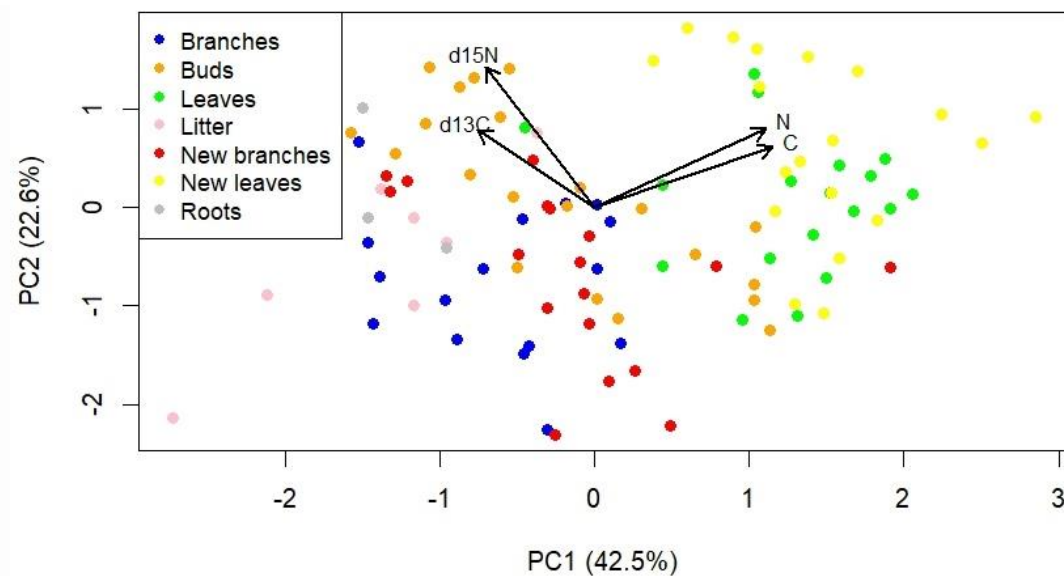
Source vs sink comparison



■ Leaves
■ Roots

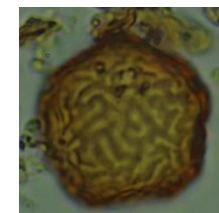
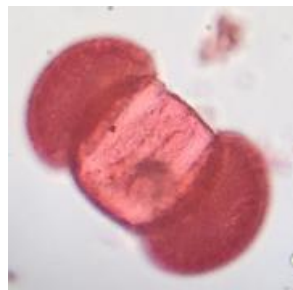


San Rossore





Further analysis are in progress on other plant compounds, including pollen extracts, and soil samples using new methodologies like LA system to better understand the response of Mediterranean species to climate change and human impact



JOURNAL OF QUATERNARY SCIENCE (2019) 1–10

ISSN 0267-8179. DOI: 10.1002/jqs.3103

JQS Journal of Quaternary Science **QRA**
Quaternary Research Association

Stable carbon isotope analysis on fossil *Cedrus* pollen shows summer aridification in Morocco during the last 5000 years

BENJAMIN A. BELL,^{1*} WILLIAM J. FLETCHER,¹ HENK L. CORNELISSEN,¹ JENNIFER F. E. CAMPBELL,¹ PETER RYAN,¹ HELEN GRANT² and CHRISTOPH ZIELHOFFER³

¹Quaternary Environments and Geoarchaeology (QEG), Department of Geography, School of Environment, Education and Development, The University of Manchester, Oxford Road, Manchester, M13 9PL, UK

²Centre for Hydrology and Ecology (C E H), Natural Environment Research Council (NERC) Life Sciences Mass Spectrometry Facility (LSMSF), Library Avenue, Bailrigg, Lancaster, UK

³Institute of Geography, Leipzig University, Leipzig, 04103, Germany

Review of Palaeobotany and Palynology 244 (2017) 128–139



Contents lists available at ScienceDirect

Review of Palaeobotany and Palynology

journal homepage: www.elsevier.com/locate/revpalbo



Stable carbon isotope analysis of *Cedrus atlantica* pollen as an indicator of moisture availability

Benjamin A. Bell^{a,*}, William J. Fletcher^a, Peter Ryan^a, Helen Grant^b, Rachid Ilmen^c

^a Quaternary Environments and Geoarchaeology (QEG), Department of Geography, School of Environment, Education and Development, The University of Manchester, Oxford Road, Manchester M13 9PL, UK

^b Centre for Hydrology and Ecology (CEH), Natural Environment Research Council (NERC) Life Sciences Mass Spectrometry Facility, Lancaster, UK

^c Department of Hydraulic, Environment and Climate (HEC), Hassania School of Public Works (EHTP), Oasis, Casablanca, Morocco



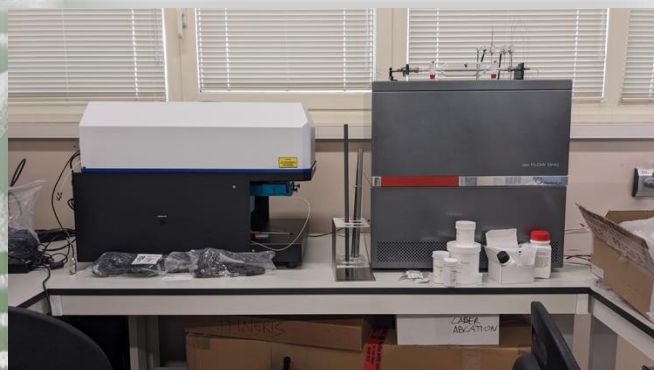
Montelibretti

IRMS Labs

Porano



- IRMS
- PyroCube
- GHG
- IsoFlow Liquiface
- GC
- HPLC



- IRMS
- GHG
- Laser Ablation System
- IsoToc





Thank you!

