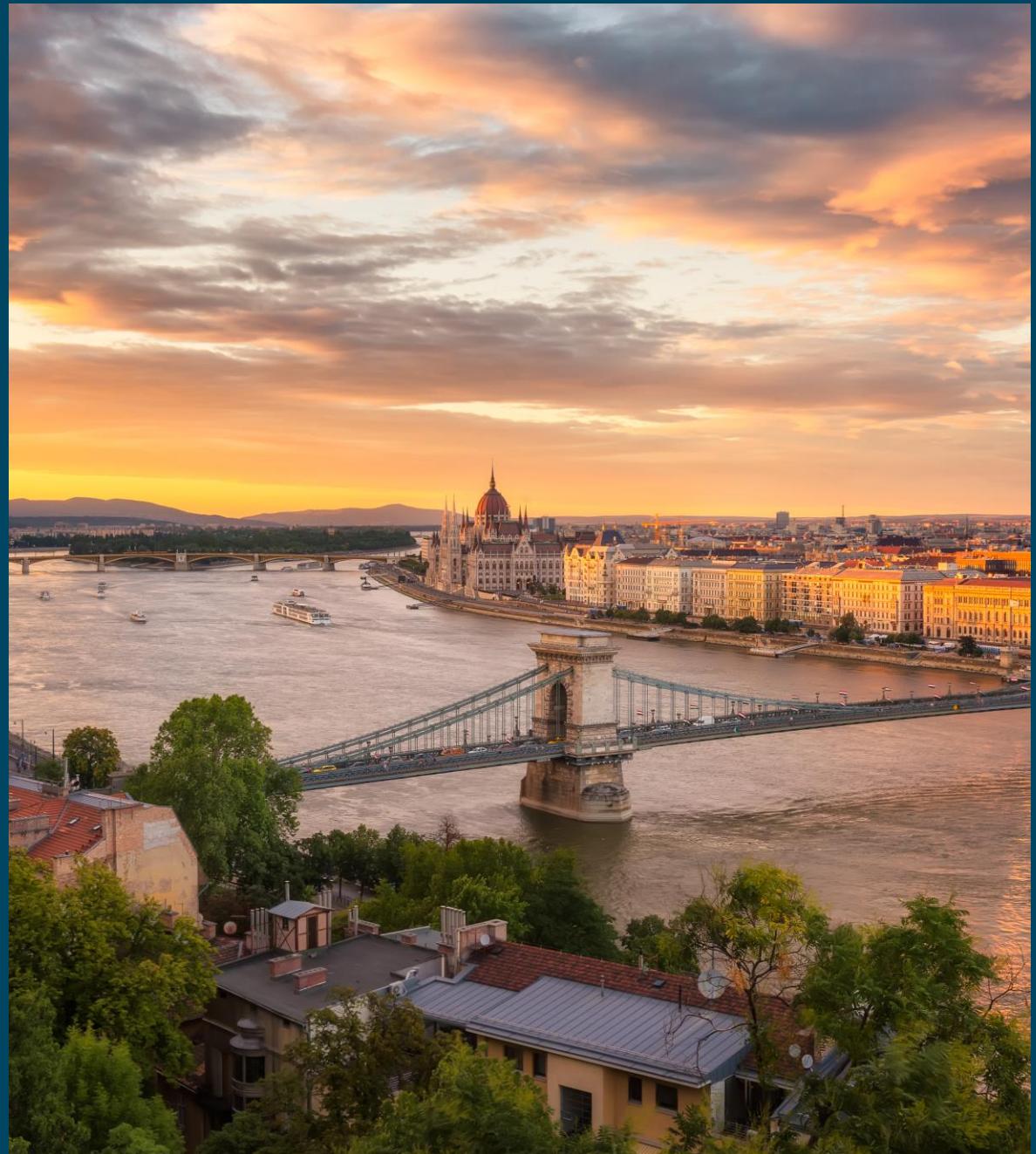


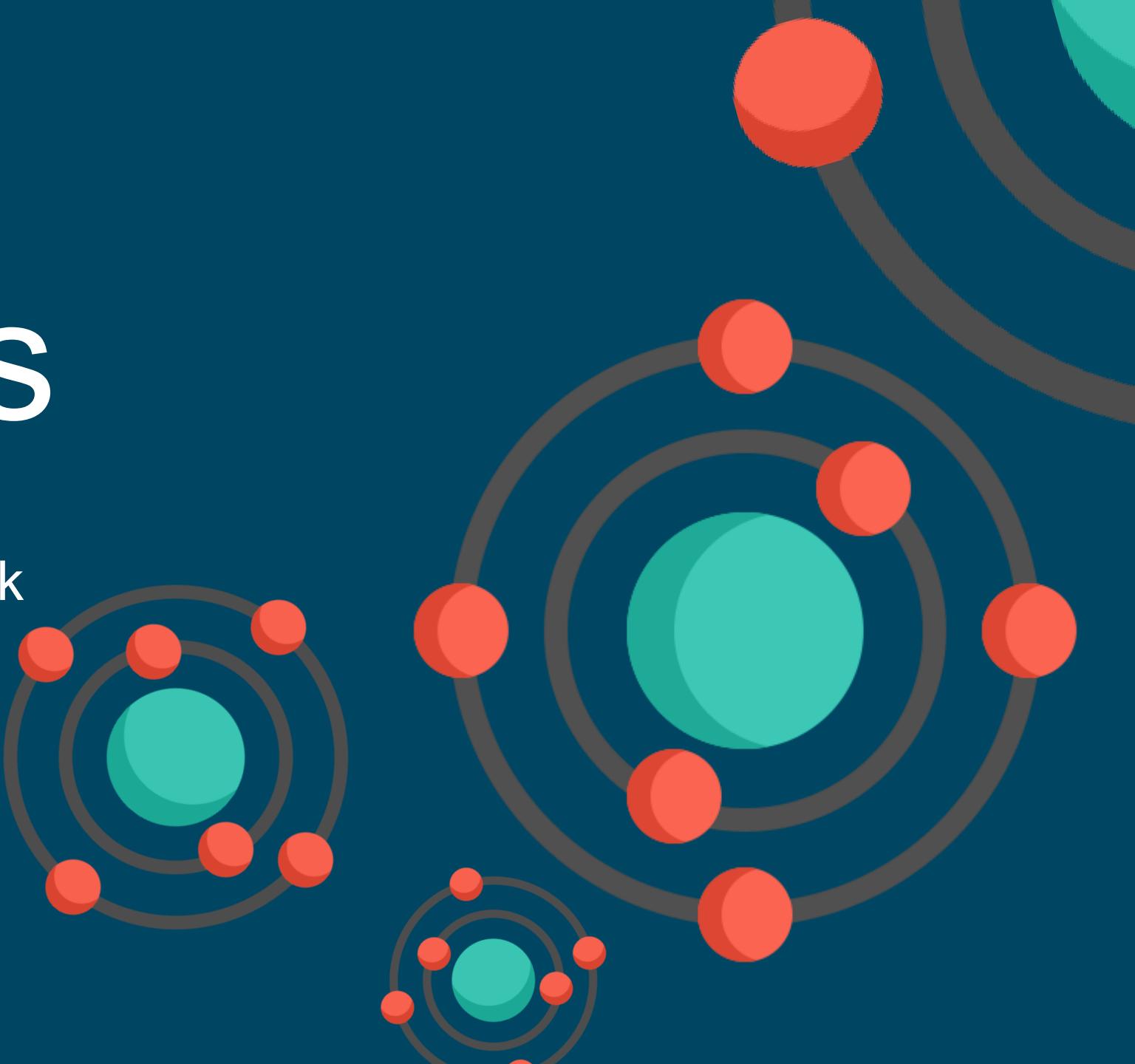
EGY ELEM, HÁROM IZOTÓP: SZÉNIZOTÓPOS VIZSGÁLATOK A METEOROLÓGIA SZOLGÁLATÁBAN

Varga Tamás
PhD



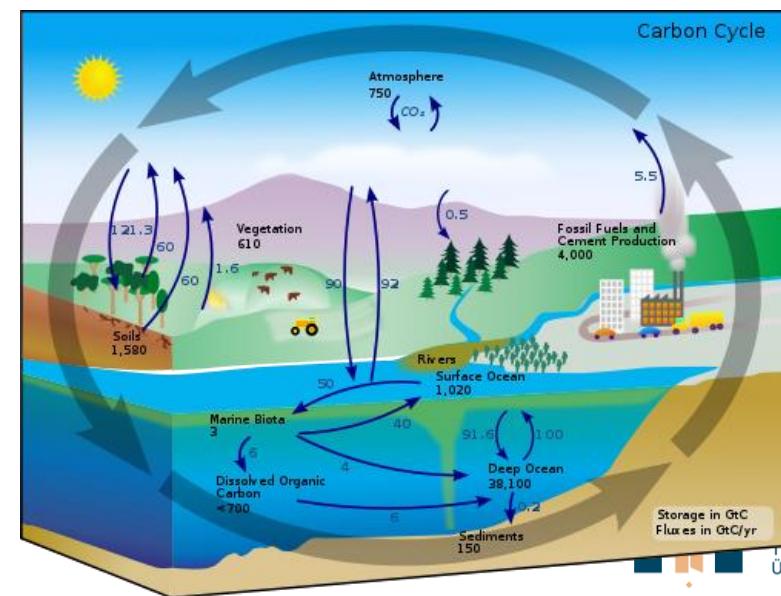
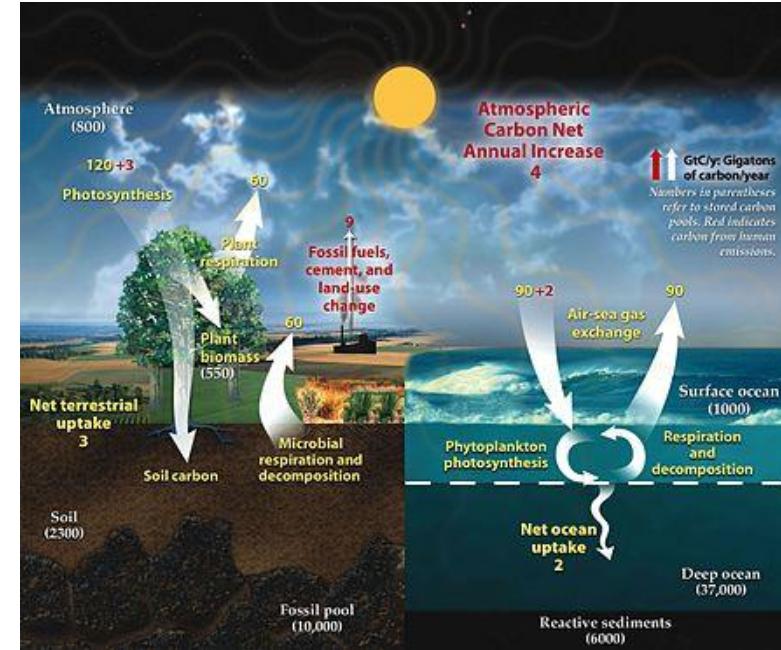
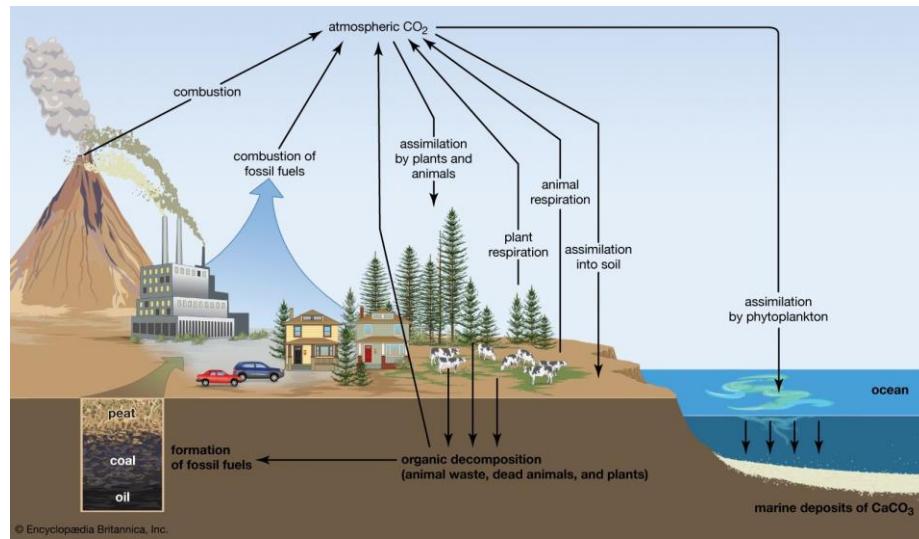
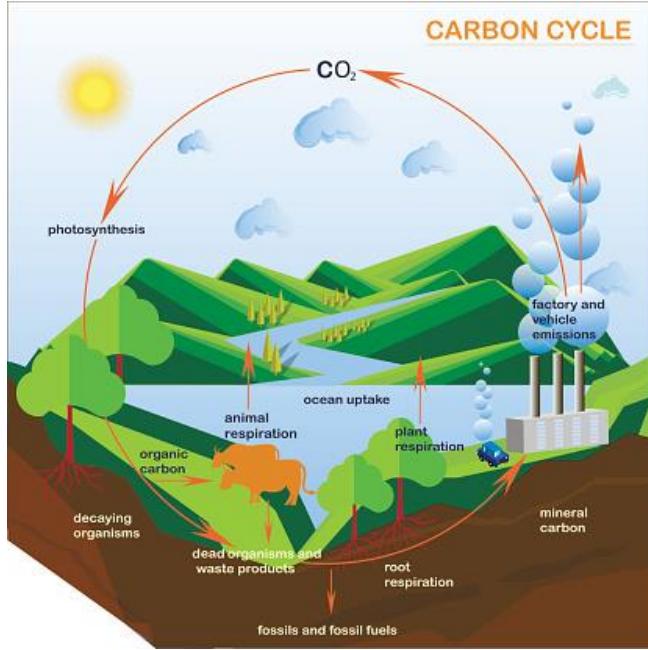
Áttekintés

- Bevezetés
- Alkalmazások, hazai példák
- COVID-19 hatása
- ICOS hálózat



Bevezetés

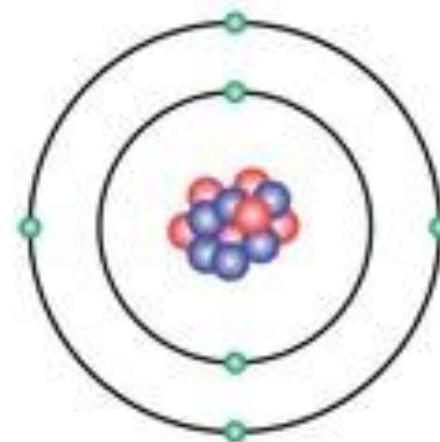
C A R B O N C Y C L E



Természetes szén izotópok

Stabilizotópok

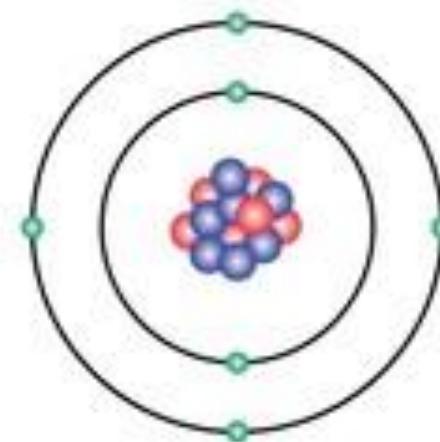
Carbon 12



**6 Protons
6 Neutrons**

98,9 %

Carbon 13

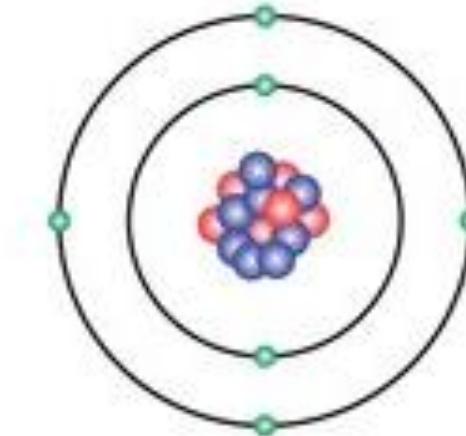


**6 Protons
7 Neutrons**

1,06 %

Radioaktív izotóp

Carbon 14

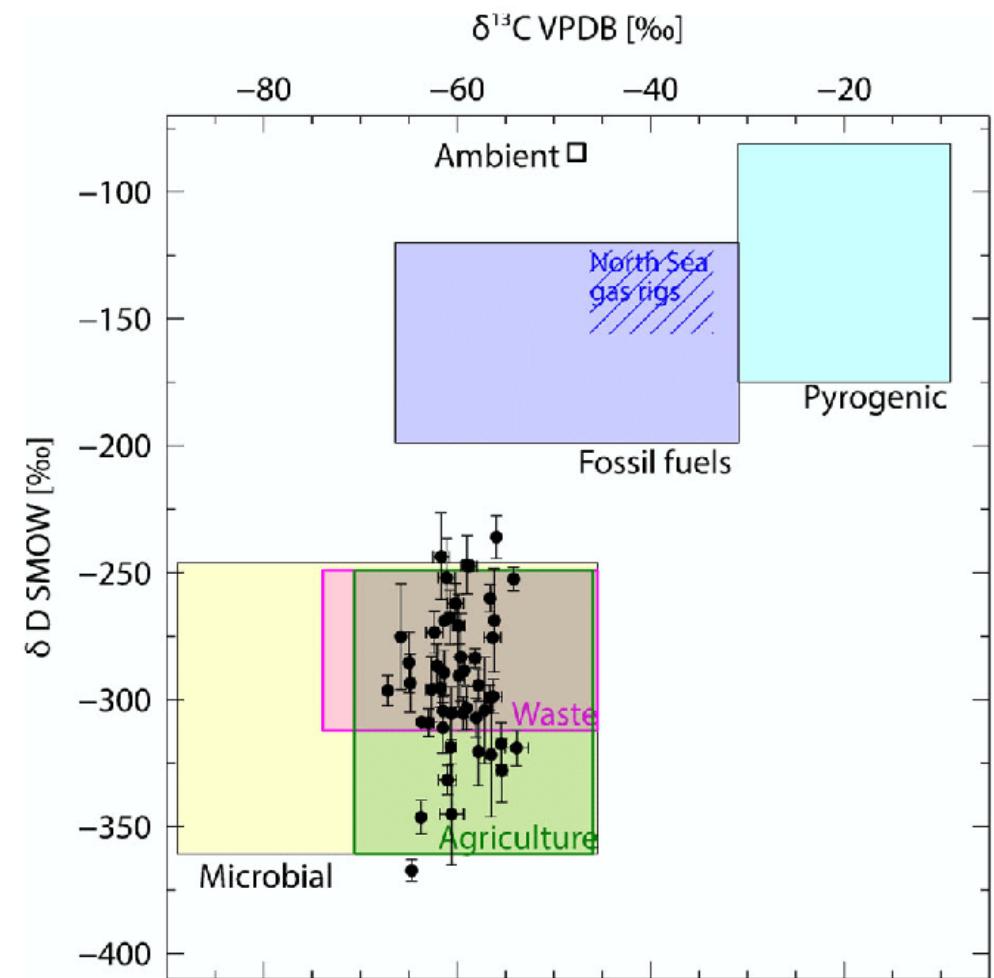
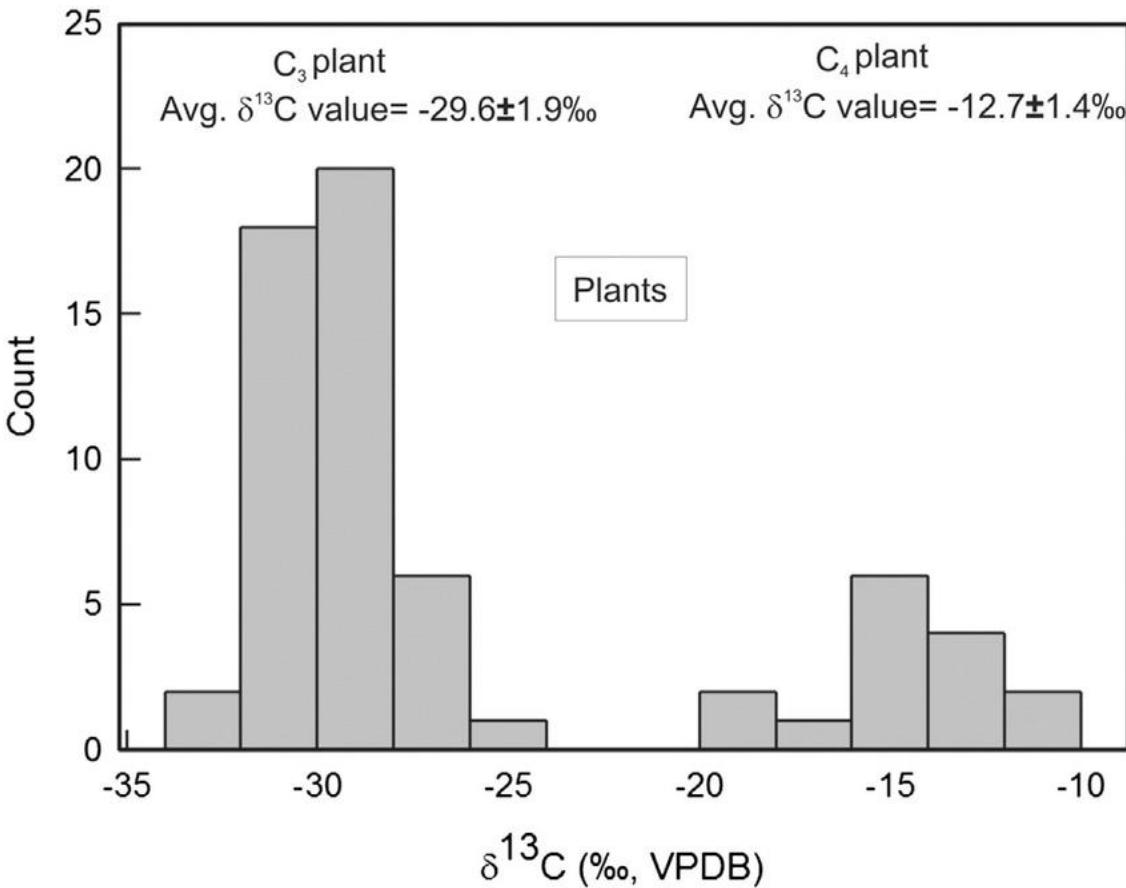


**6 Protons
8 Neutrons**

10^{-12}

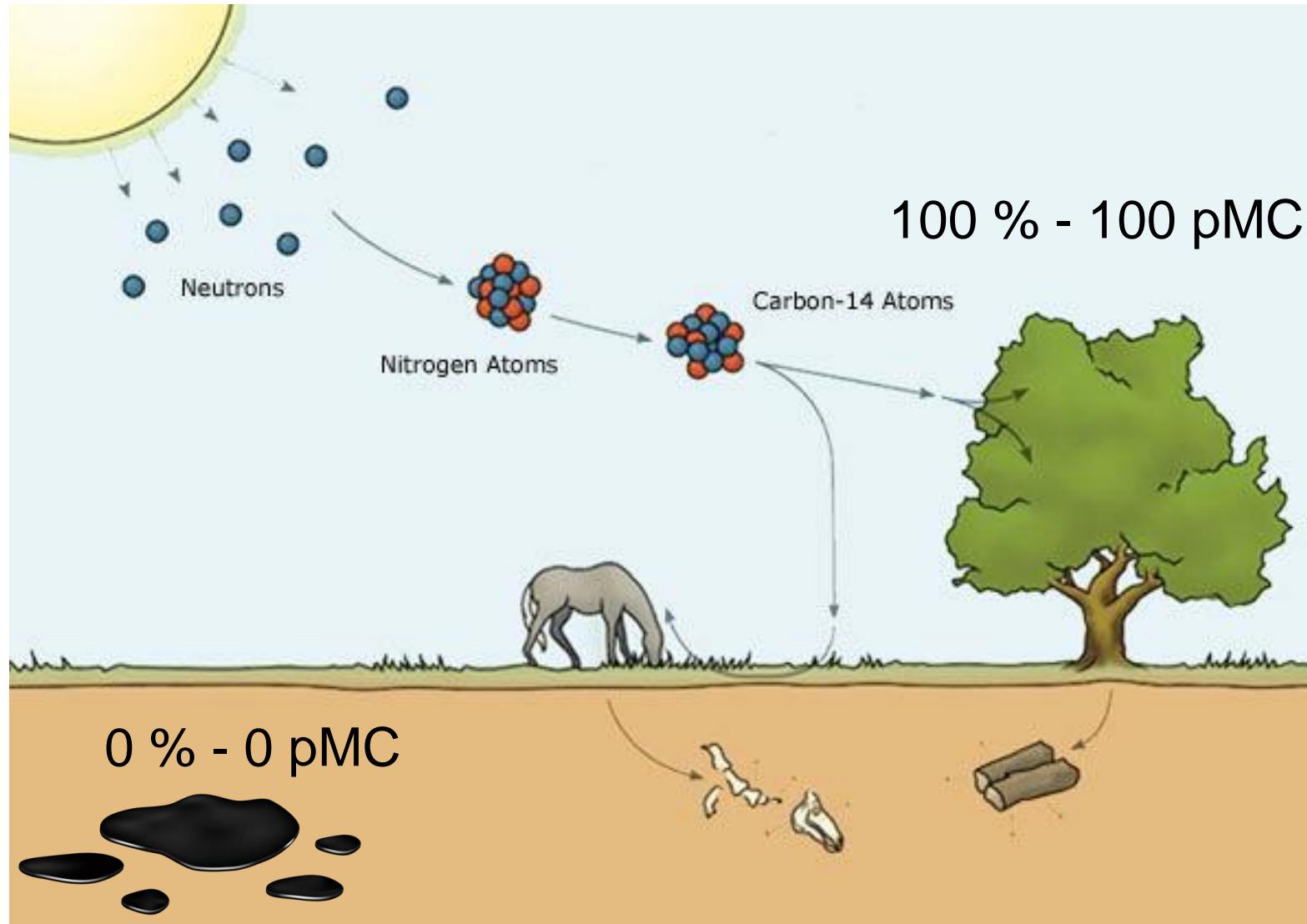
Természetes szén izotópok

Stabilizotópok



Természetes szén izotópok

Radiokarbon



Radiokarbon

Willard Frank Libby
Radiokarbon
kormeghatározás - 1949
Nobel-díj
1960

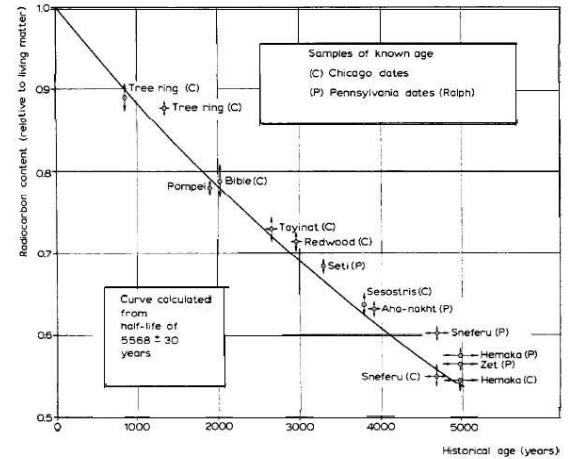


Fig. 3. Curve of Knowns.

Hans Eduard Suess
Suess effektus
1955
Faévgyűrűk

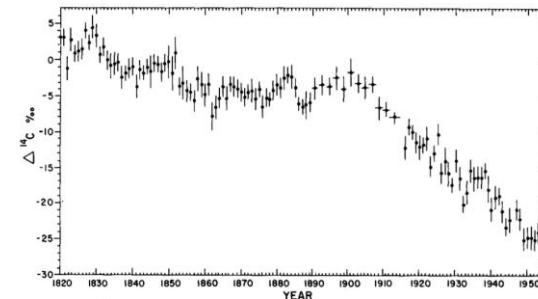
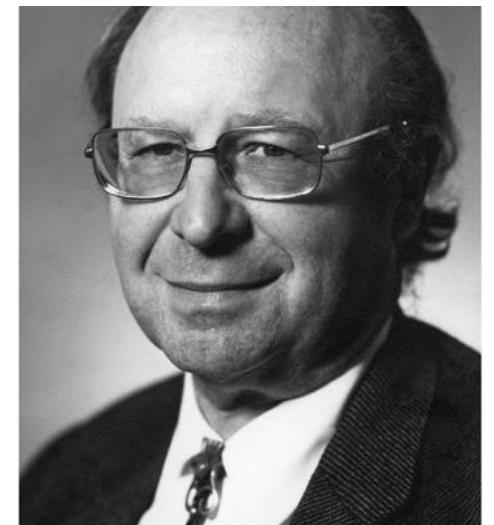


Fig. 2. Atmospheric $\Delta^{14}\text{C}$ levels, derived from tree rings, between 1820 and 1954. Single-year determinations are given, except for the 1890–1915 interval (Table I). The vertical bar denotes one standard deviation. $\Delta^{14}\text{C}$ levels of the 1895–1915 interval probably give an upper limit only (see text).



Alkalmazások

Aeroszolkutatás

Forrásmeghatározás Pozsony



Fig. 1. The sampling location (Comenius University in Bratislava, Slovakia) on a map of Europe.

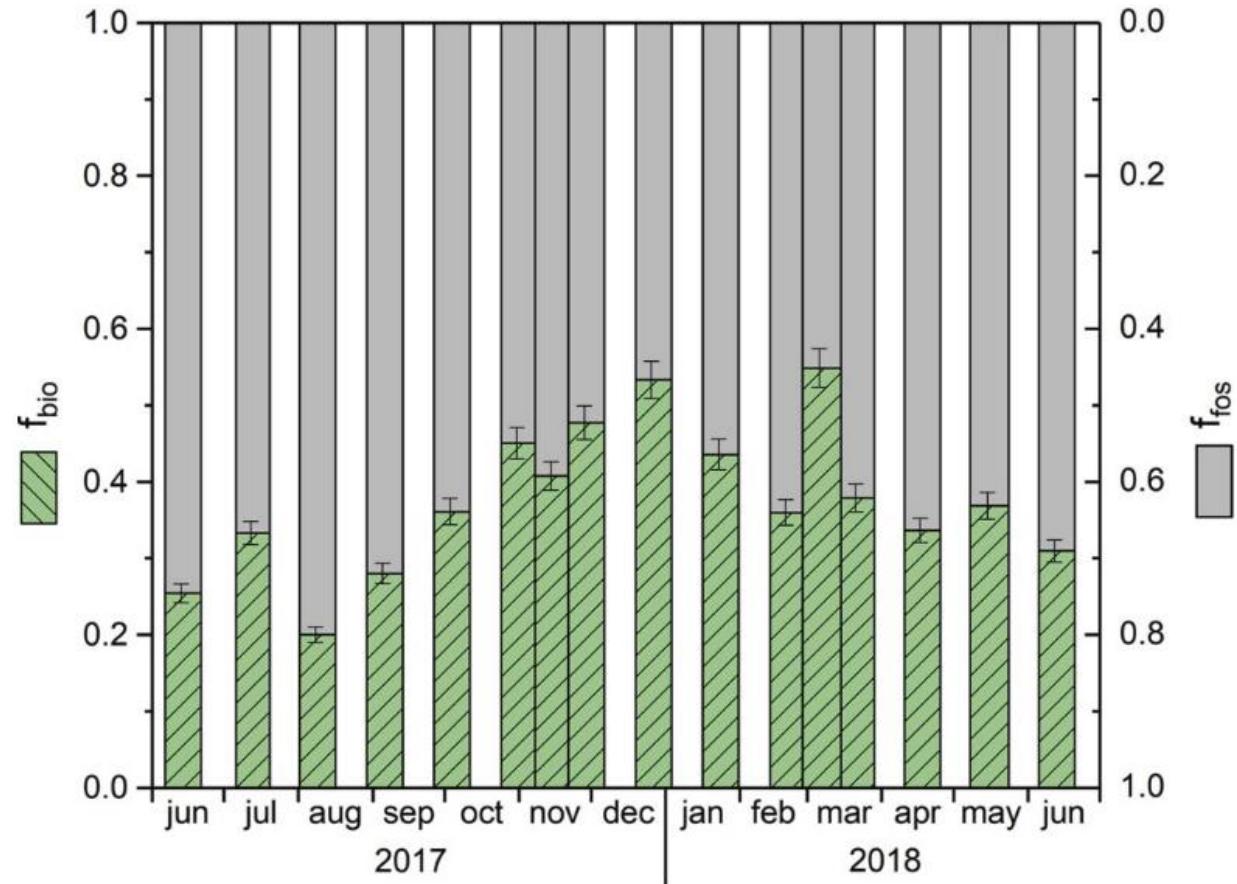
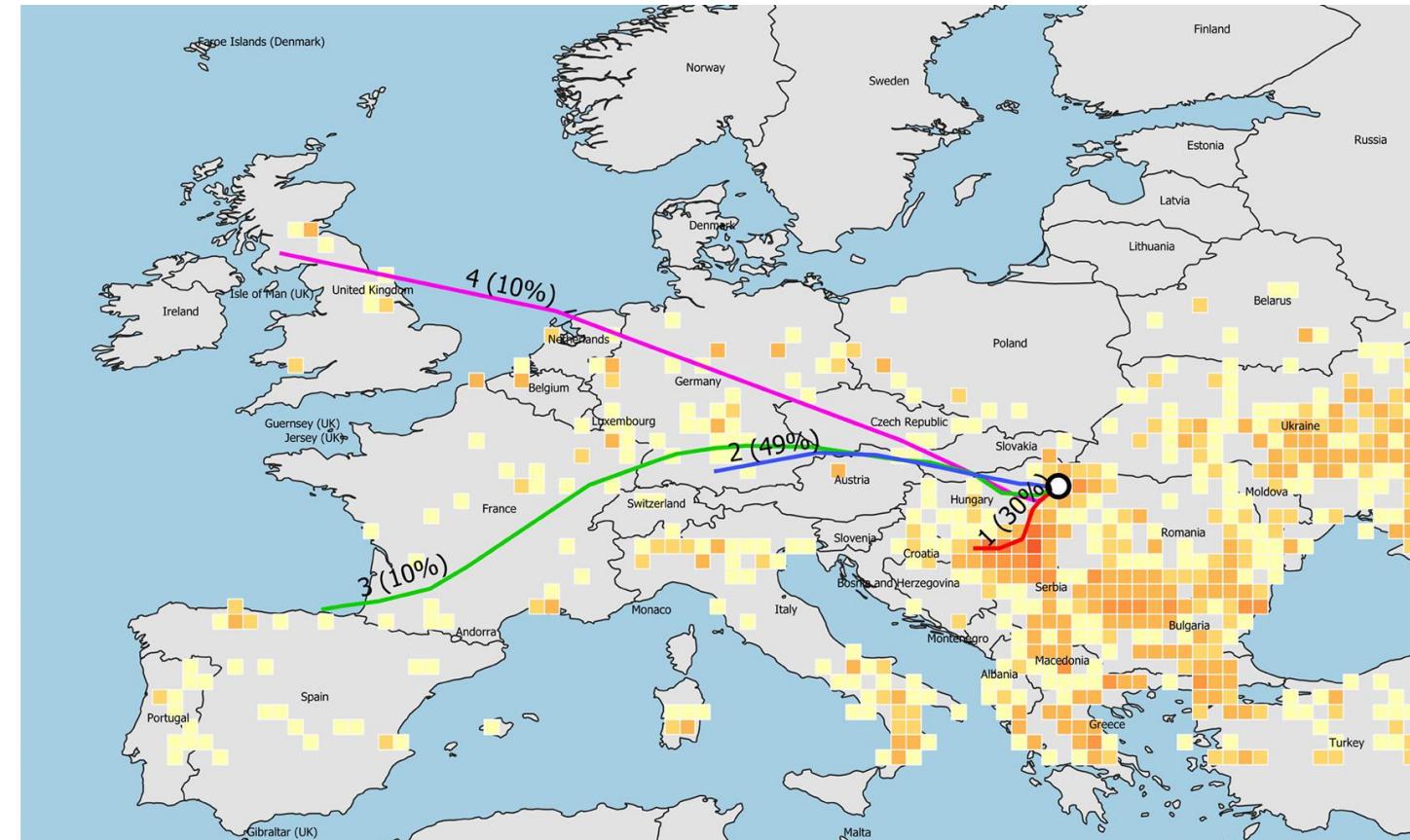
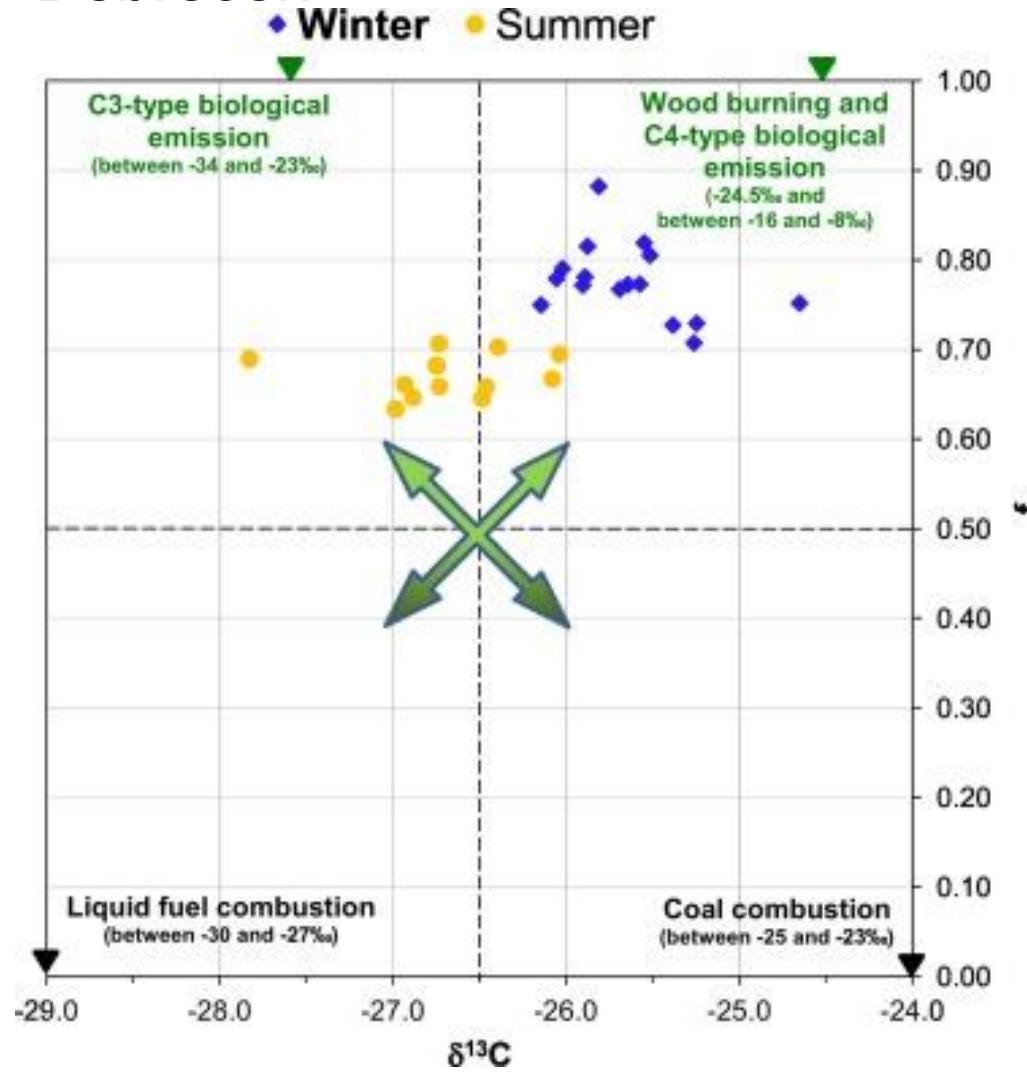


Fig. 4. Results of the source apportionment of EC aerosol fraction in Bratislava air presented as fraction of fossil-fuel derived particles (f_{fos}) and fraction of particles from biomass burning (f_{bio}).

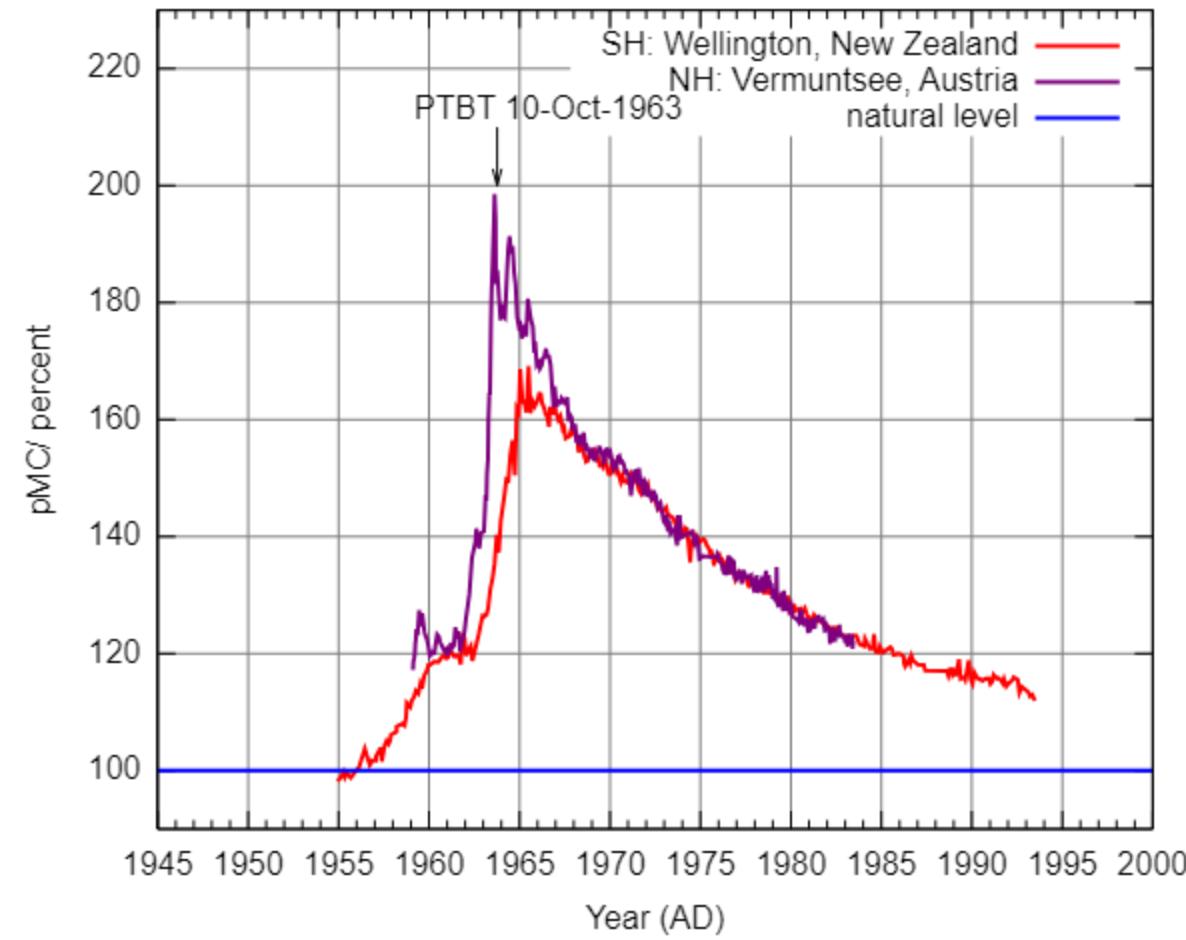
Aeroszolkutatás

Forrásmeghatározás

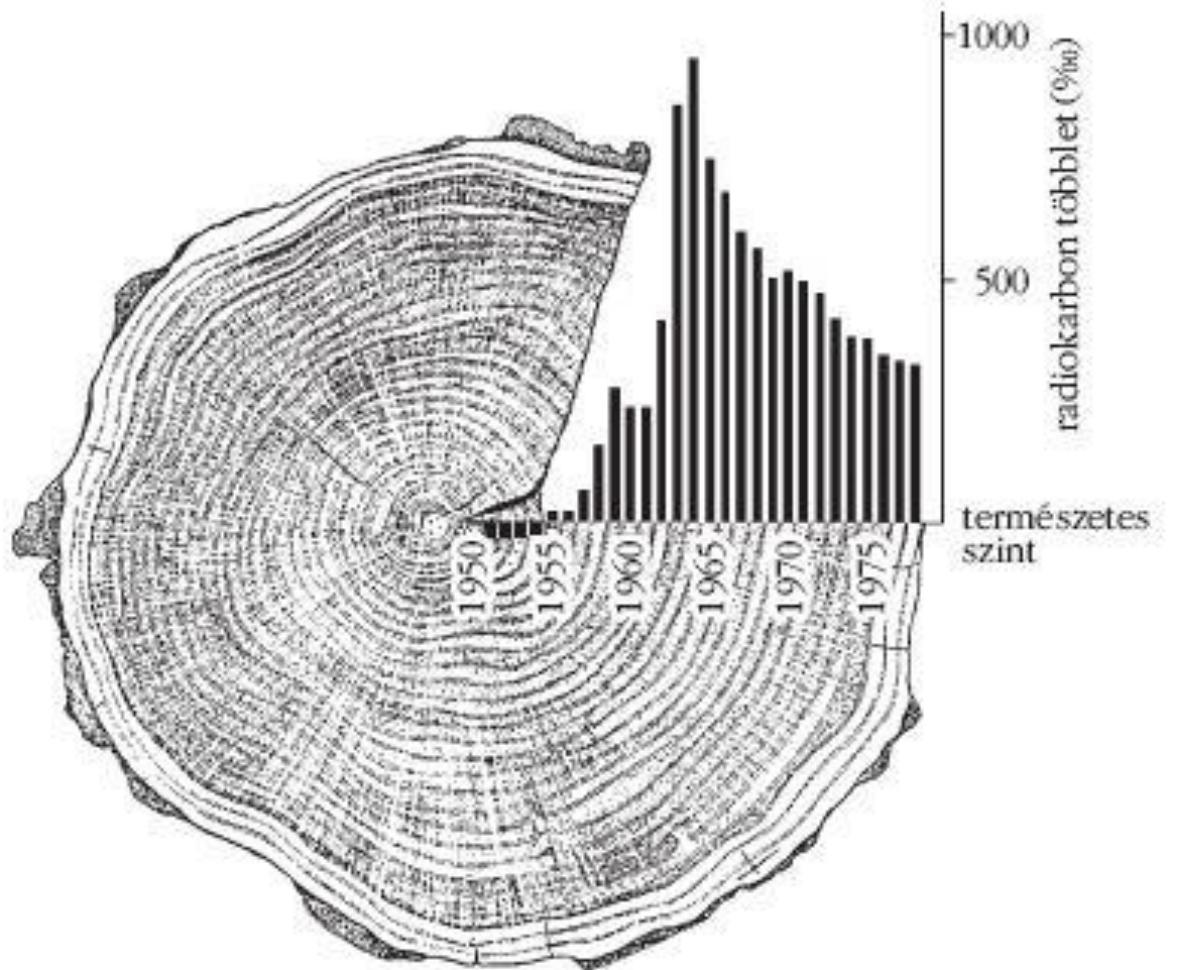
Debrecen



Üvegházhatású gázok

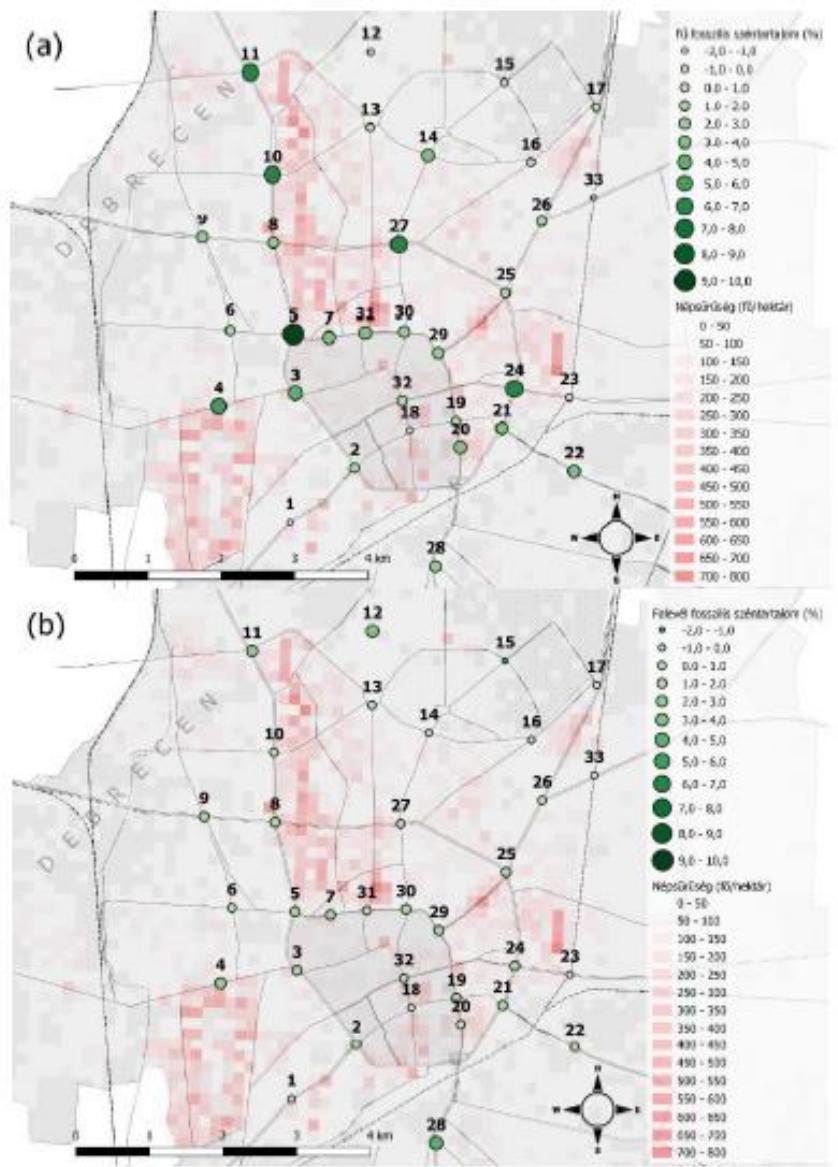


Debreceni faévgyűrűk



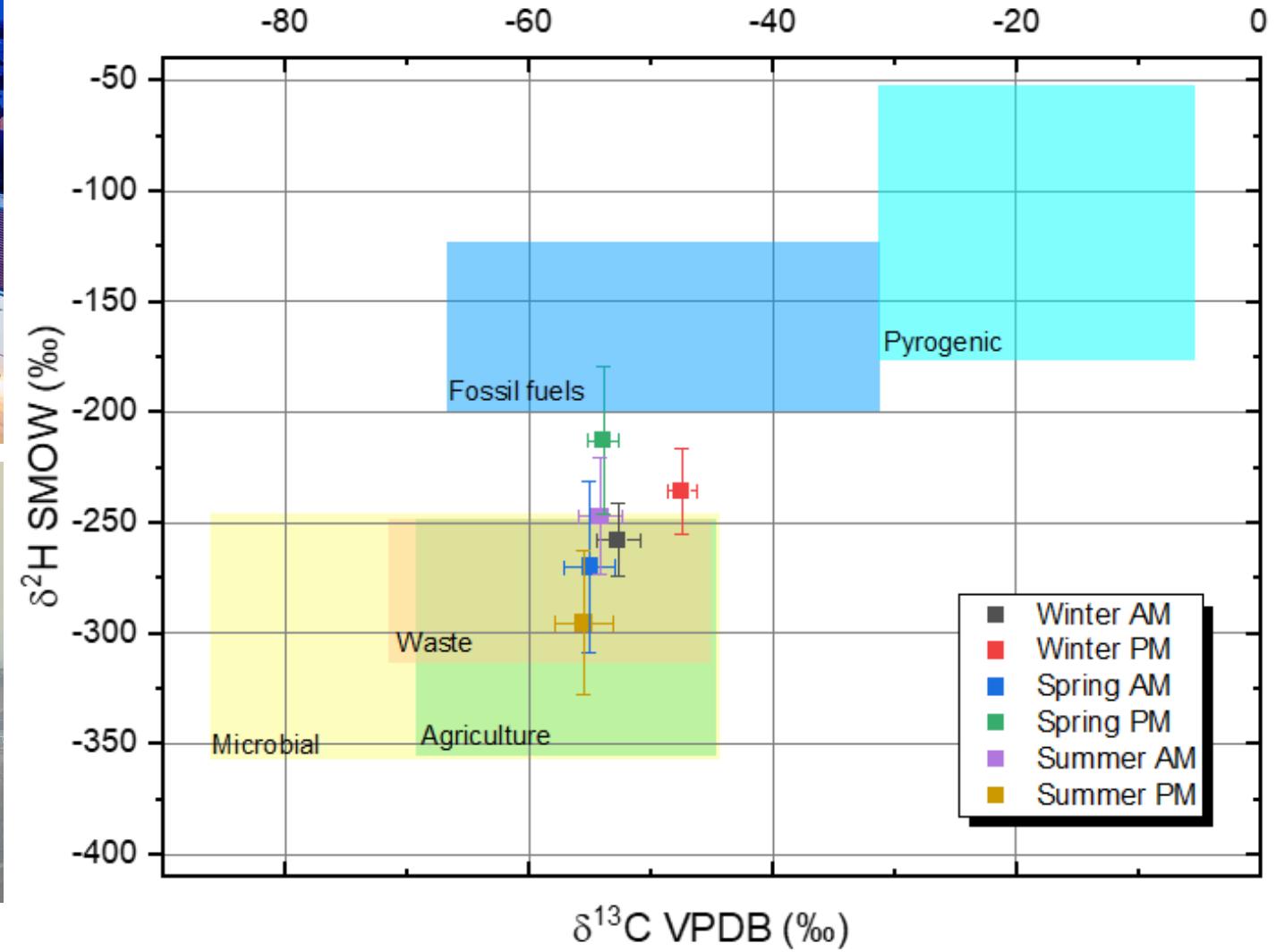
6. ábra. Az atombomba-csúcs egy 1945-ben ültetett és 1980-ban kivágott fa évgyűrűiben.

Növényi minták

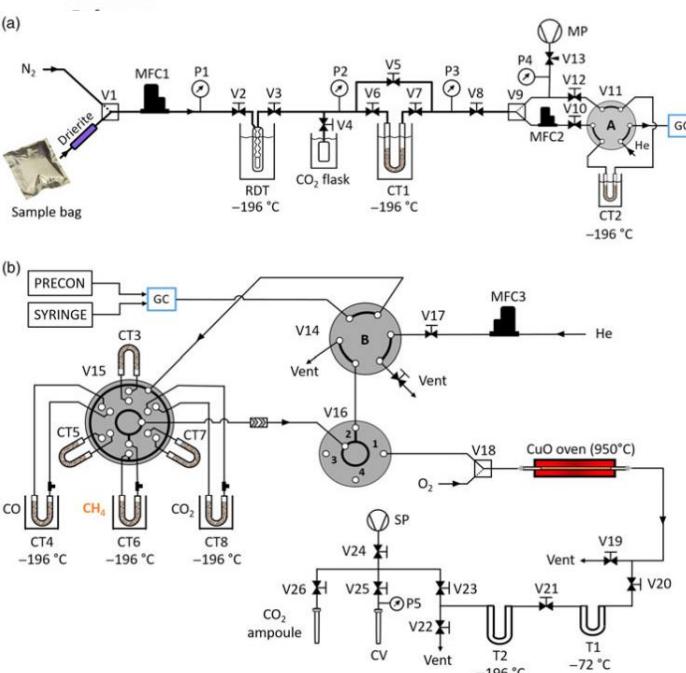
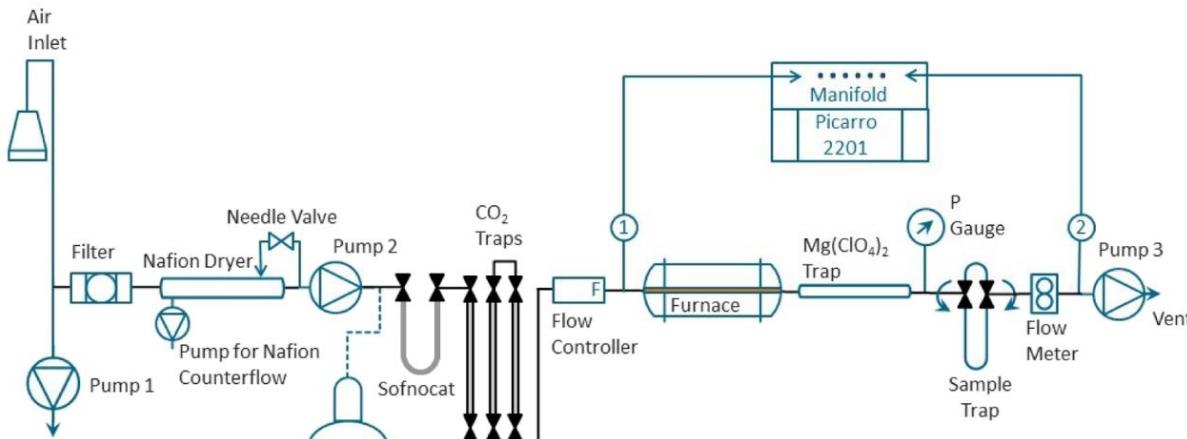


22. ábra: Fűszál (a) és falelevél (b) minták fosszilis széntartalom (%) eredményei térképen ábrázolva

CH_4 vizsgálatok



CH_4 vizsgálatok



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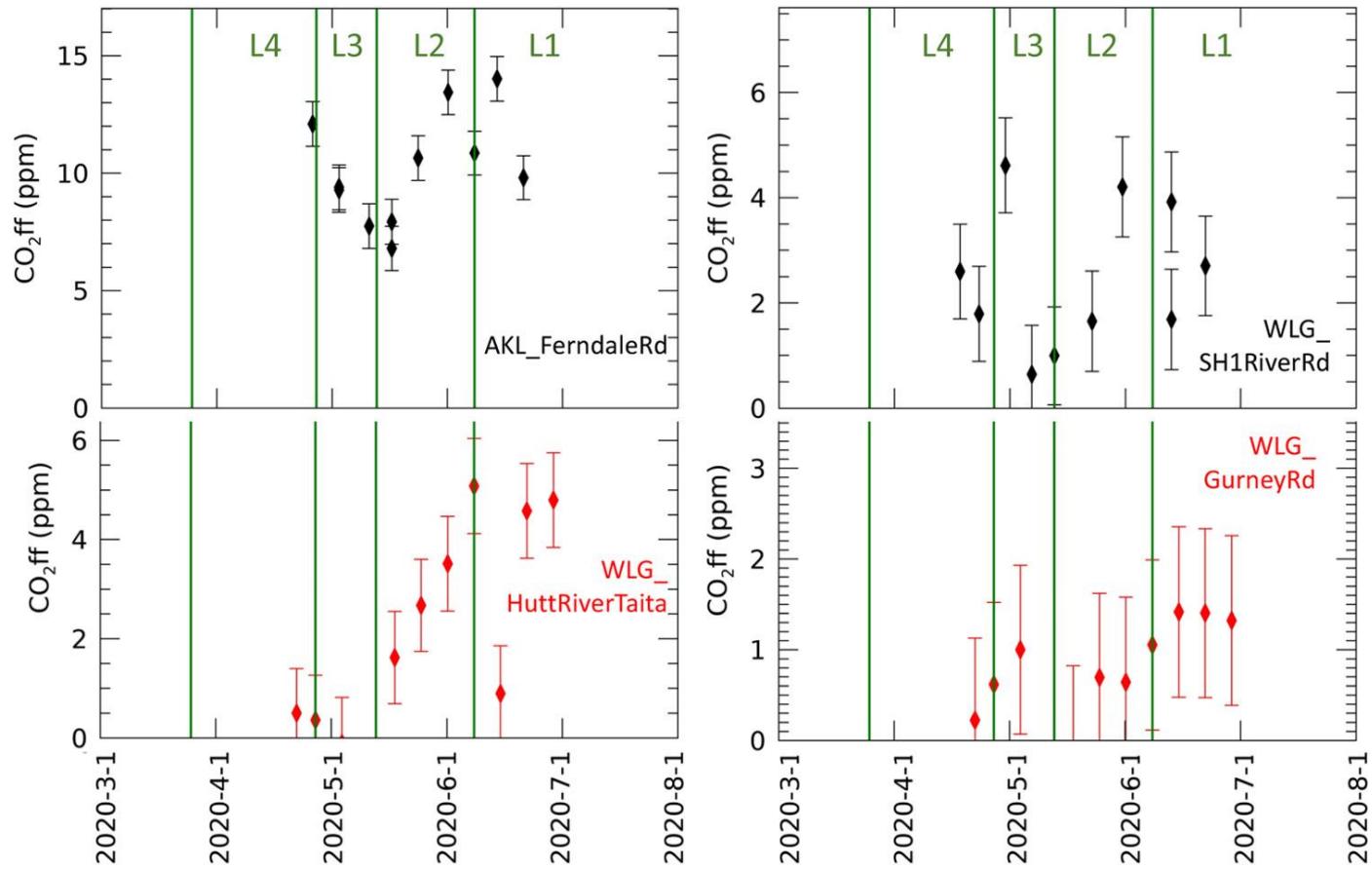
MTA

Dramatic Lockdown Fossil Fuel CO₂ Decrease Detected by Citizen Science-Supported Atmospheric Radiocarbon Observations

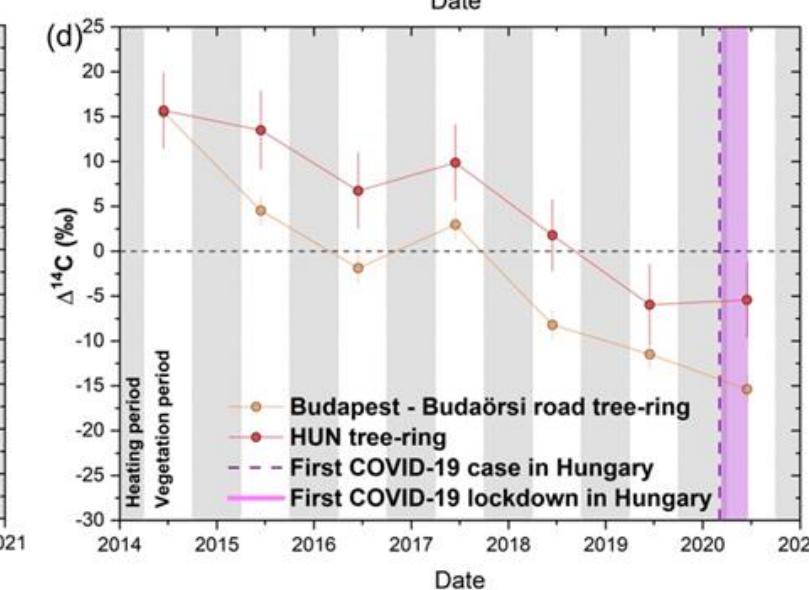
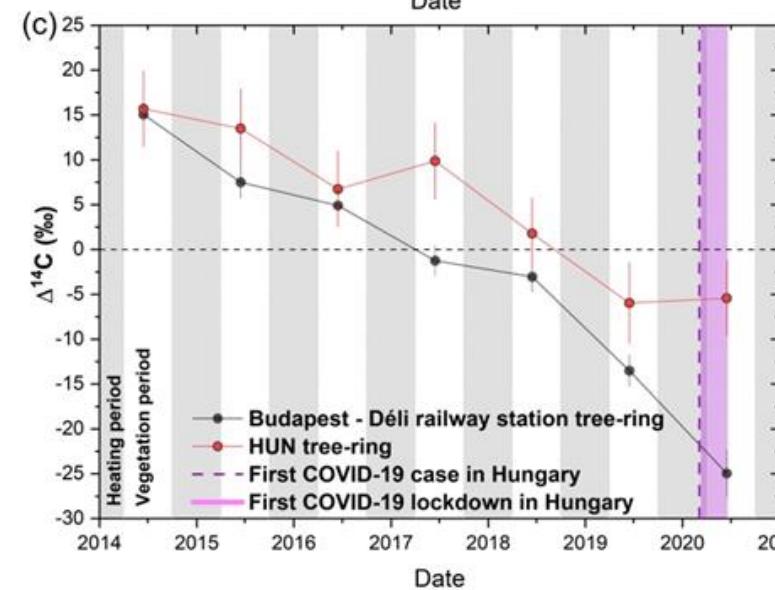
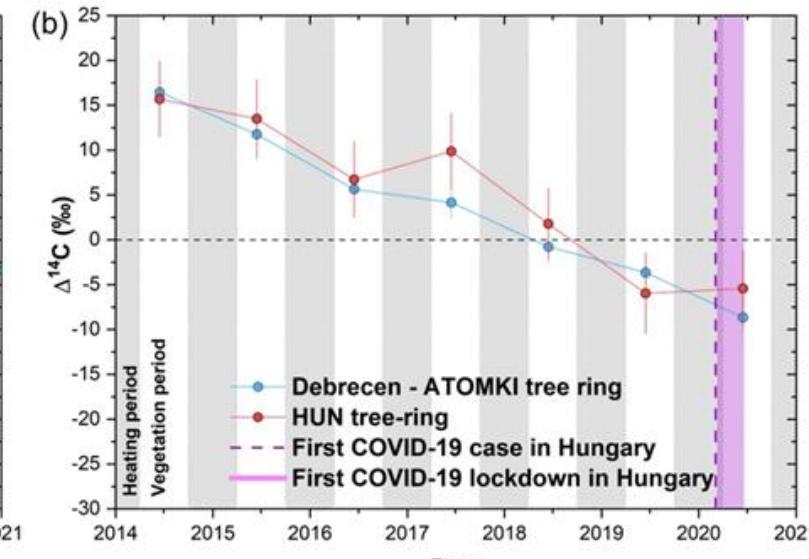
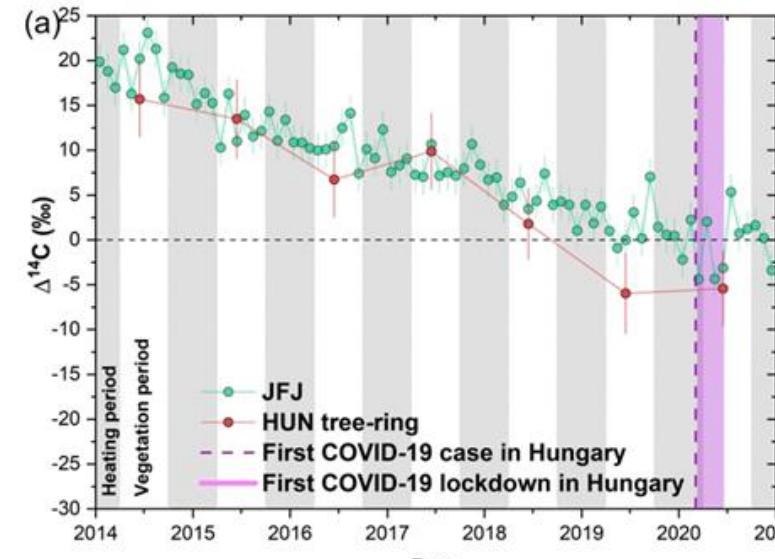
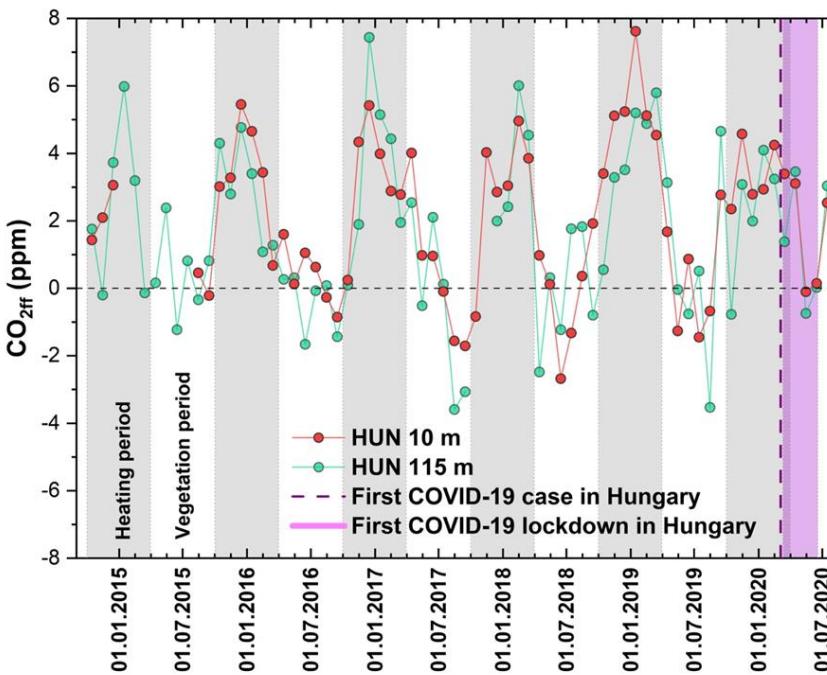
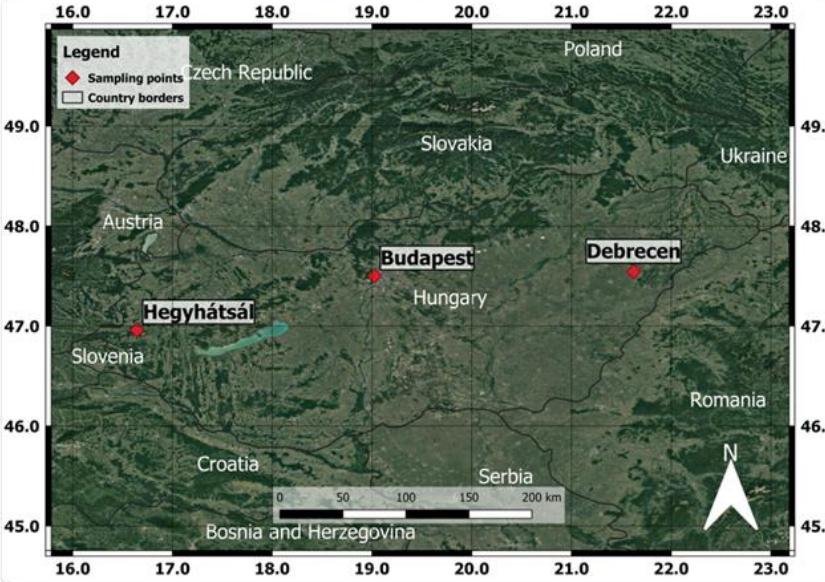
Jocelyn C. Turnbull,* Lucas Gatti Domingues, and Nikita Turton

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ICOS

Integrated Carbon Observation System

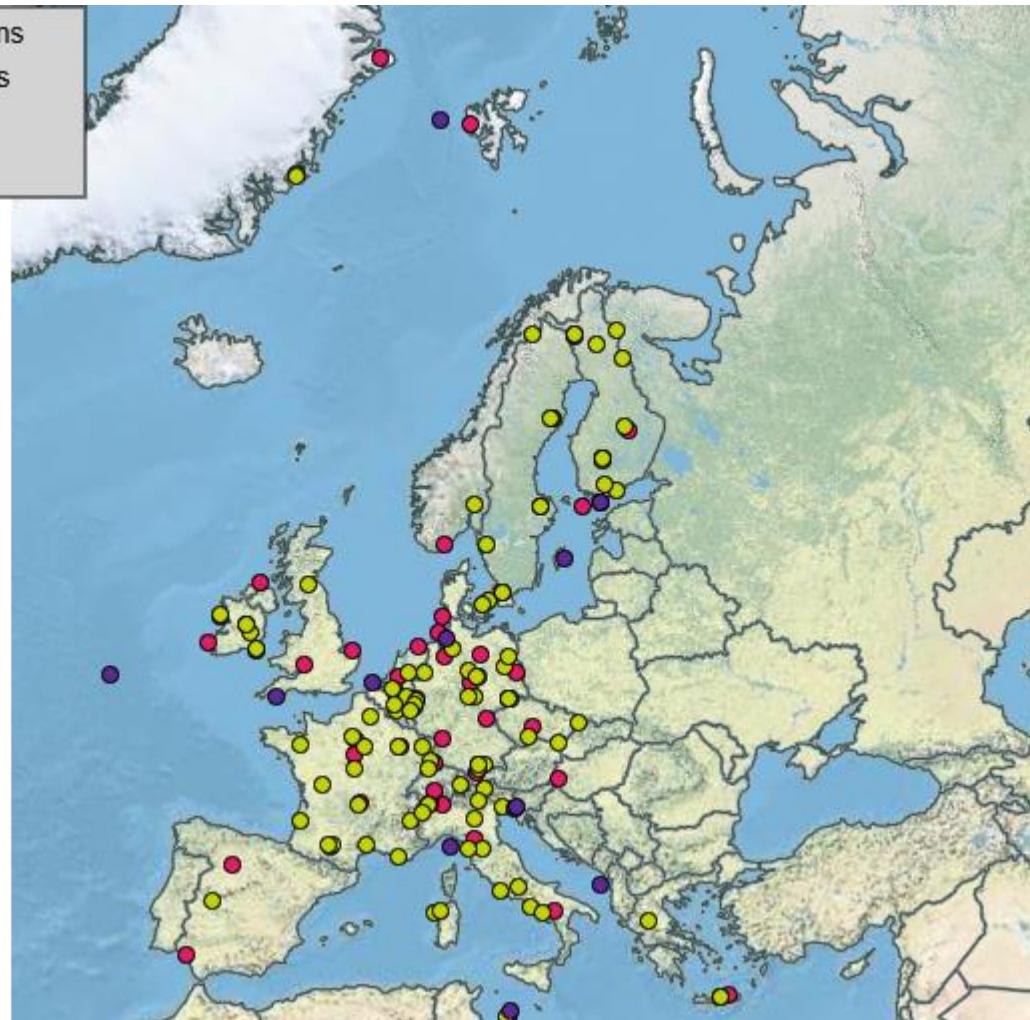


ICOS

INTEGRATED CARBON OBSERVATION SYSTEM

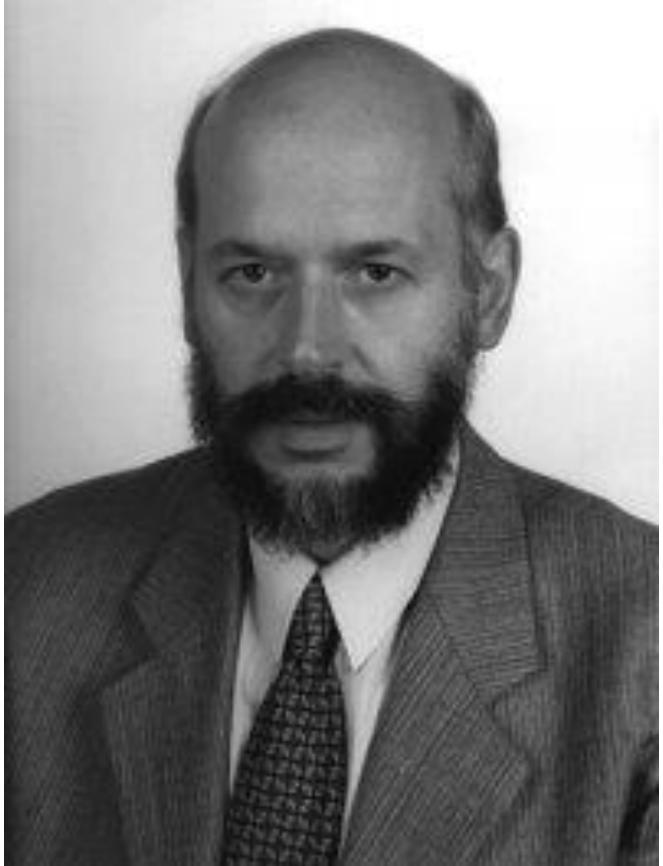
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- Atmosphere stations
- Ecosystem stations
- Ocean stations



17 állomáson izotópanaltikai mérések is

Hertelendi Ede
1950-1999



Ingeborg Levin
1953-2024



Köszönethirdillvánítás

Közreműködtek: Molnár Mihály, Major István, Haszpra László, Baráth Balázs Áron, Bán Sándor, HUN-REN
Atommagkutató Intézet munkatársai

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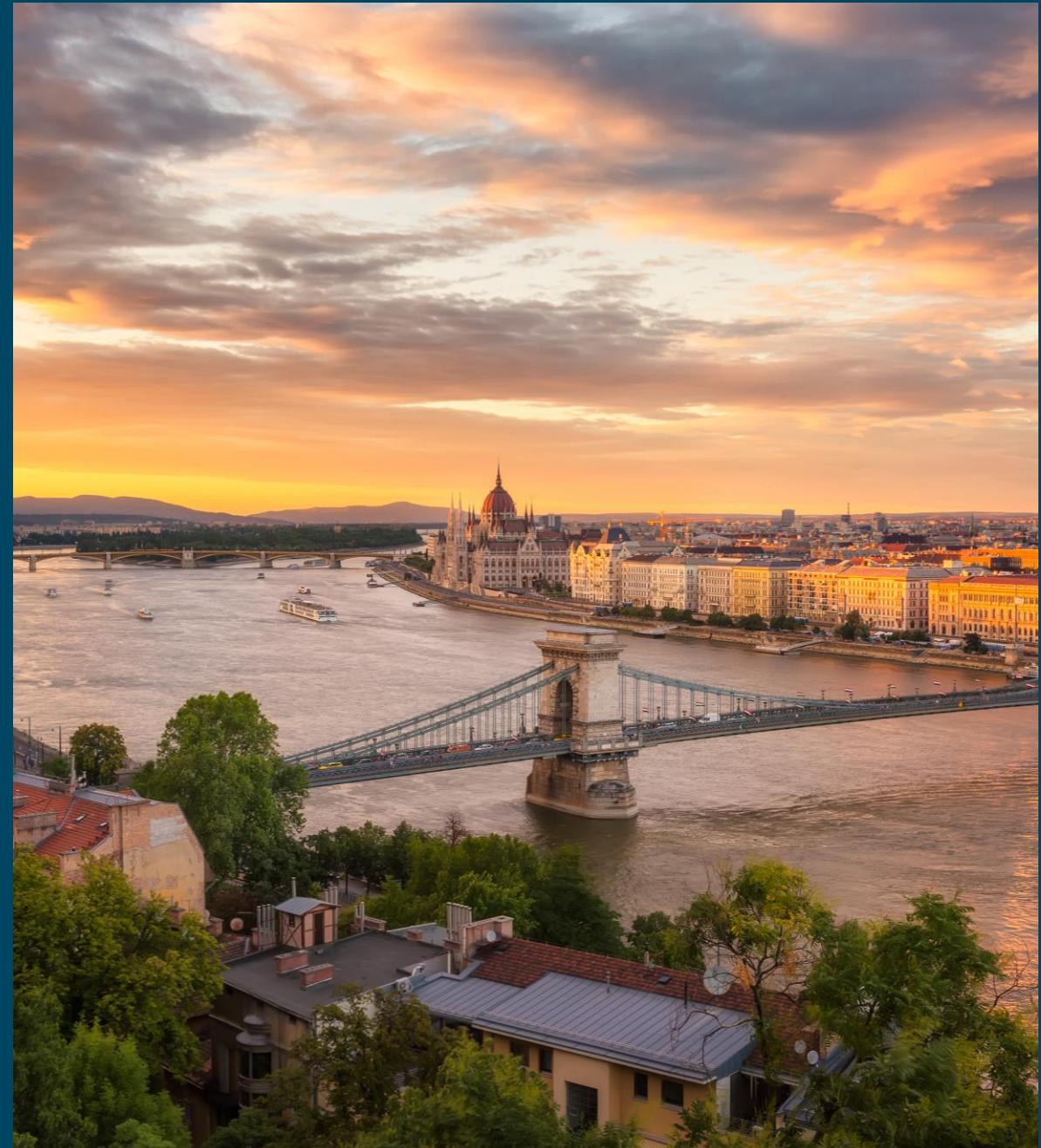


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2024. szeptember 18.

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