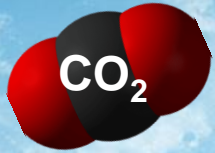


# MIÉRT KELL MÉRNÜNK AZ ÜVEGHÁZHATÁSÚ GÁZOK MENNYISÉGÉT?



Haszpra László

Csillagászati és Földtudományi Kutatóközpont



MIÉRT KELL MÉRNÜNK AZ  
ÜVEGHÁZHATÁSÚ GÁZOK  
MENNYISÉGÉT?



*„You can't manage what you don't measure”*

*W. Edwards Deming*

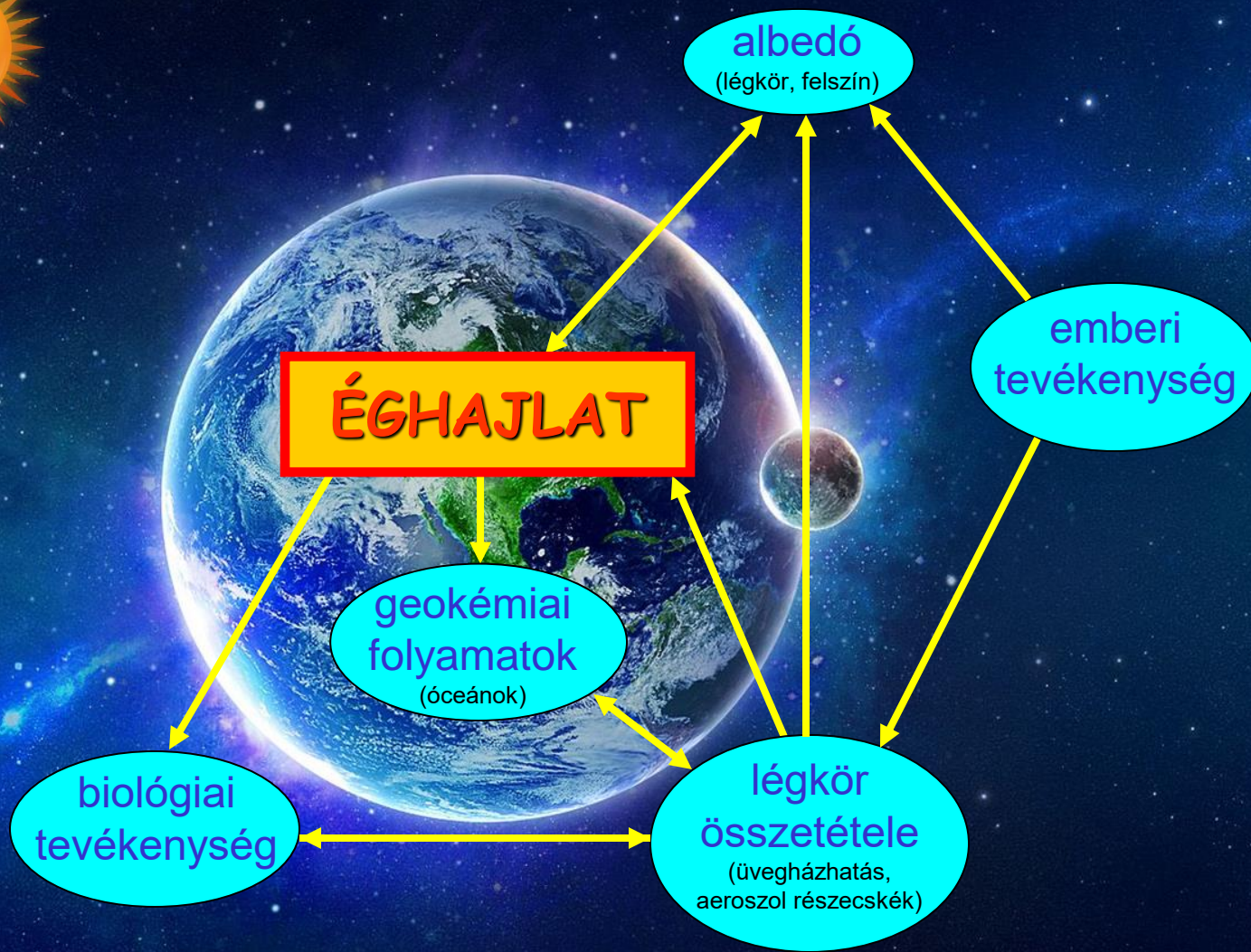




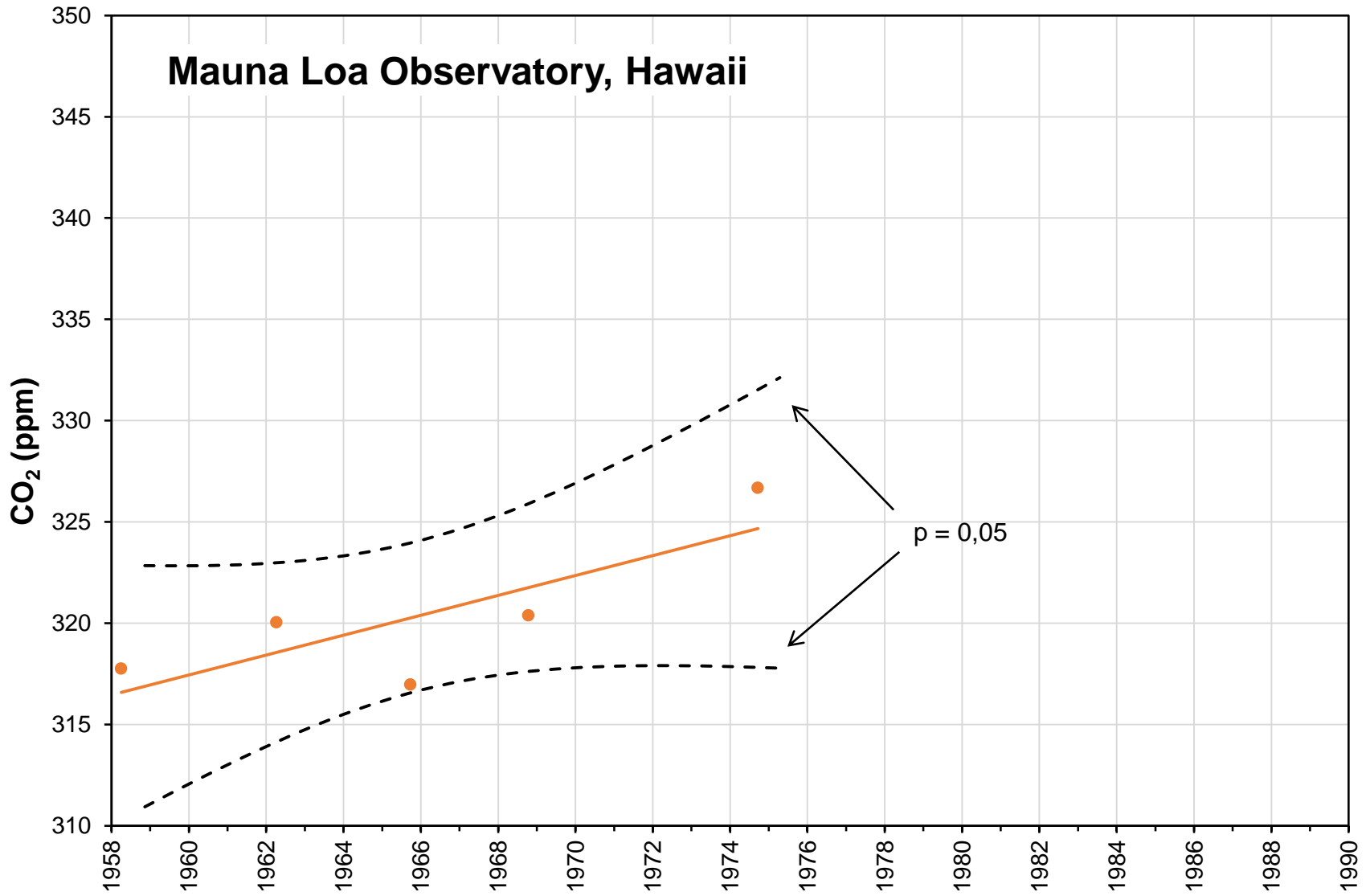
A légkör elnyelőképessége nem a kibocsátástól, hanem a légkörben lévő anyagmennyiségtől függ!



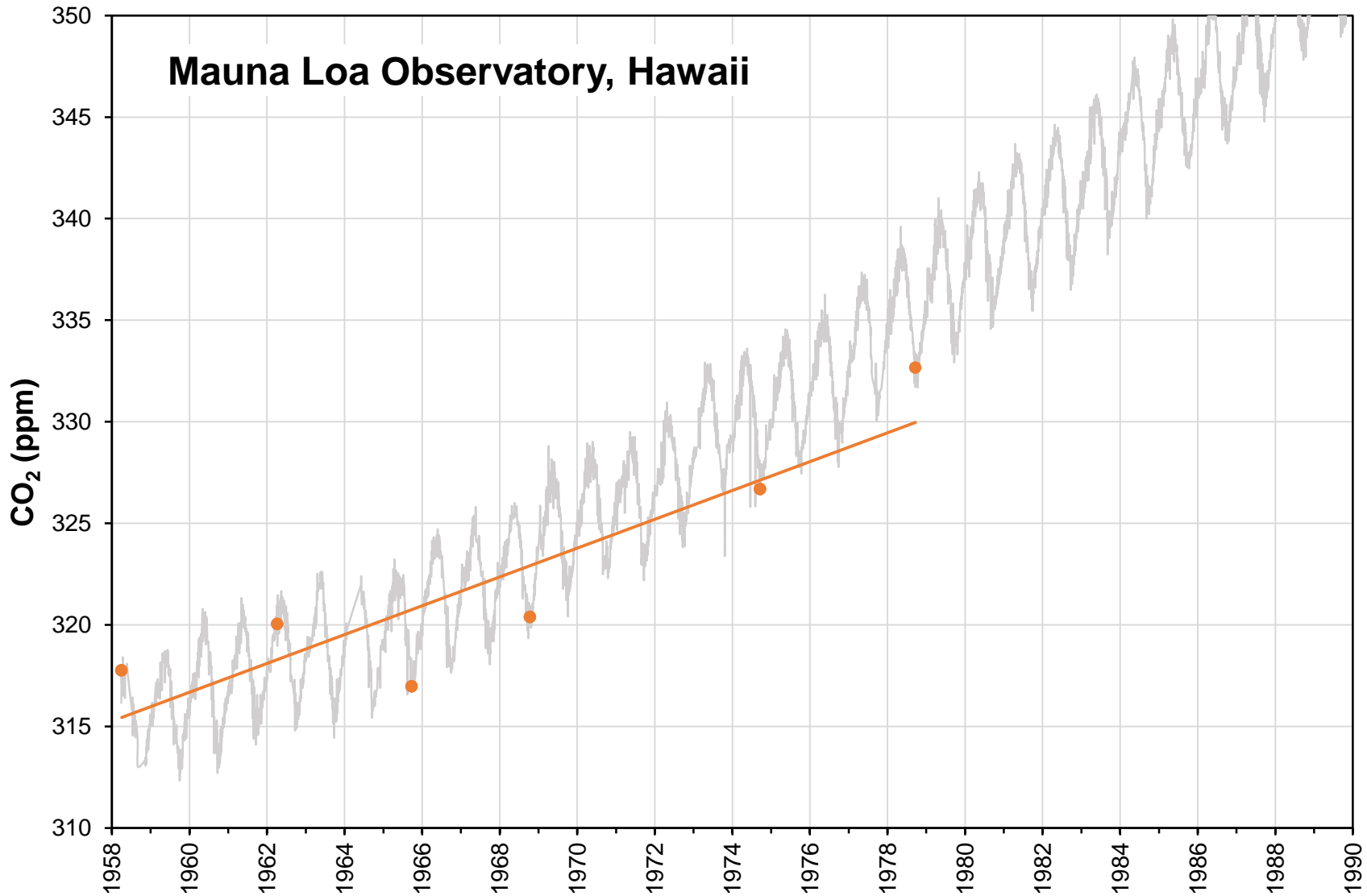




# Mauna Loa Observatory, Hawaii



# Mauna Loa Observatory, Hawaii



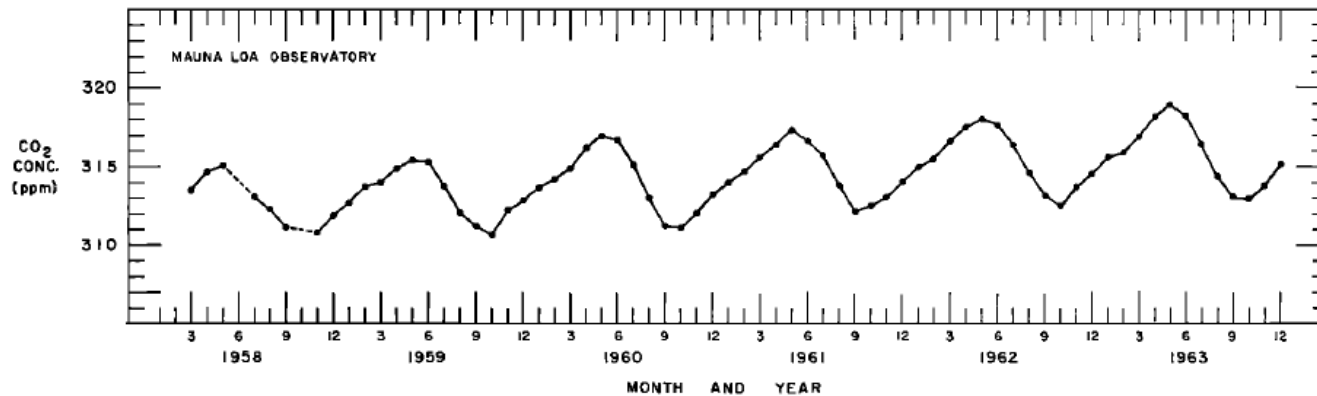


Fig. 10. Monthly average concentration of atmospheric CO<sub>2</sub> at Mauna Loa Observatory versus time.

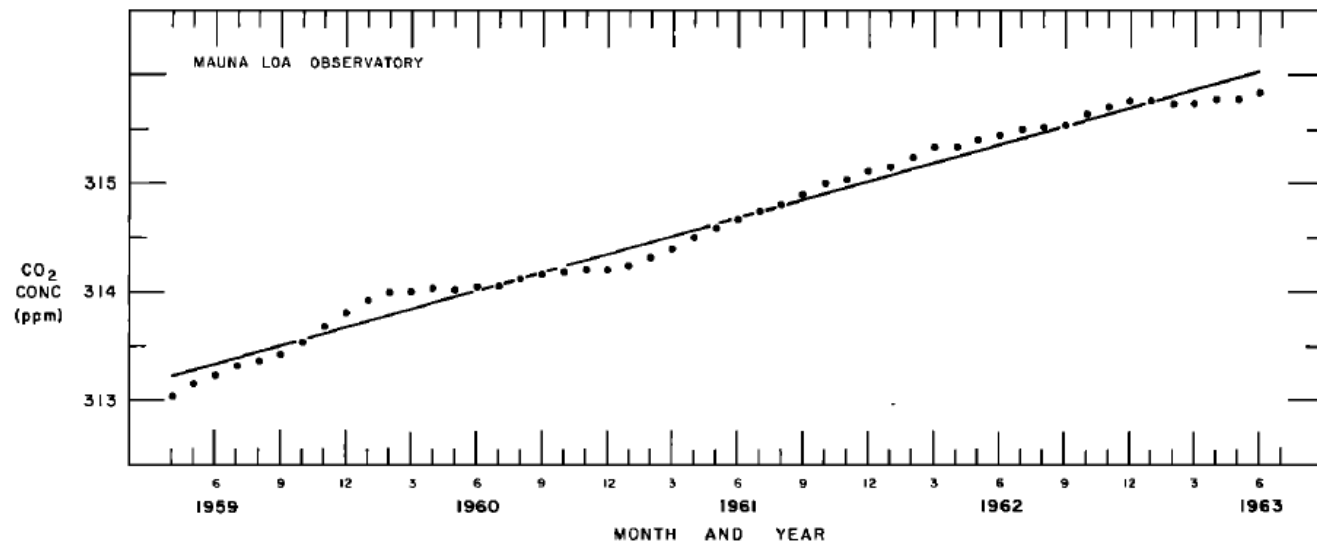
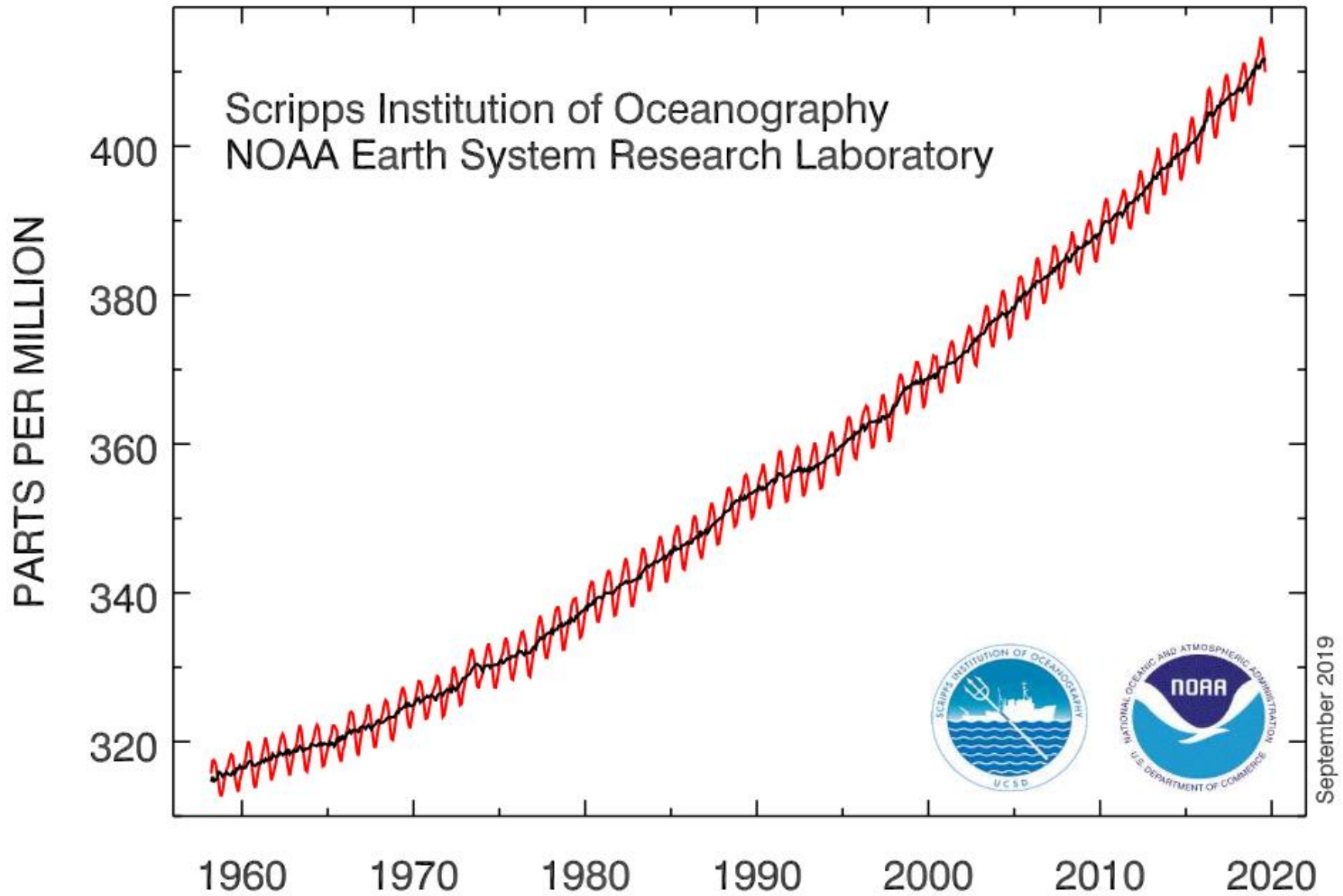


Fig. 11. Twelve-month running mean of the concentration of atmospheric CO<sub>2</sub> at Mauna Loa Observatory. Means are plotted versus the sixth month of the appropriate 12-month interval. The straight line indicates a rate of increase of 0.68 ppm/yr.

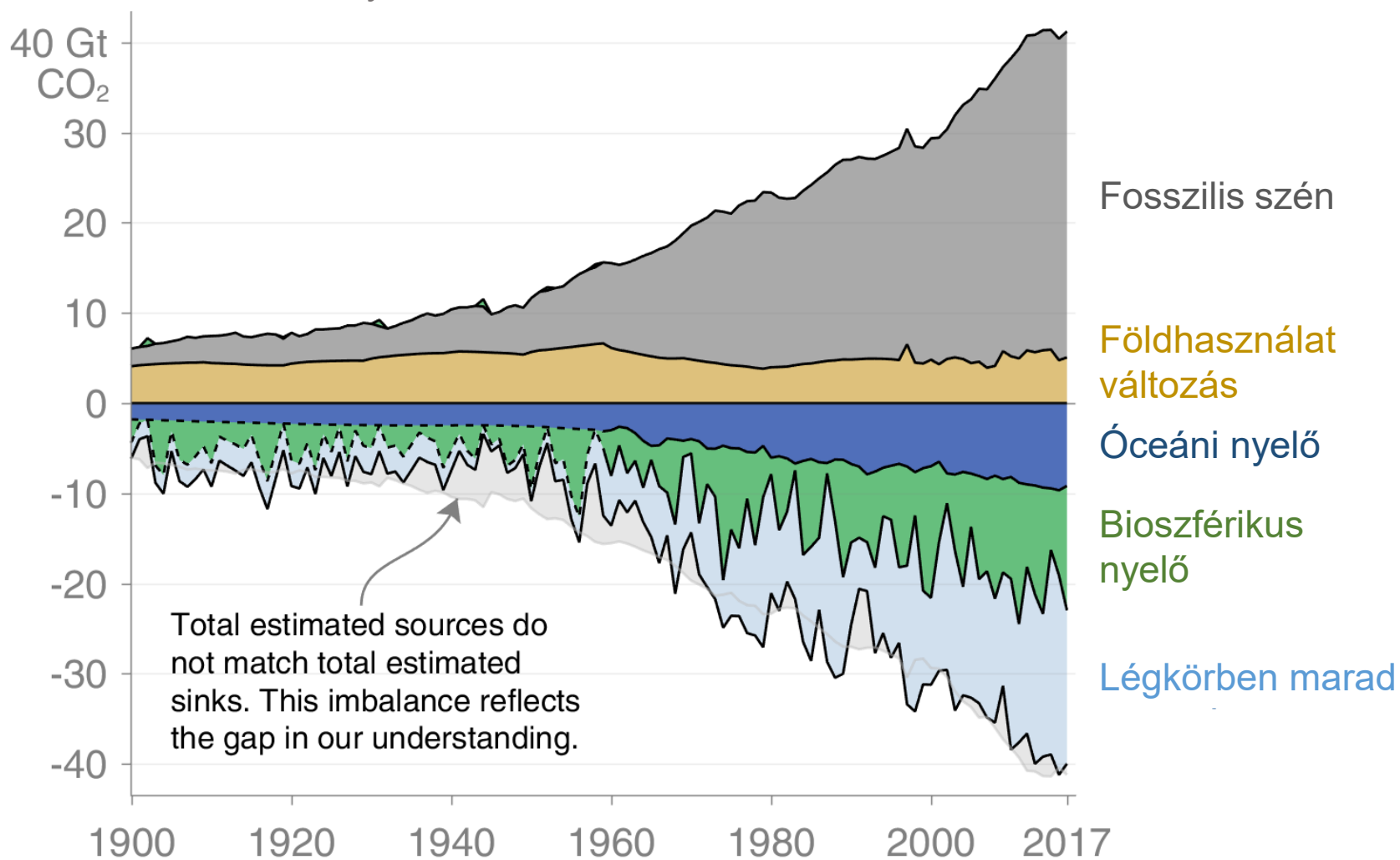


# Atmospheric CO<sub>2</sub> at Mauna Loa Observatory





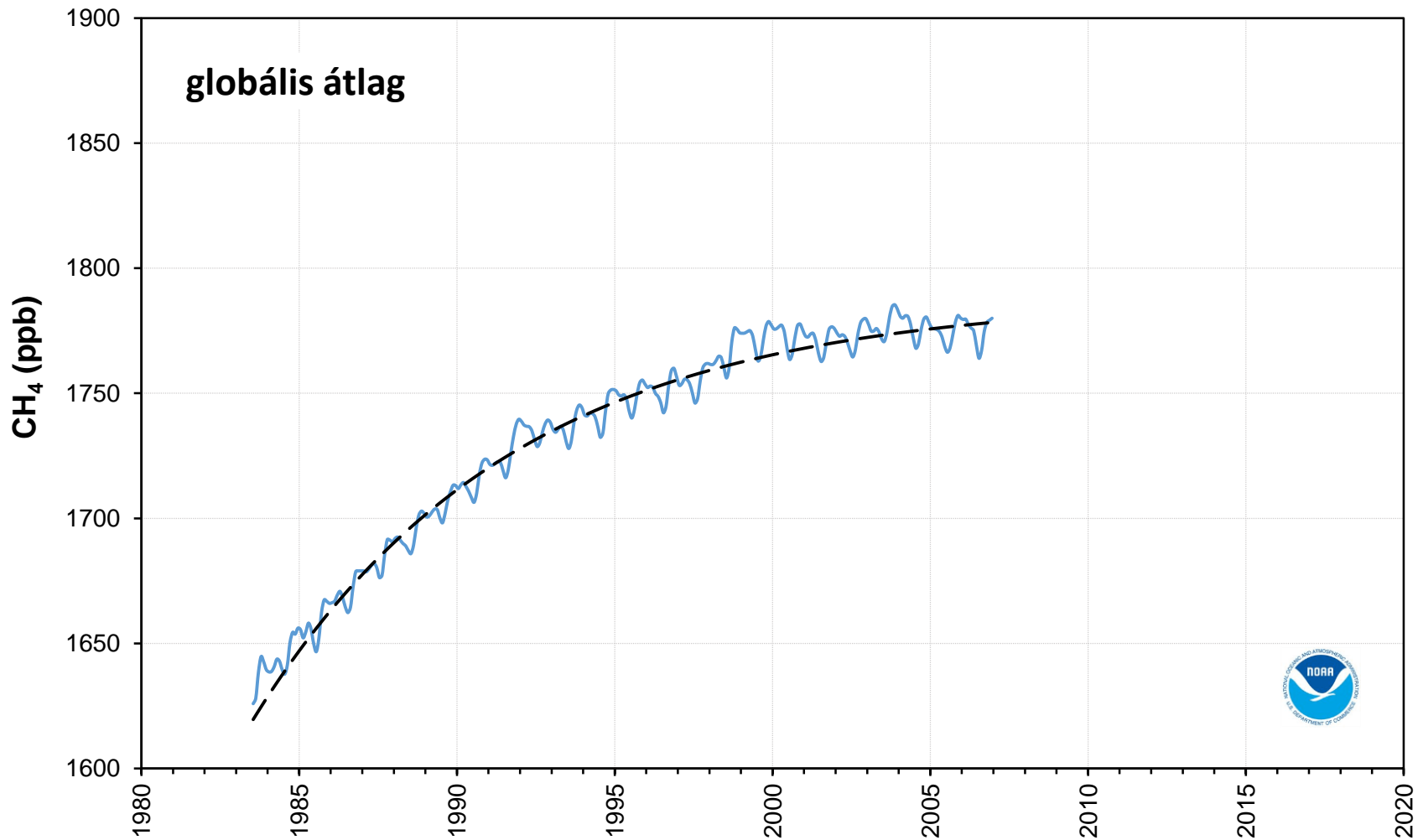
## Források és nyelők

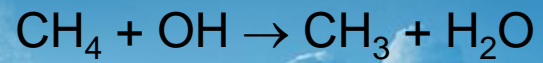




$$d[\text{CH}_4]/dt = E - [\text{CH}_4]/\tau$$

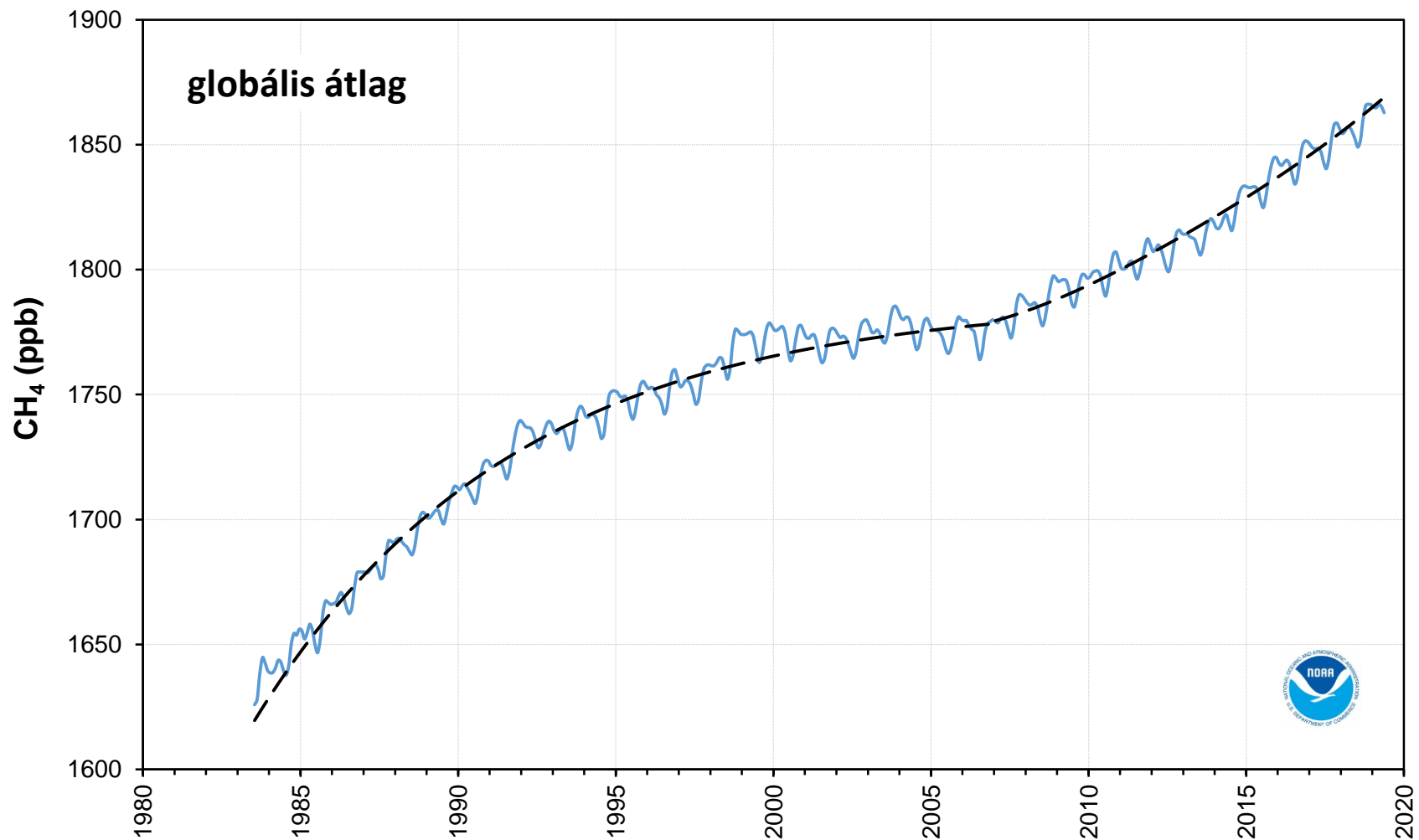
$$[\text{CH}_4]_t = ([\text{CH}_4]_0 - E \cdot \tau) \cdot e^{-t/\tau} + E \cdot \tau$$

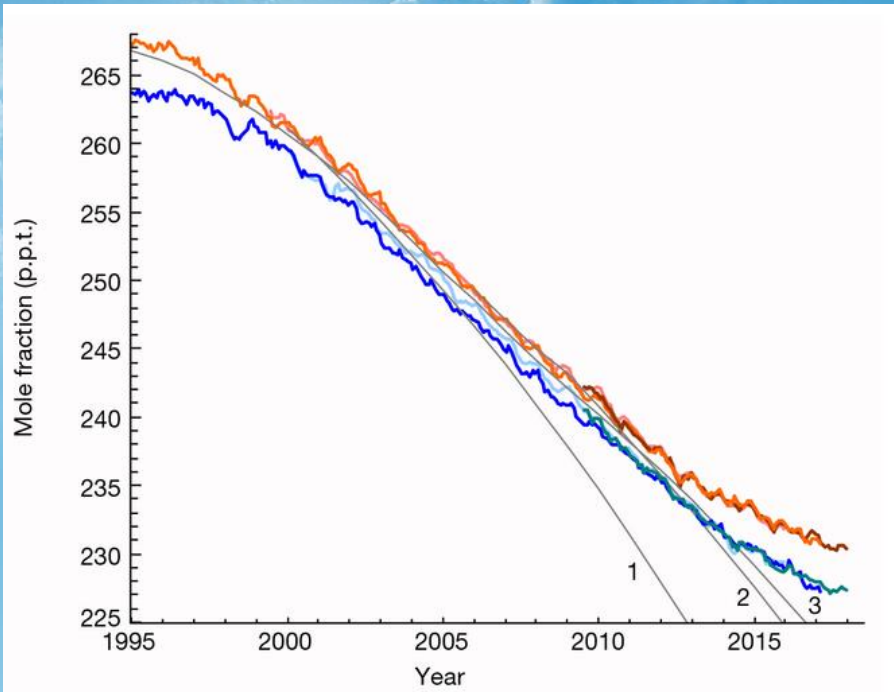




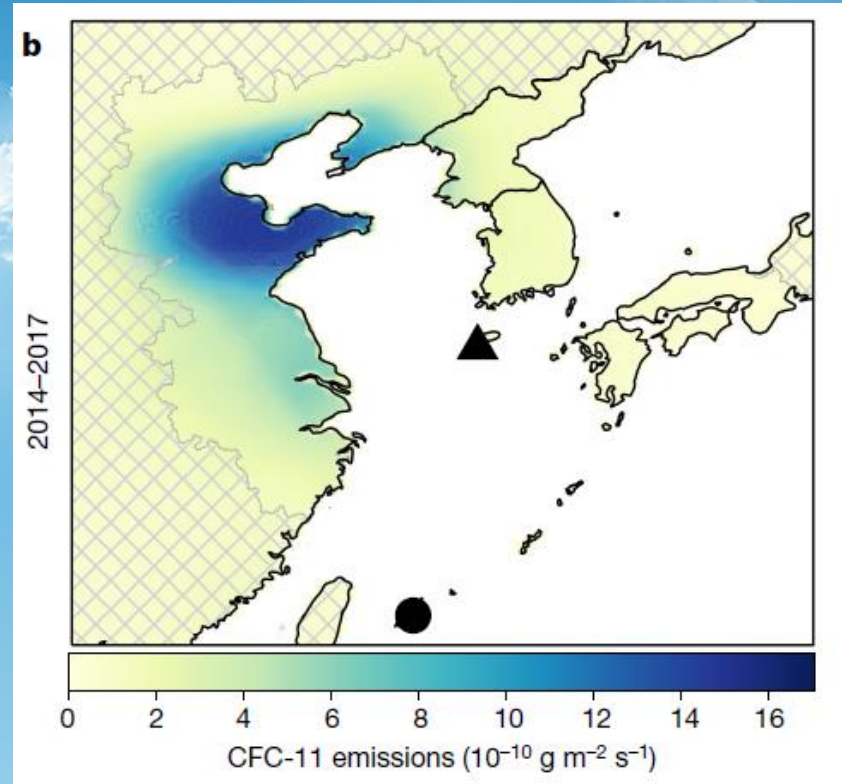
$$d[\text{CH}_4]/dt = E - [\text{CH}_4]/\tau$$

$$[\text{CH}_4]_t = ([\text{CH}_4]_0 - E \cdot \tau) \cdot e^{-t/\tau} + E \cdot \tau$$



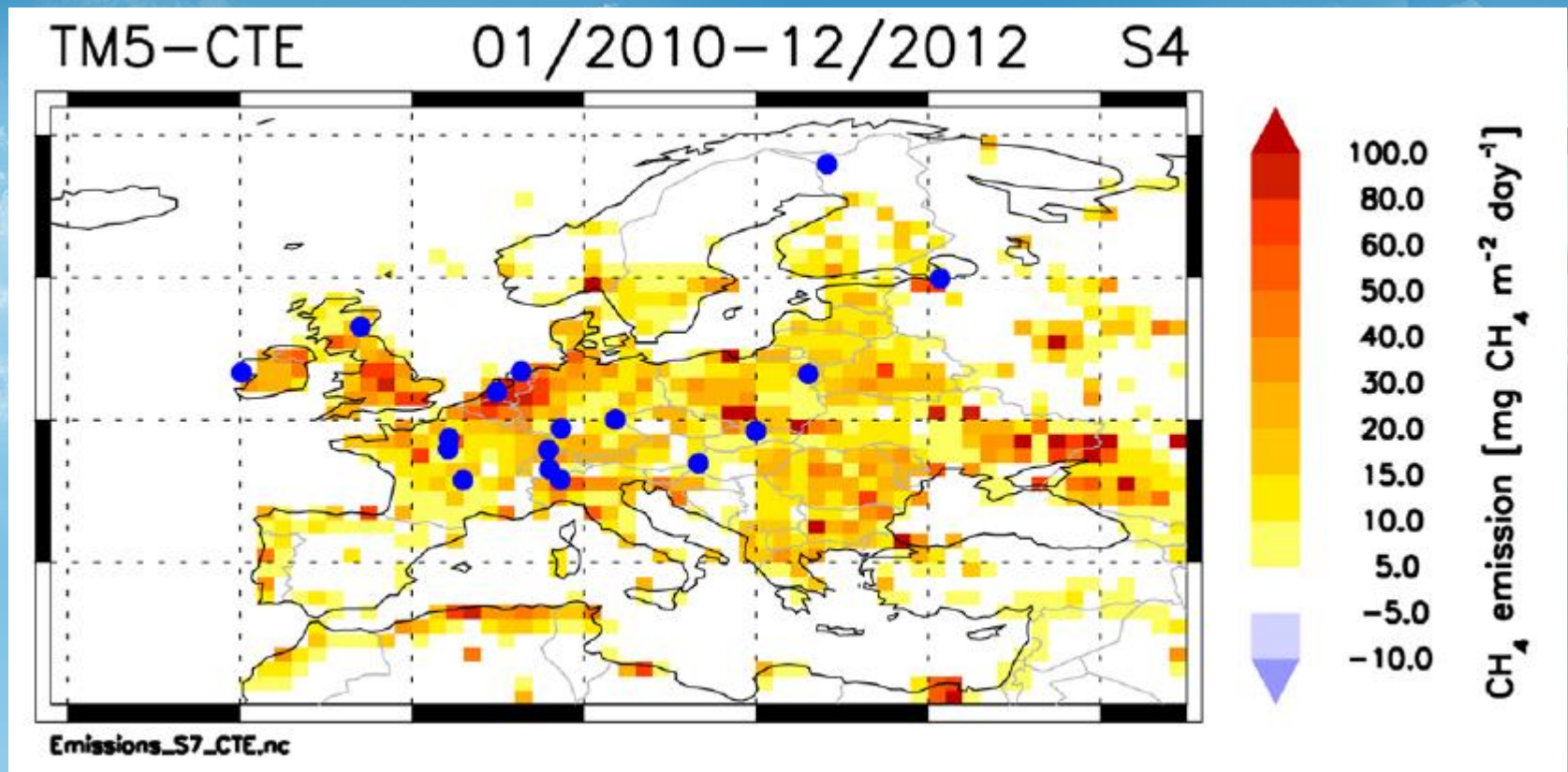


Montzka et al., 2018. An unexpected and persistent increase in global emissions of ozone-depleting CFC-11. *Nature* 557, 413-417.



Rigby et al., 2019. Increase in CFC-11 emissions from eastern China based on atmospheric observations. *Nature* 569, 546-550.





**Доверяй, но проверяй! / Trust, but verify!**

*Ronald Reagan – Mihail Gorbacsov*

Bergamaschi et al., 2018. Inverse modelling of European CH<sub>4</sub> emissions during 2006–2012 using different inverse models and reassessed atmospheric observations. *Atmos. Chem. Phys.* 18, 901-920.

# MIÉRT KELL MÉRNÜNK AZ ÜVEGHÁZHATÁSÚ GÁZOK MENNYISÉGÉT?

- a légkörben zajló folyamatok jobb megértése
- riasztás a váratlan változások esetén
- a tényleges ÜHG kibocsátás meghatározása

***„Regulating emissions without verification against actual accumulation in the atmosphere is like going on a diet without weighting oneself”***

*Euan Nisbet*