

GALLERY 3:
TIME SERIES AS NARRATIVE

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Making a line plot

Most time series *plots* in social science articles are fairly boring

(It's unlikely the data themselves are boring)

Just a line for the data; no effort to relate multiple variables

Let's learn from a field with beautiful time series plots: climatology

Example: Temperature & CO₂ data from ice cores. 400,000+ years of data

(Cite: Pettit *et al*, 1999, Nature.)

Influential evidence in studies of global warming & climate.

Powerful data, but can be obscured by poor data presentation.

Making a line plot

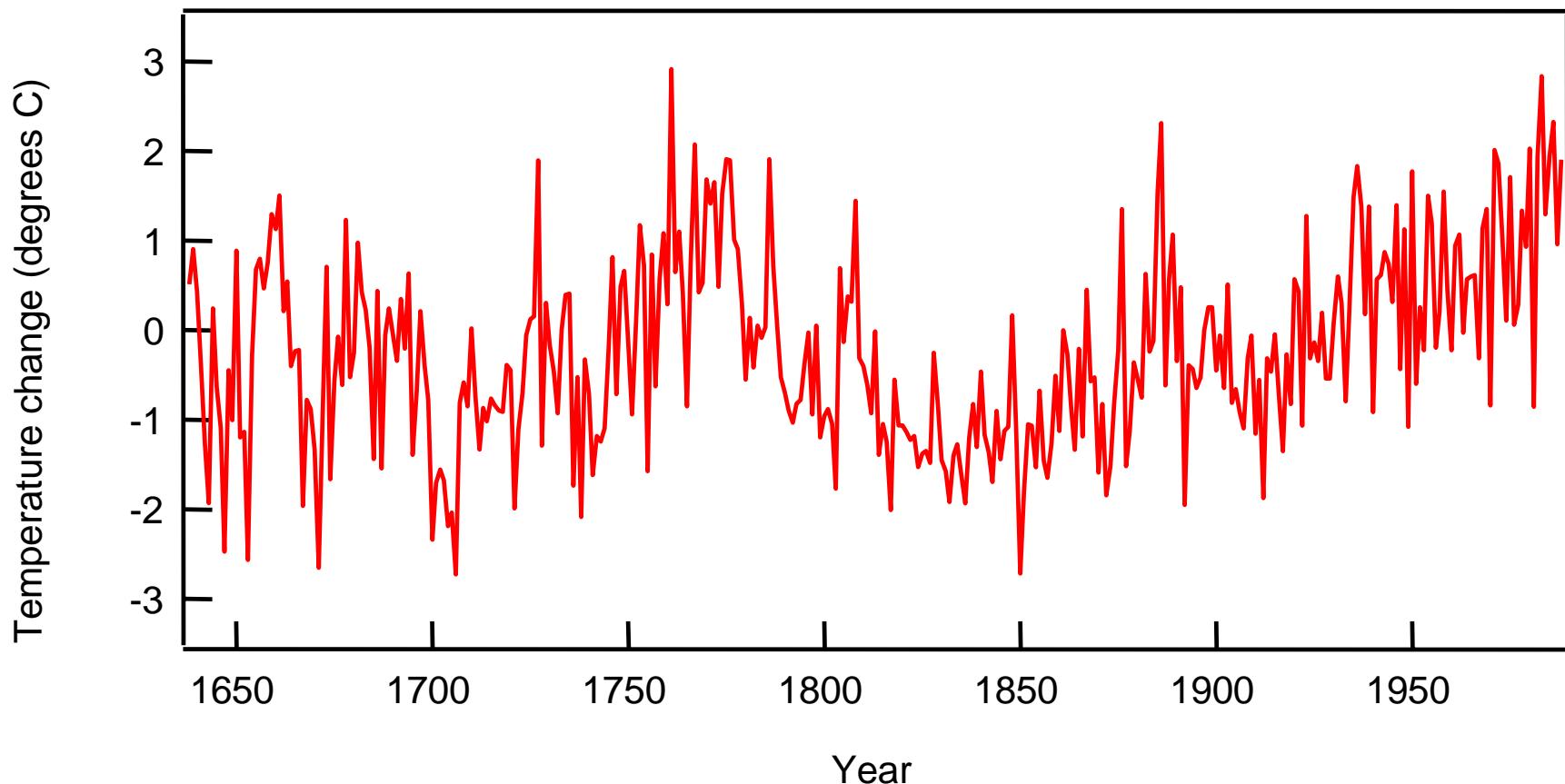
Problem for visualizing climate data are the long time scales

How do we relate geological and human time frames?

We'll start by making a lot of plots at different scales.

In each plot, we'll look at global average temperatures

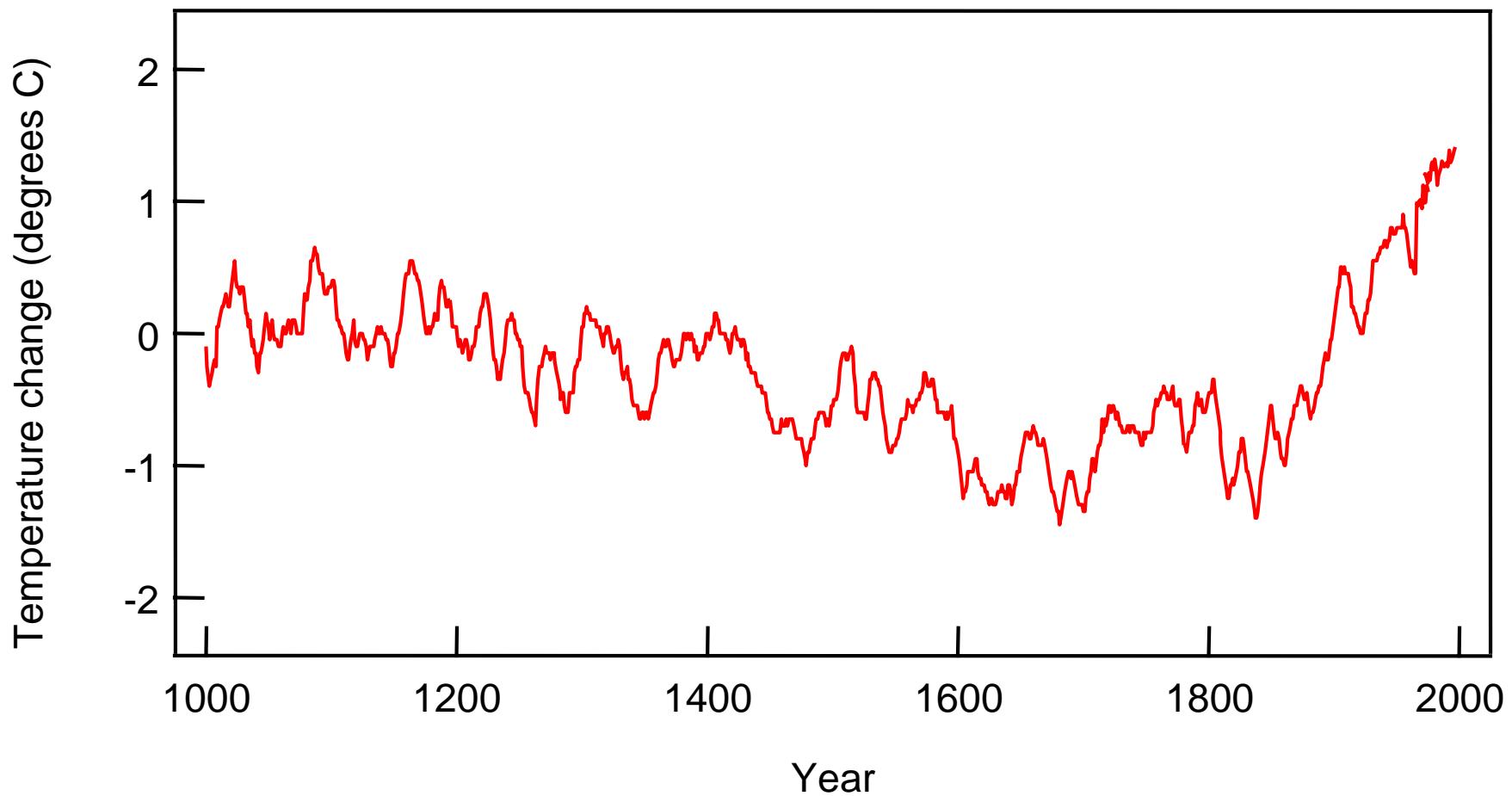
Tree ring data: the last 350 years



Data source: <ftp://ftp.ngdc.noaa.gov/paleo/treering/reconstructions/nwcanada/nwcan-recon.txt>

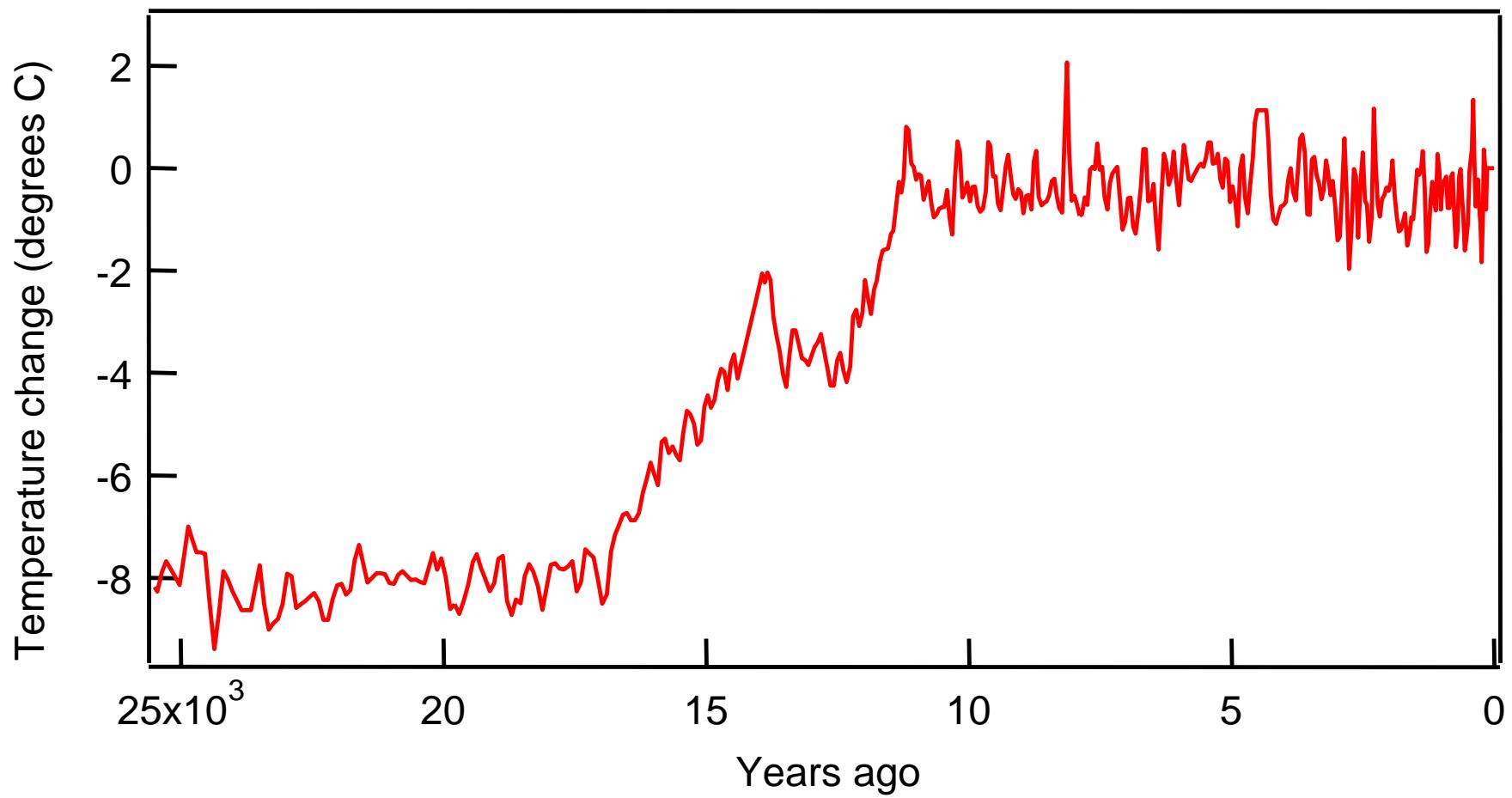
This and following plots made by Antoine van Oijen in Igor

Coral data: the last 1,000 years



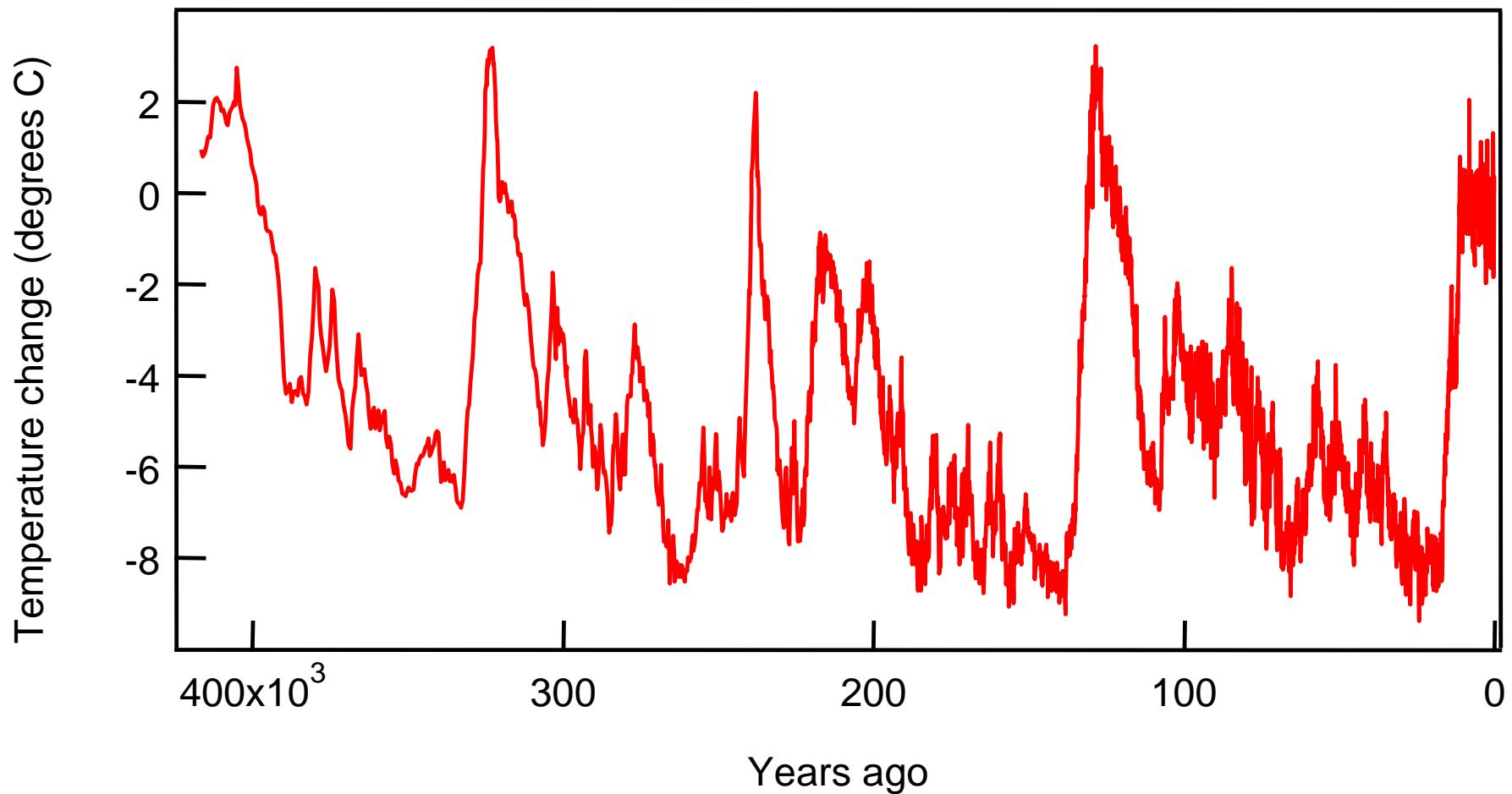
Data source: ftp://ftp.ngdc.noaa.gov/paleo/gcmoutput/crowley2000/crowley_lowery2000_nht.txt

Ice core data: the last 25,000 years



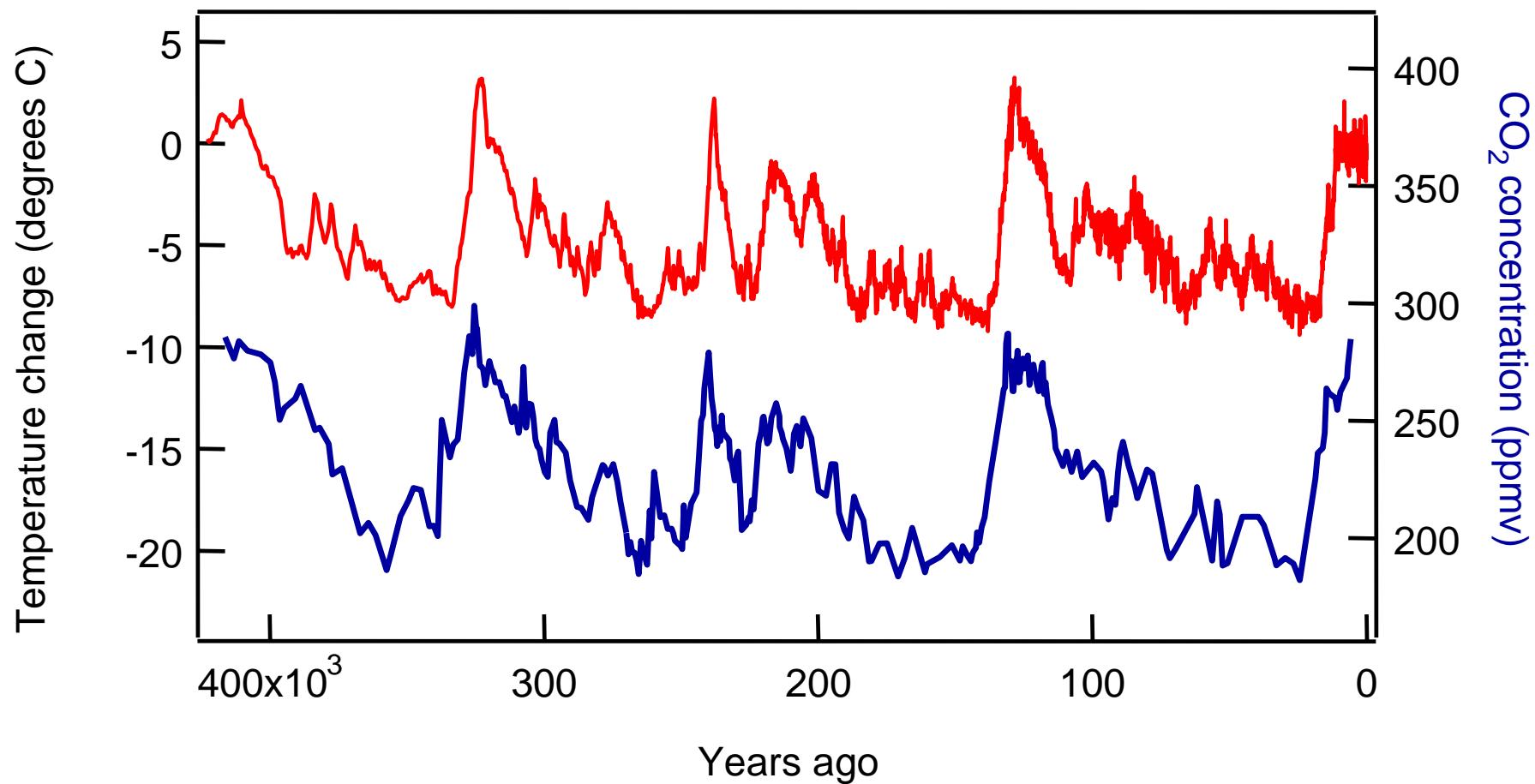
Data source: Pettit *et al*, *Nature* 399 (1999) 429

Ice core data: the last 440,000 years



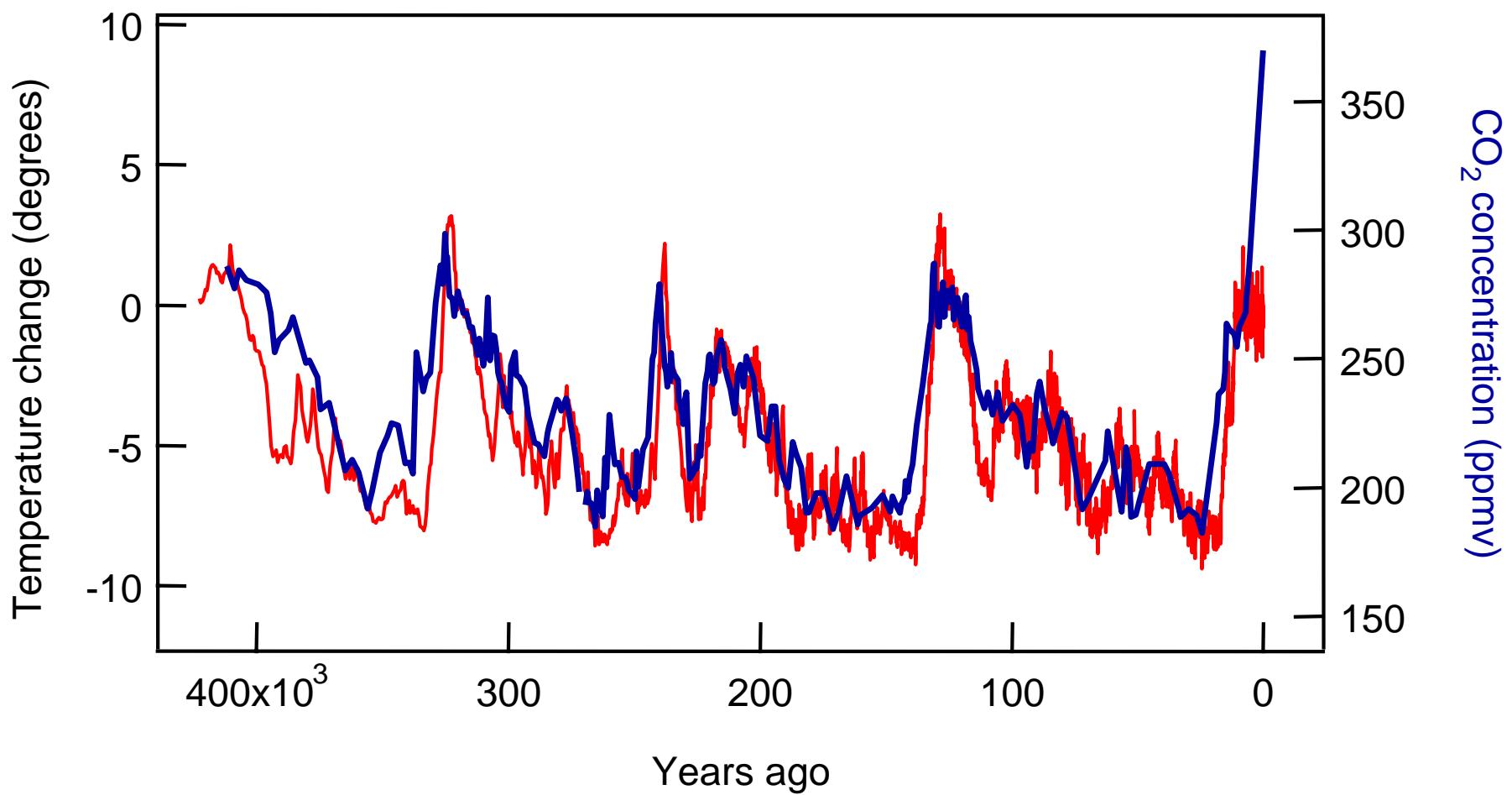
Data source: Pettit *et al*, *Nature* 399 (1999) 429

Ice core data: the last 440,000 years



Data source: Pettit *et al*, *Nature* 399 (1999) 429

Ice core data: the last 440,000 years



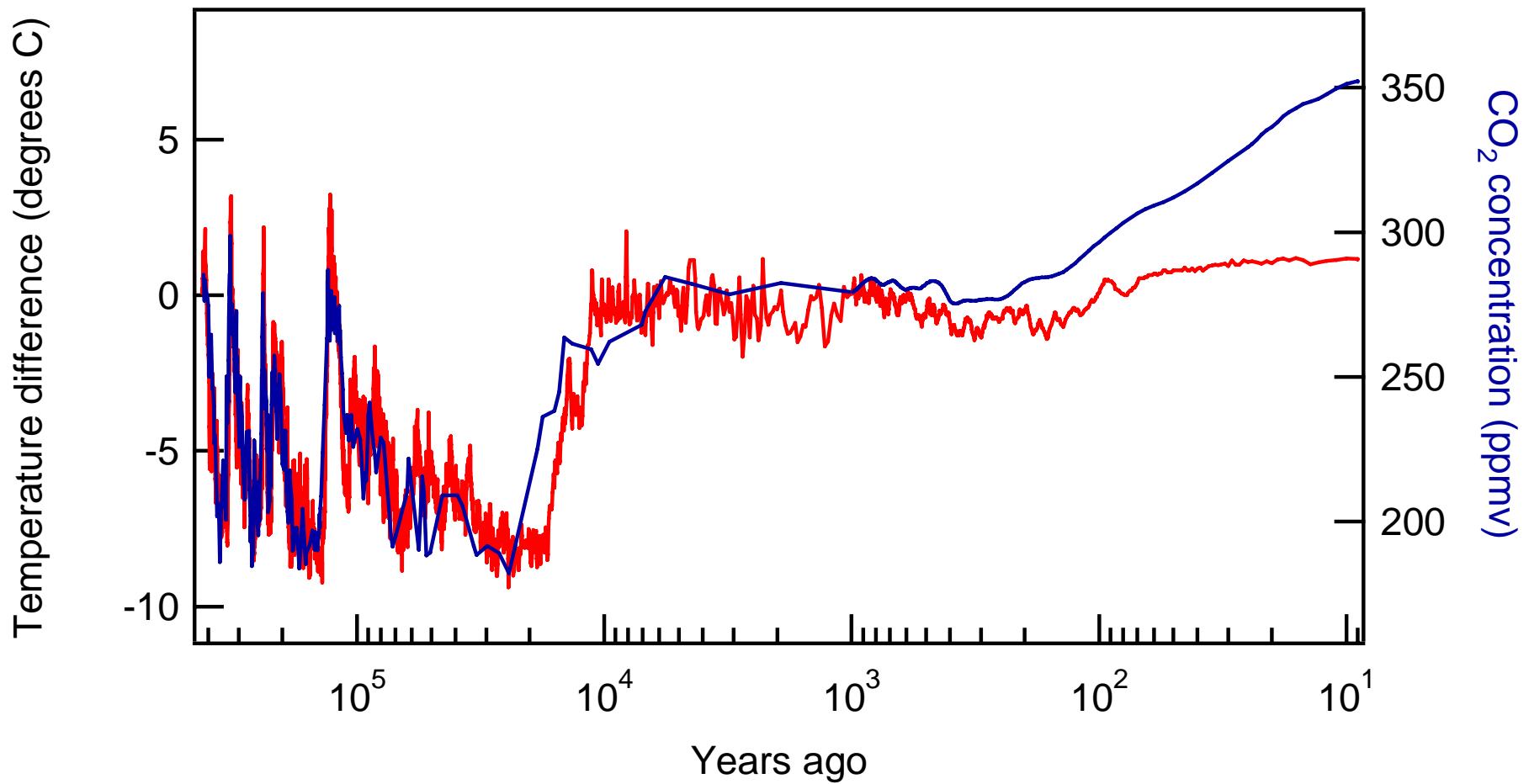
Data source: Pettit *et al*, *Nature* 399 (1999) 429

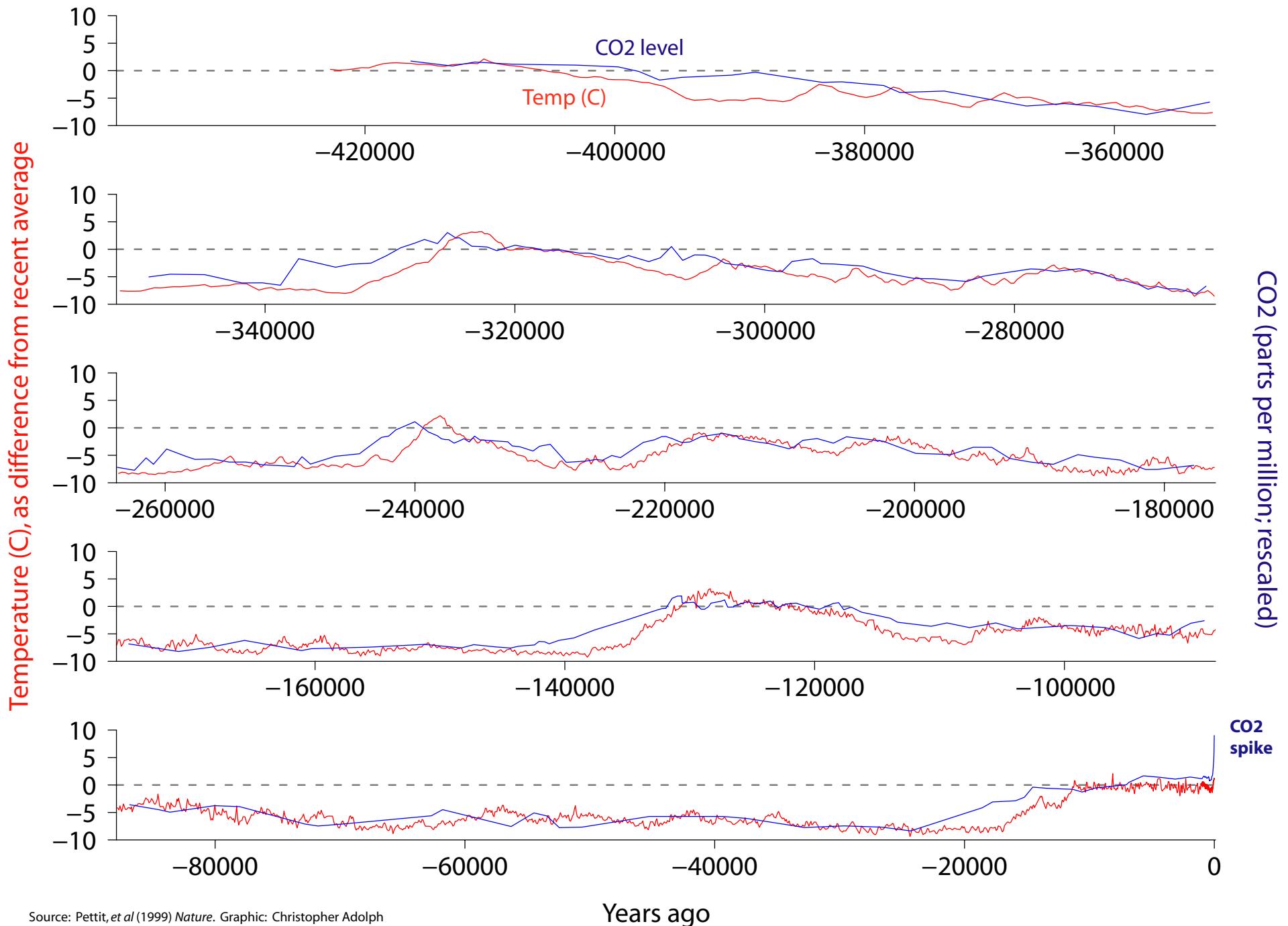
Questions raised by climate data

- What is the range of (natural) variability in Temp & CO₂?
- Do they “cycle” together?
- Does one proceed the other?
- How do very recent (e.g., last 100 years) of data compare?

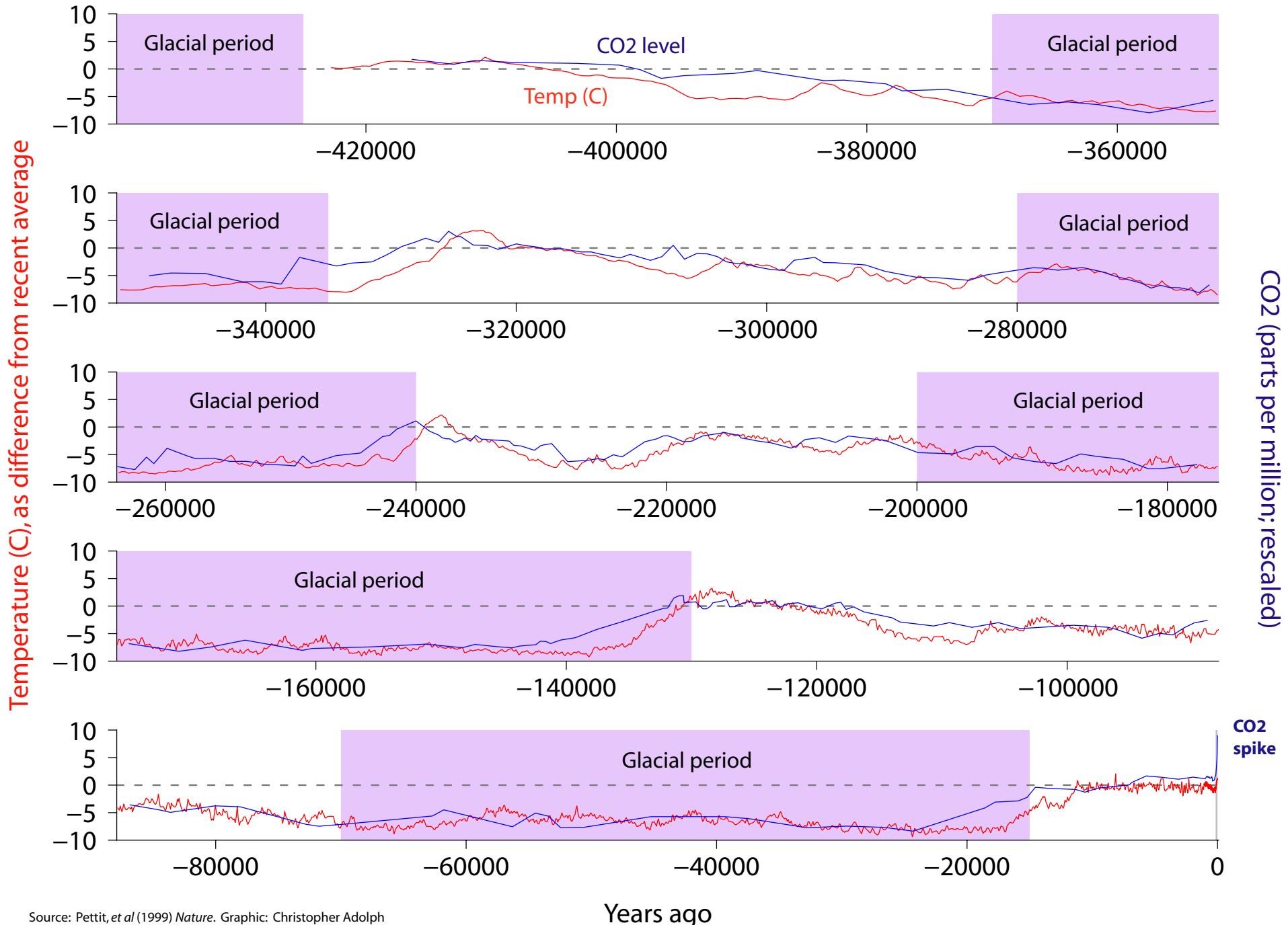
Can we answer this all in one graphic? How?

Log scaling (van Oijen)

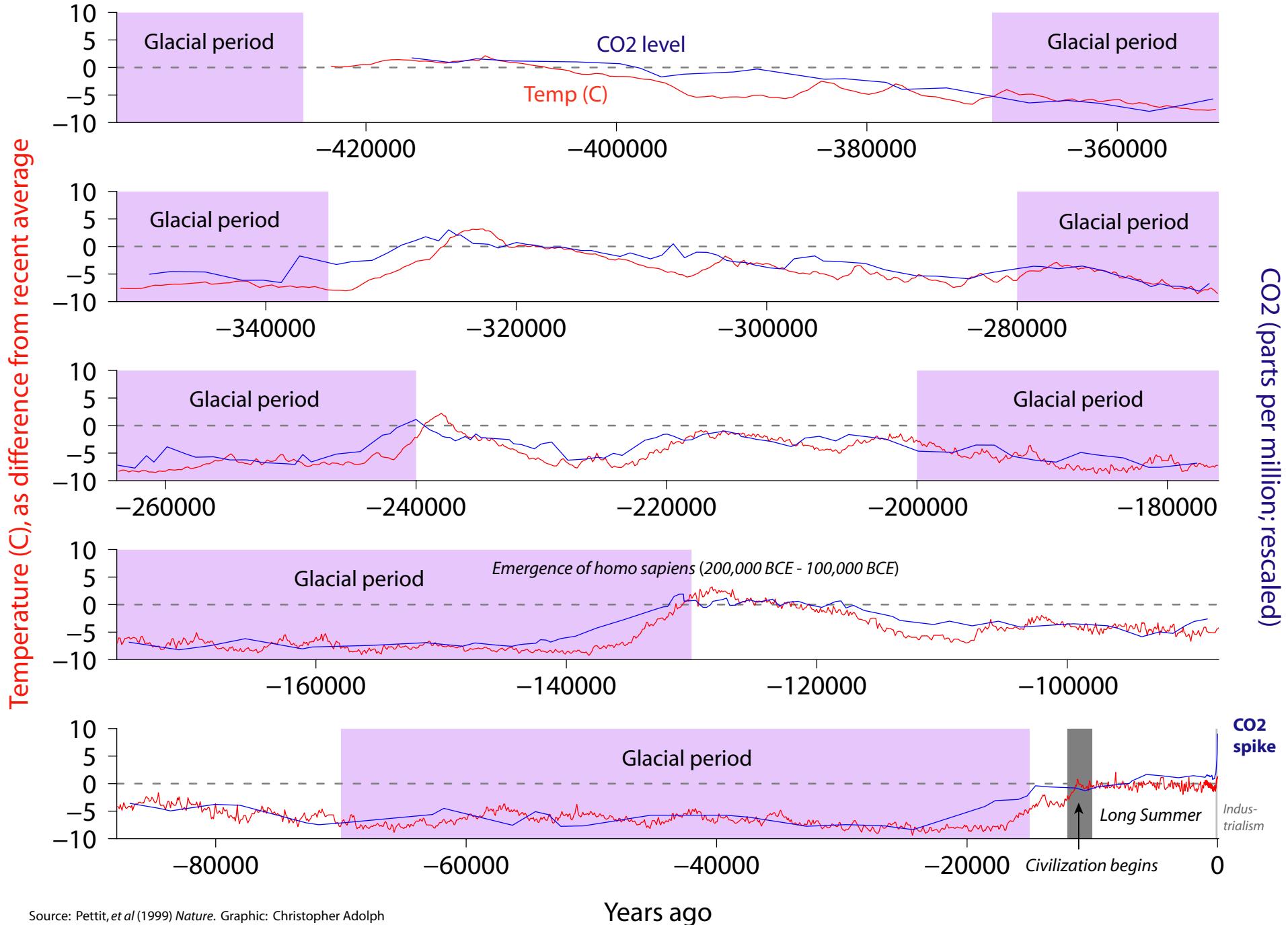




Source: Pettit, et al (1999) *Nature*. Graphic: Christopher Adolph



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Stack & split (Cleveland inspired)

Flaws: No right axis. Data need to be interpolated to axis limits.

But, small multiples work here to show data over a vast scale

Helps to get a sense of proportion over geological time scales

Climate data have inspired beautiful, data rich displays. Some examples

The long run: 65 million years

