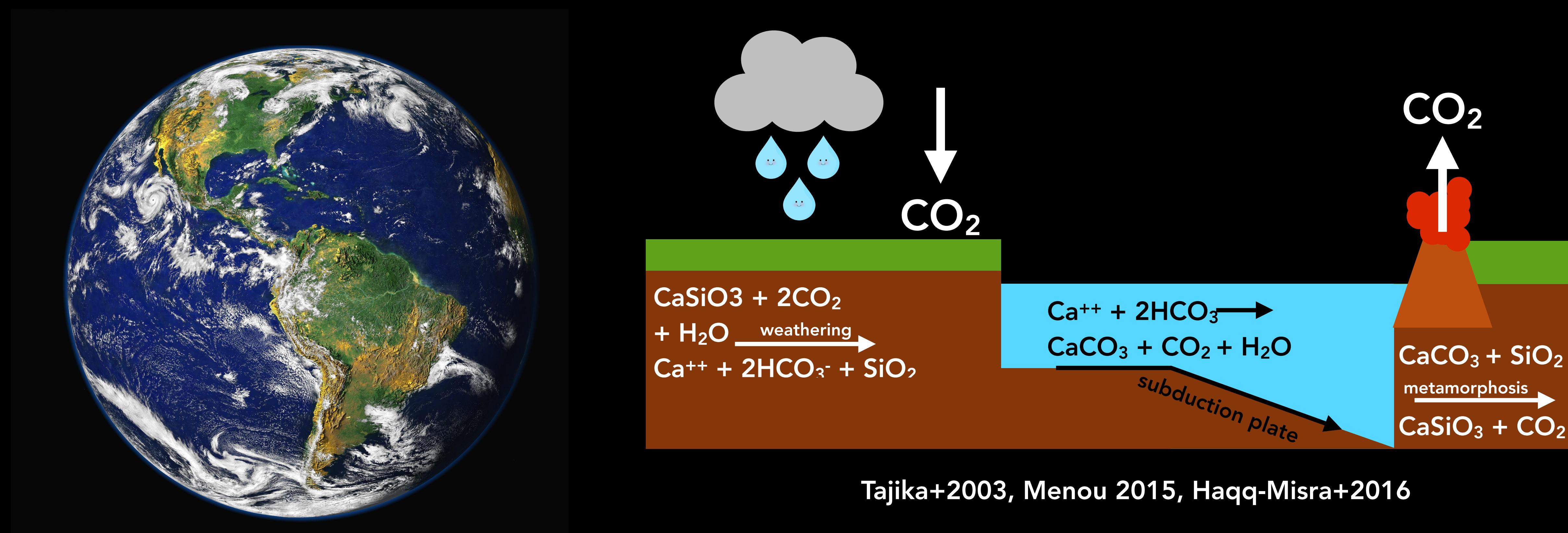


# ON PRESENT-DAY EARTH...

THE CARBONATE-SILICATE CYCLE REGULATES THE CONCENTRATION OF ATMOSPHERIC CO<sub>2</sub>



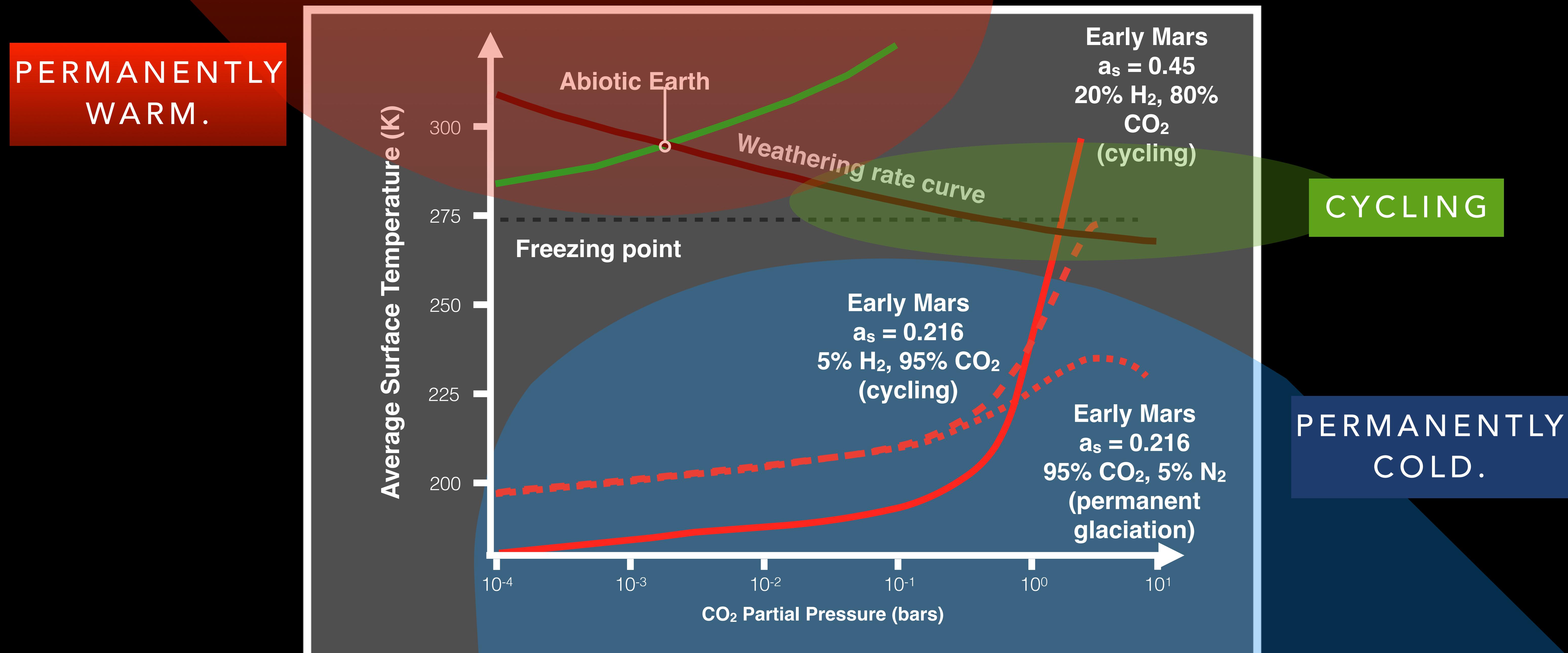
# ON EARLY-MARS...

THE CARBONATE-SILICATE CYCLING WOULD'VE BEEN DIFFERENT IF MARS WERE ALSO RECYCLING VOLATILES AND IF THERE WAS SUBSTANTIAL CO<sub>2</sub> OUTGASSING

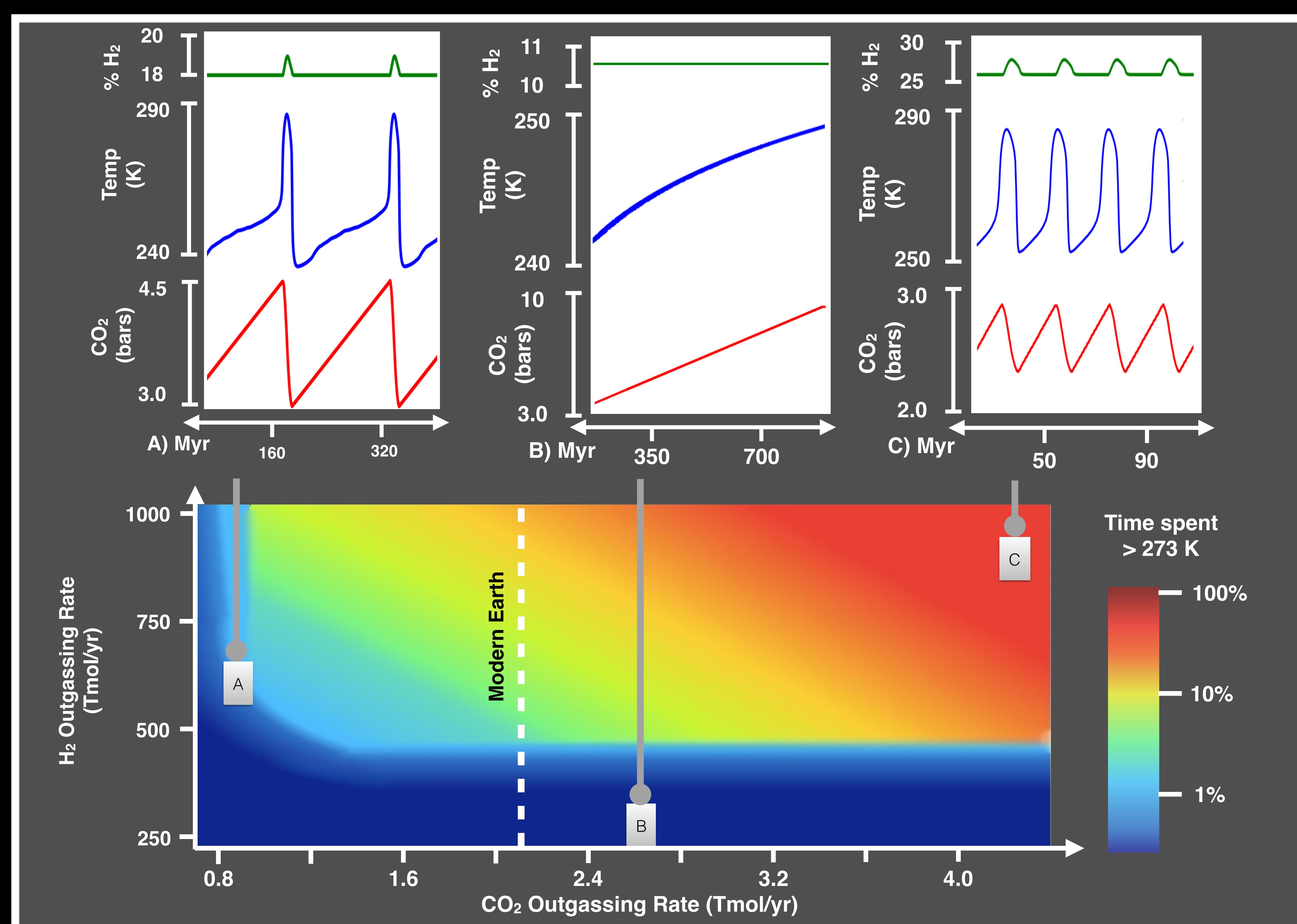
Weathering is dependent on temperature and concentration of CO<sub>2</sub>:

Temperature is cooler → Weathering slows down → CO<sub>2</sub> builds up → Temperature starts to increase

## REGIONS WHERE CLIMATE CYCLING MIGHT HAPPEN



WE DEFINE REGIONS OF PARAMETER SPACE WHERE CLIMATE CYCLING ON MARS MIGHT HAPPEN



A FLIP FLOPPING CLIMATE ON EARLY MARS COULD IMPLY MARS, 3.8 BILLION YEARS AGO, WAS BOTH WARM AND WET, AND COLD AND FROZEN