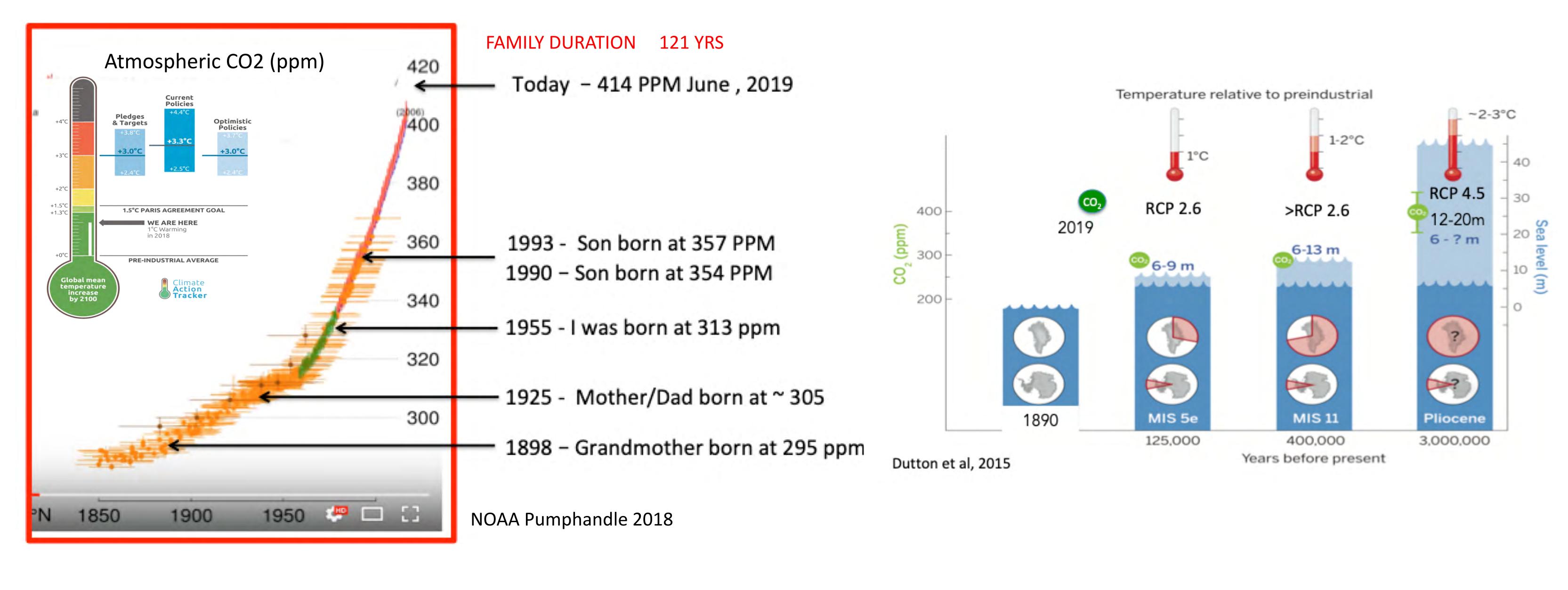
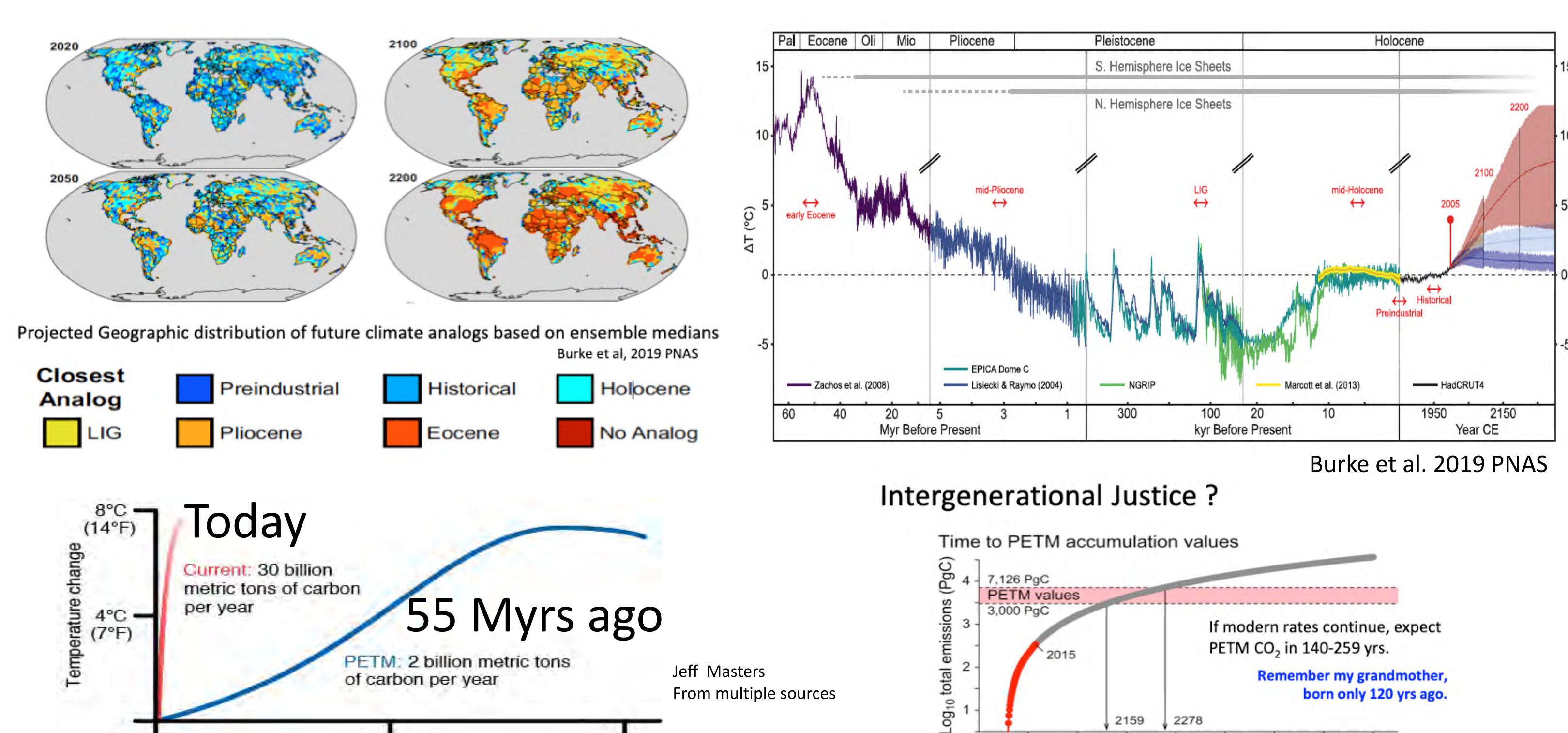
Arctic paleoclimate record shows Earth System's end game with Global Temperatures > 1.5° C





3,000 PgC

2015

2100

2159

2278

Time t (calendar years)

2400

CO₂ is increasing faster than any time in human history. Paleoclimate records back 3 million years show CO₂ concentrations as high as today (410 ppm) and ice sheets in Greenland and West Antarctica were small. CO₂/CH₄ emission rates today are 10x faster than 55 Myr ago when the Earth experienced massive extinctions. The past is a portal to our future without changing energy policies!

PETM: 2 billion metric tons

of carbon per year

10,000

Duration (years)

per year

4°C -

(7°F)

UMassAmherst

2500

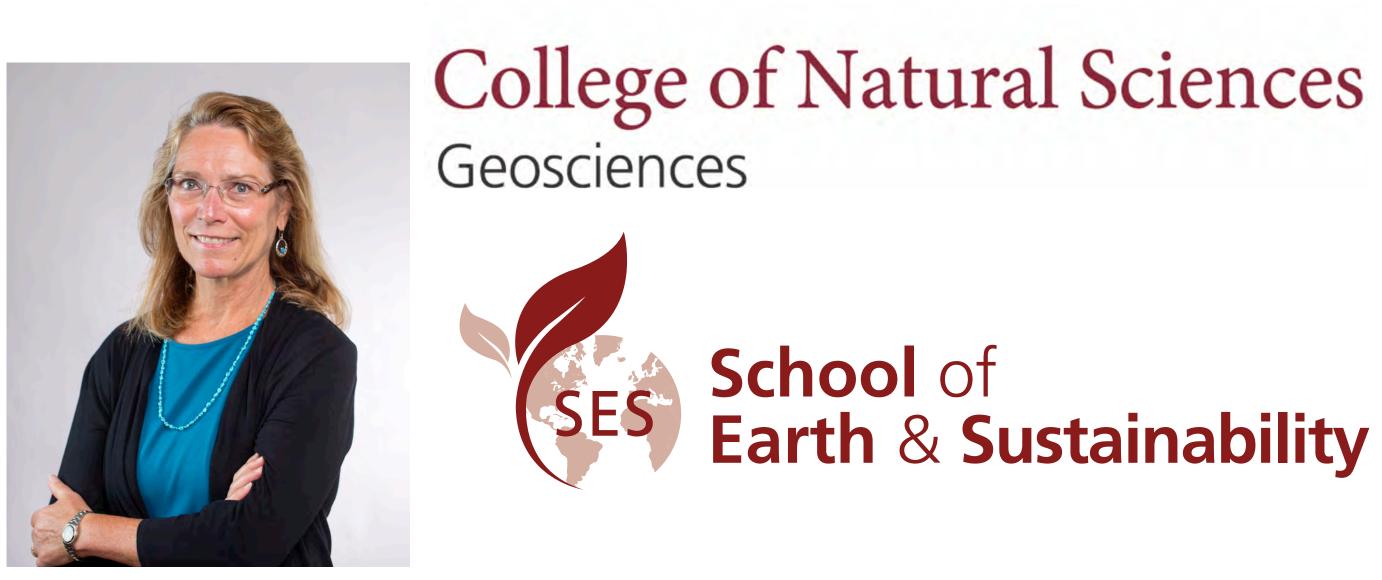
If modern rates continue, expect

Gingerich, January 2019, AGU PP

Remember my grandmother,

born only 120 yrs ago.

PETM CO₂ in 140-259 yrs.



Julie Brigham-Grette University of Massachusetts-Amherst

Jeff Masters

20,000

From multiple sources