



Caltech

# Plan B: Engineering a Cooler Earth

*This symposium is made possible by a generous grant from Charles T. Munger*



RONALD AND MAXINE LINDE CENTER  
FOR GLOBAL ENVIRONMENTAL SCIENCE





# Plan B: Engineering a Cooler Earth

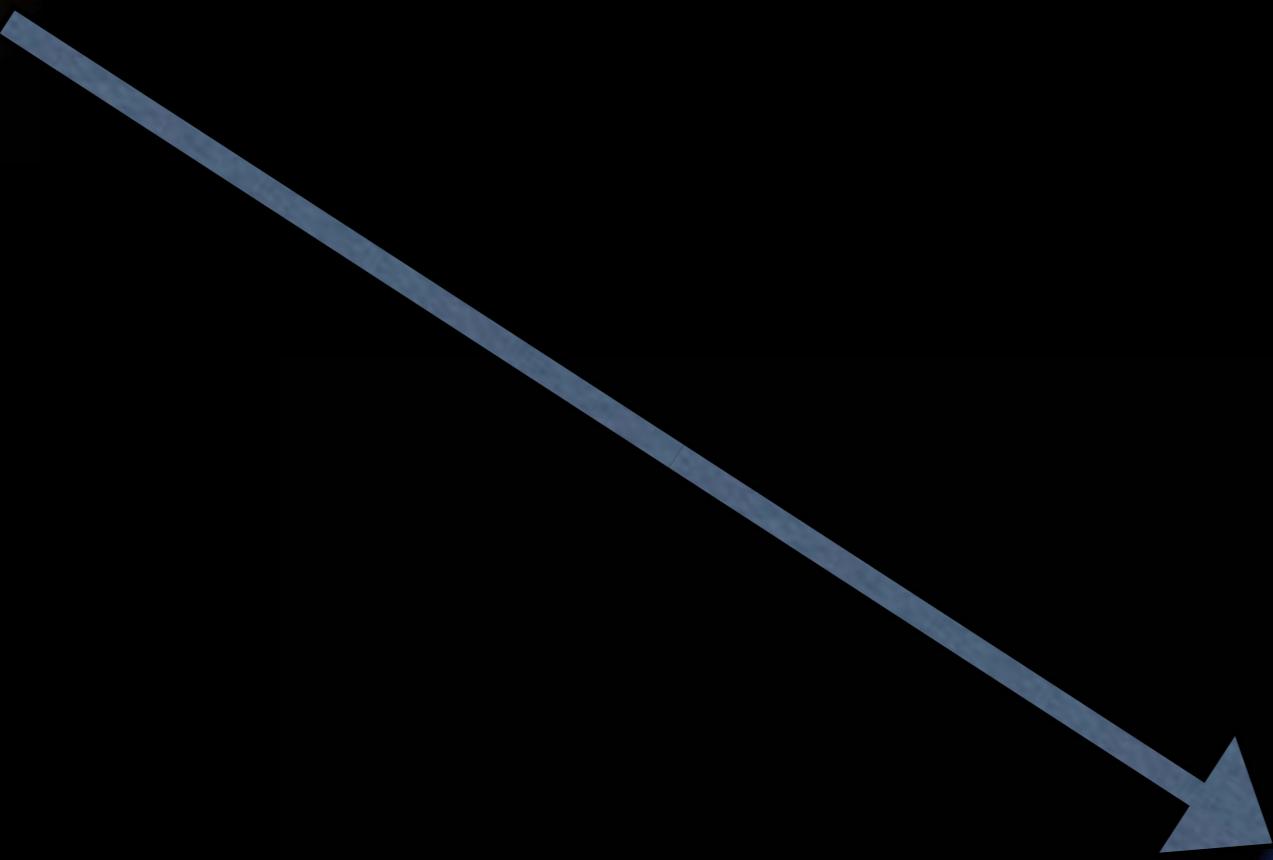
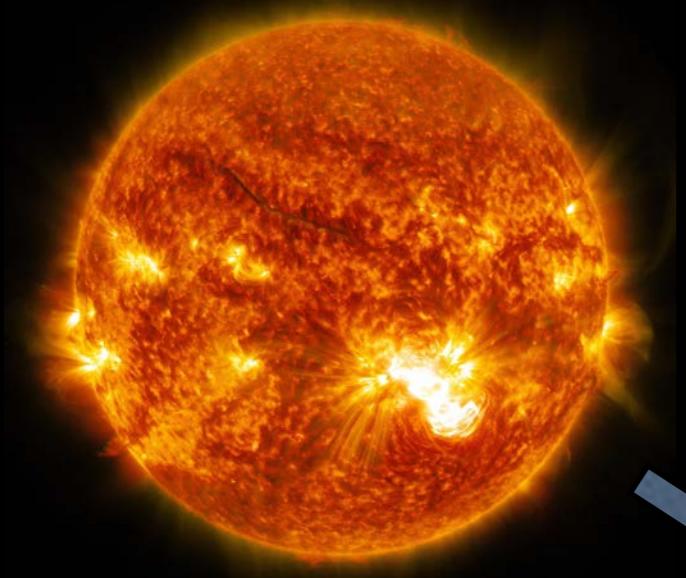
Paul Wennberg

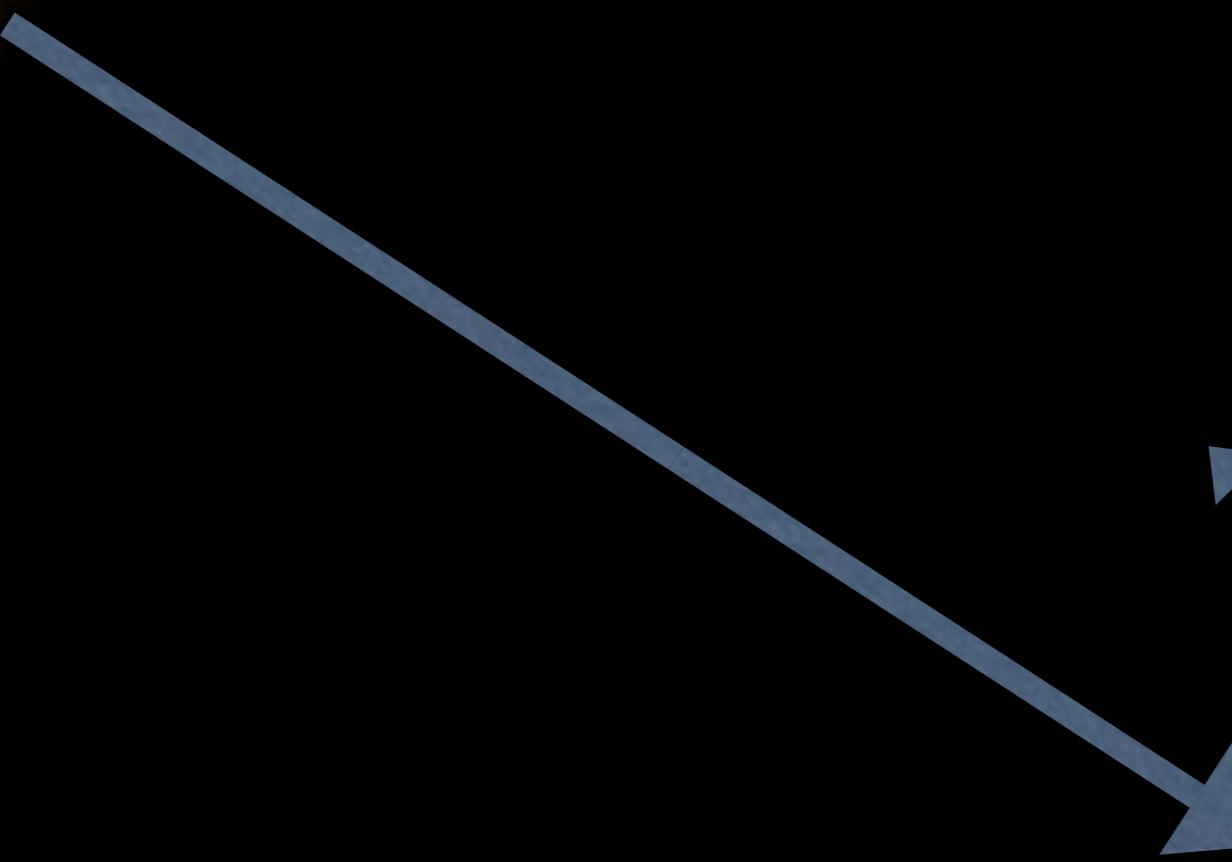
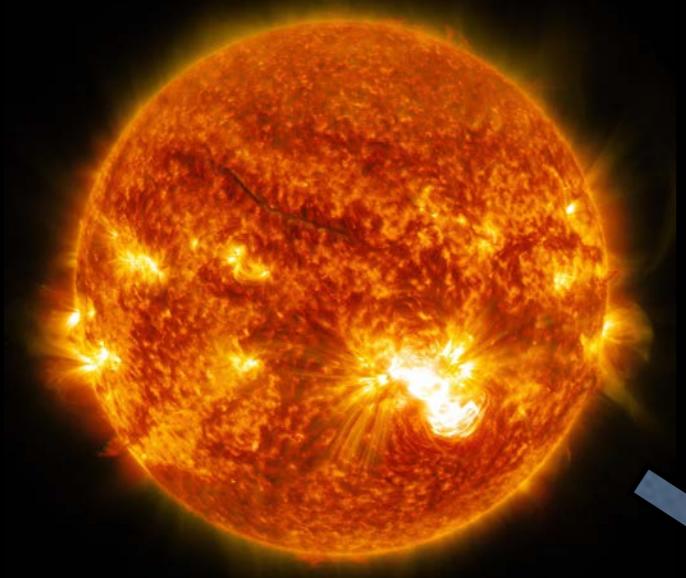


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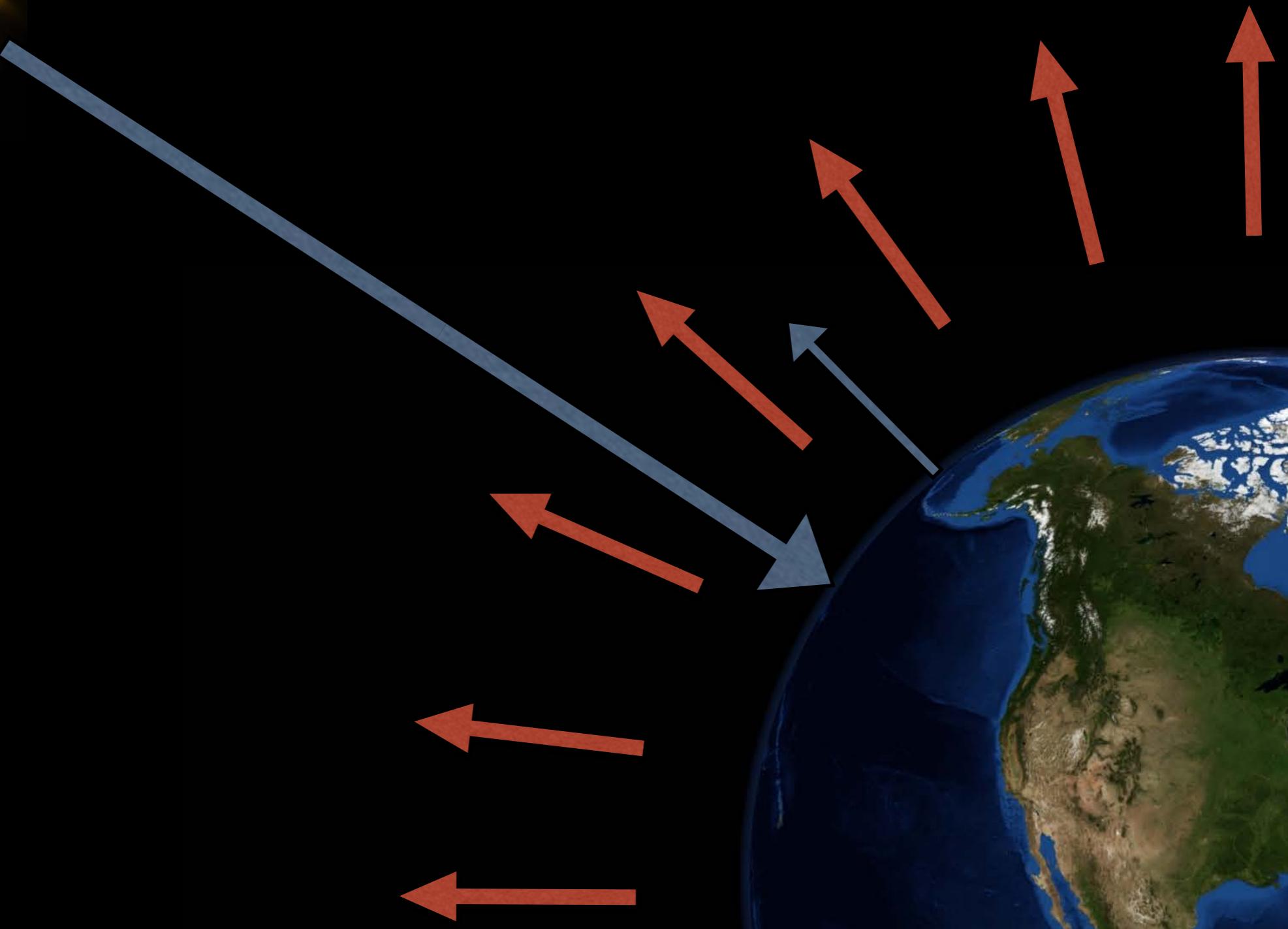
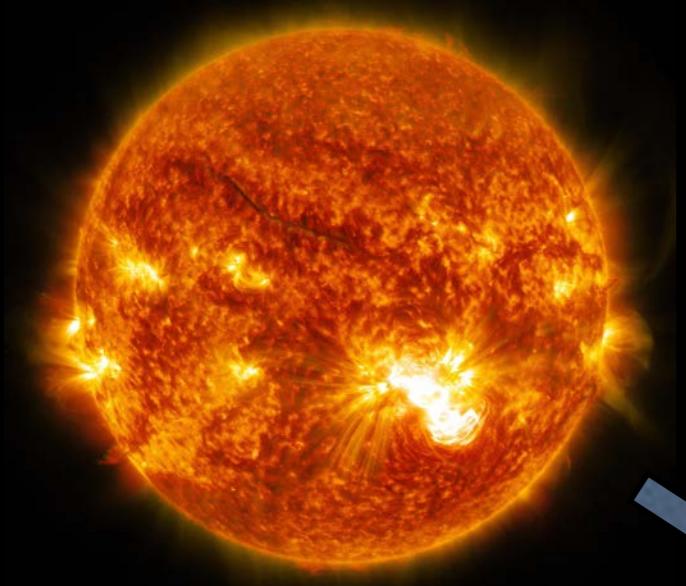


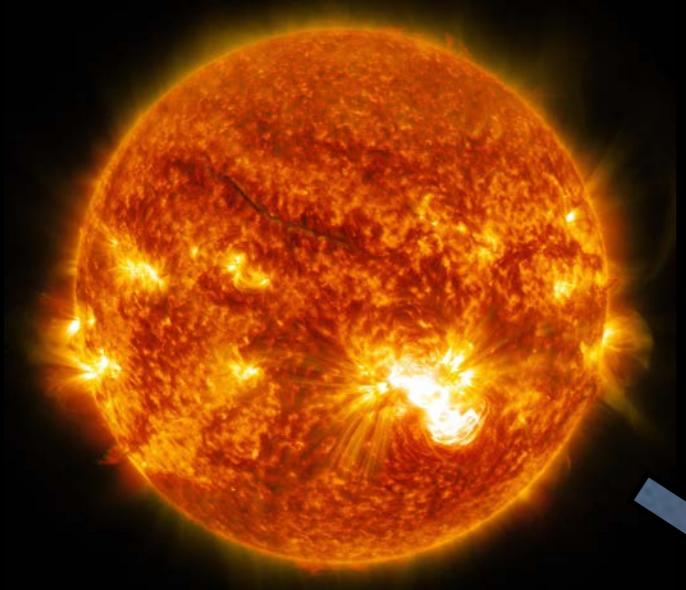




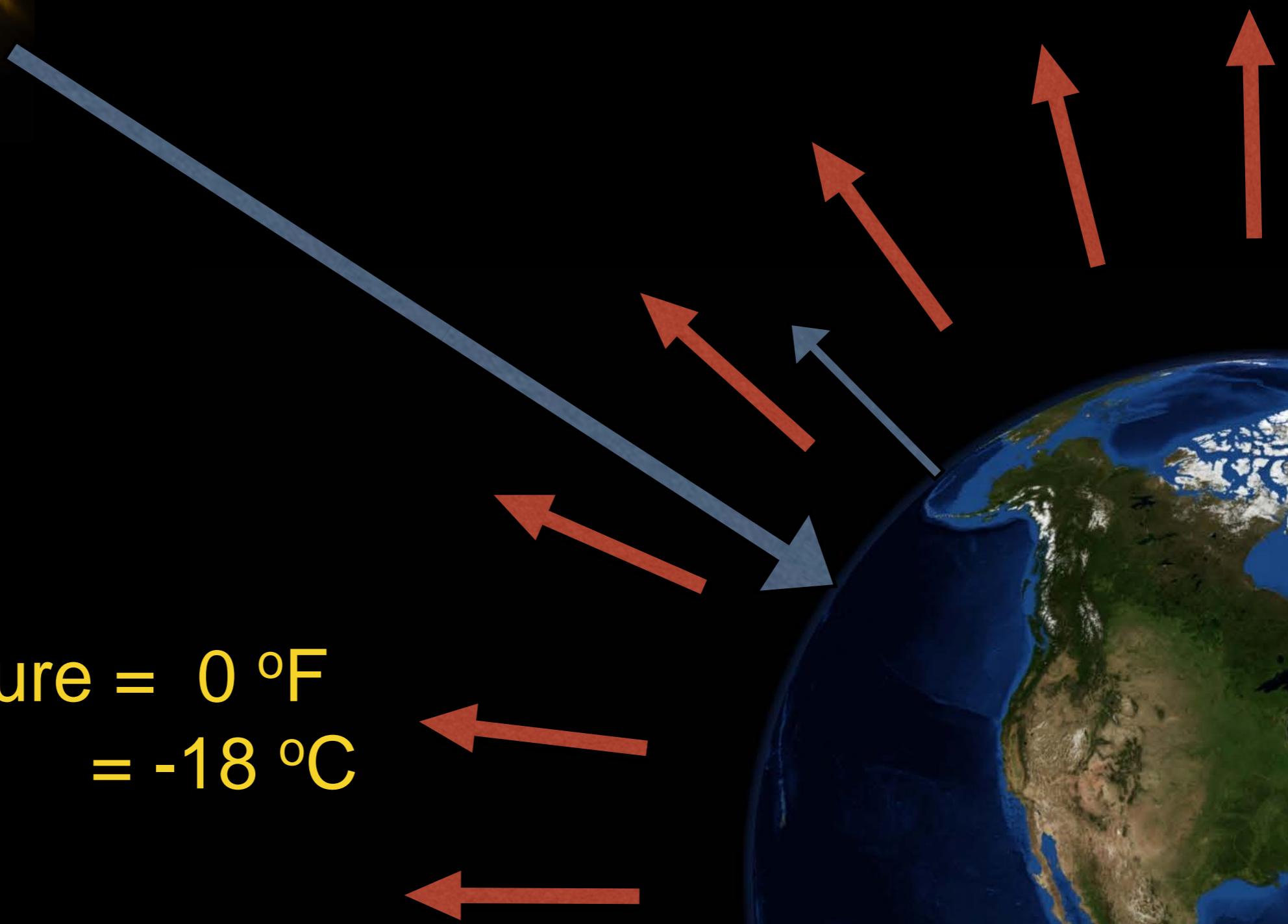
Albedo = 0.3

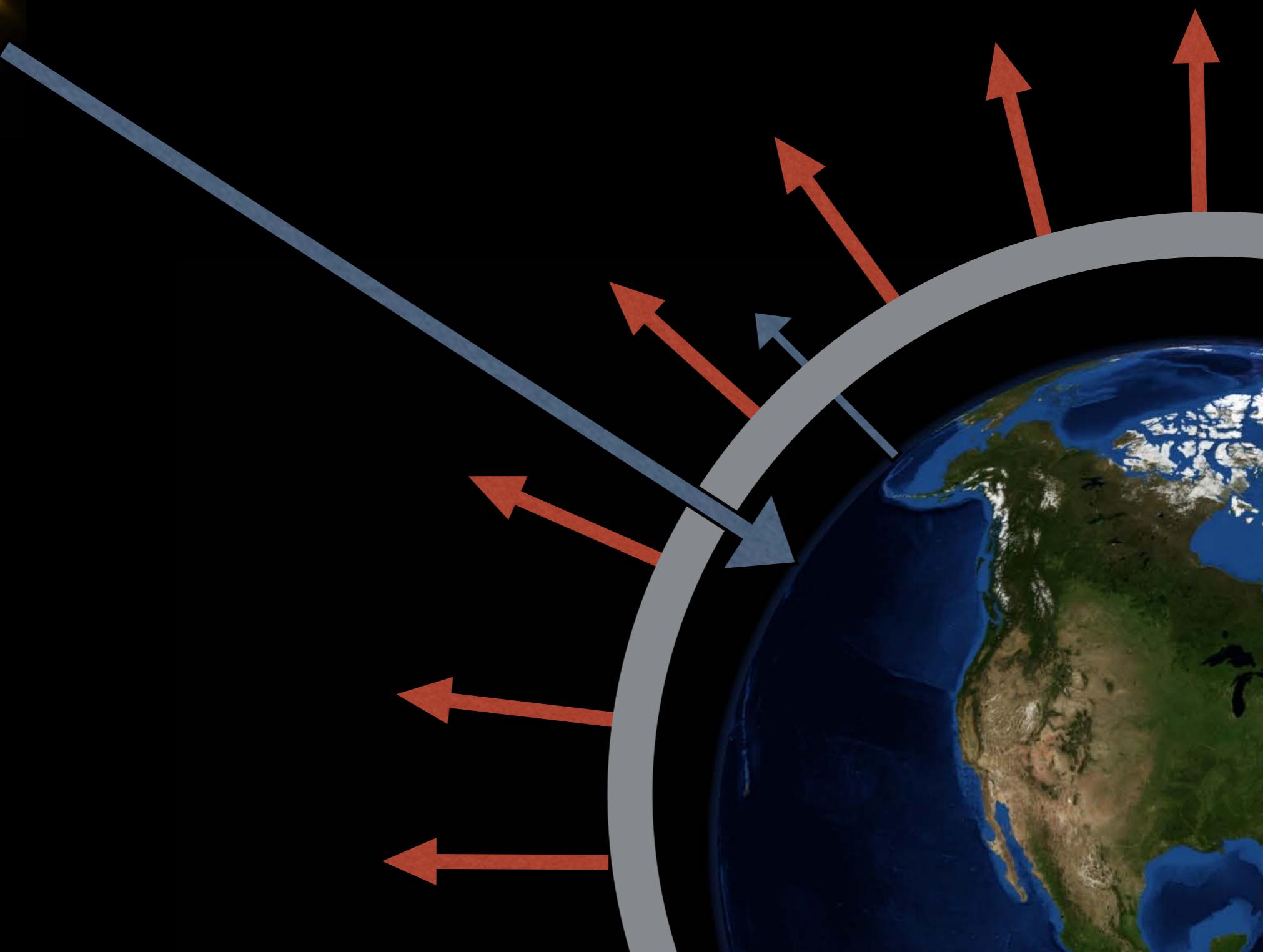
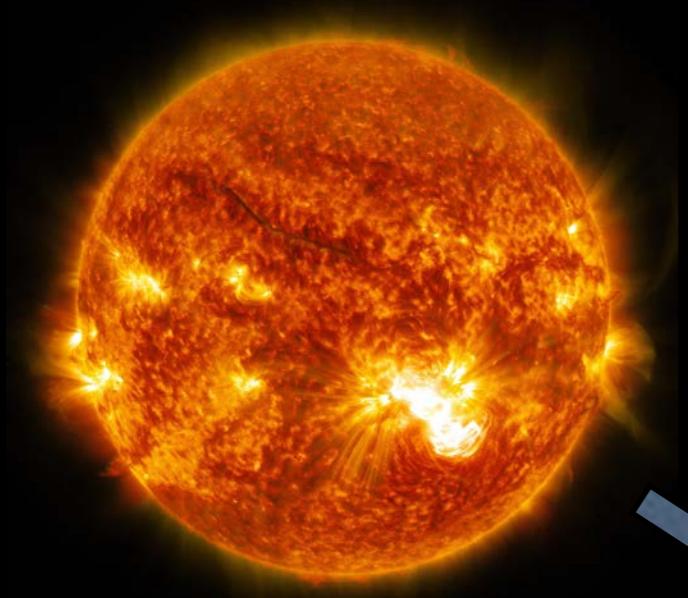


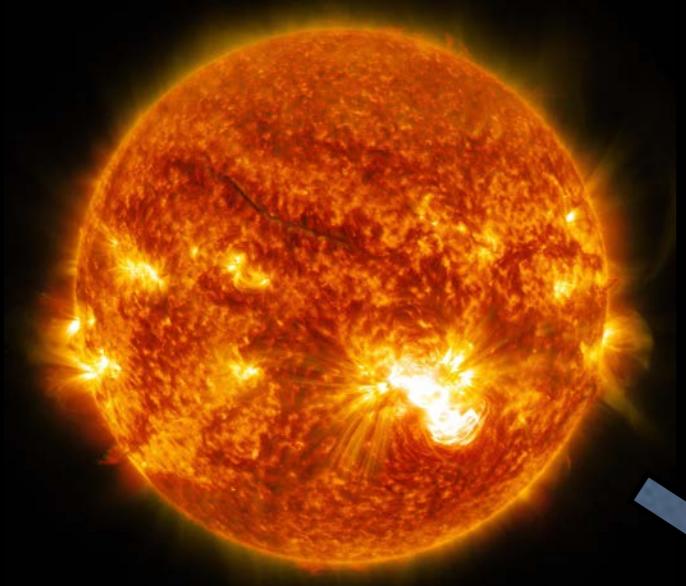




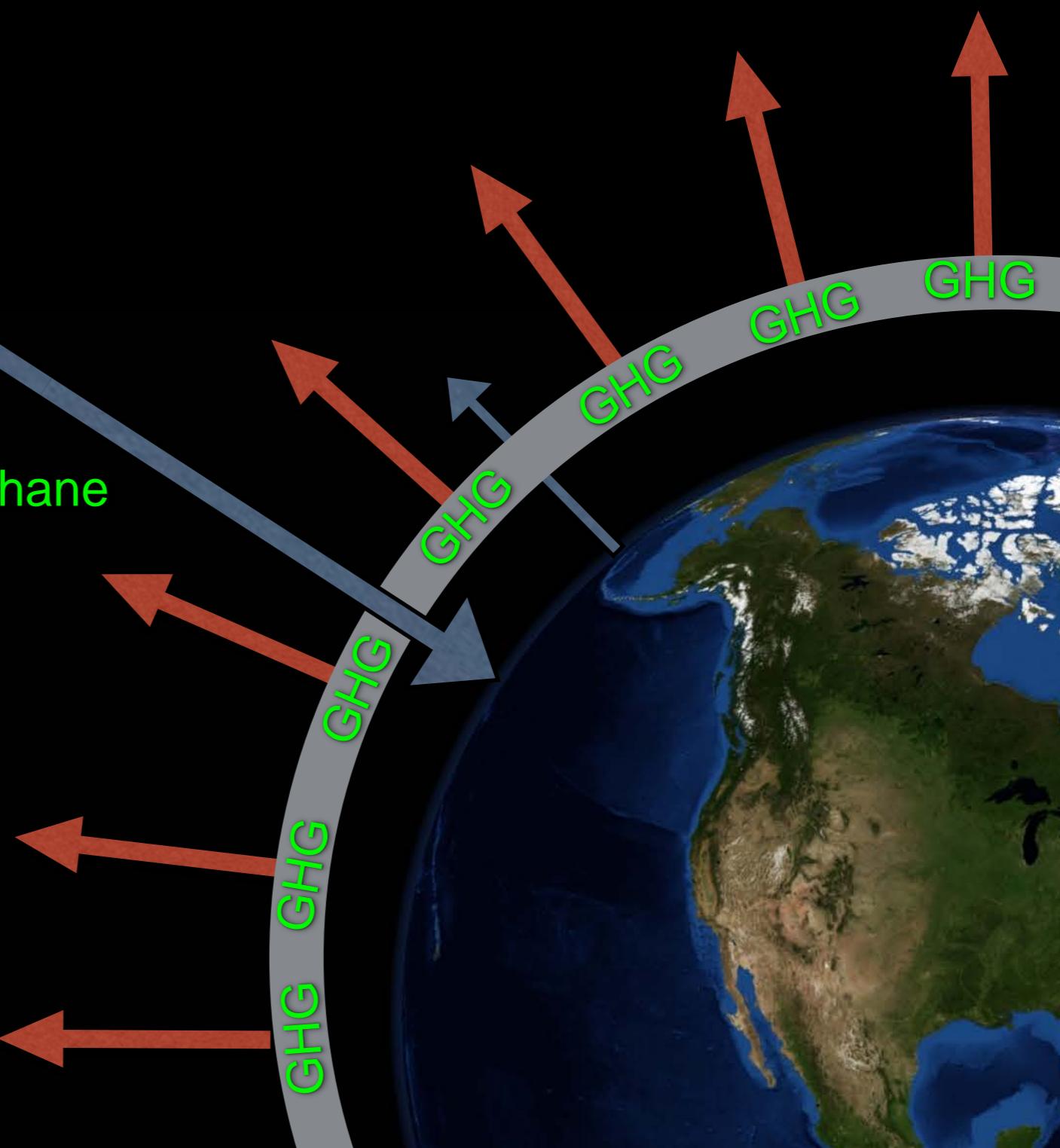
Temperature =  $0^{\circ}\text{F}$   
 $= -18^{\circ}\text{C}$

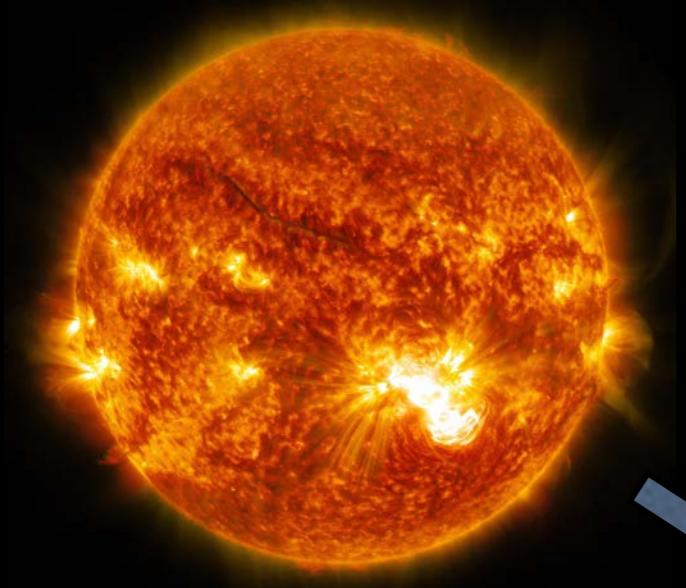




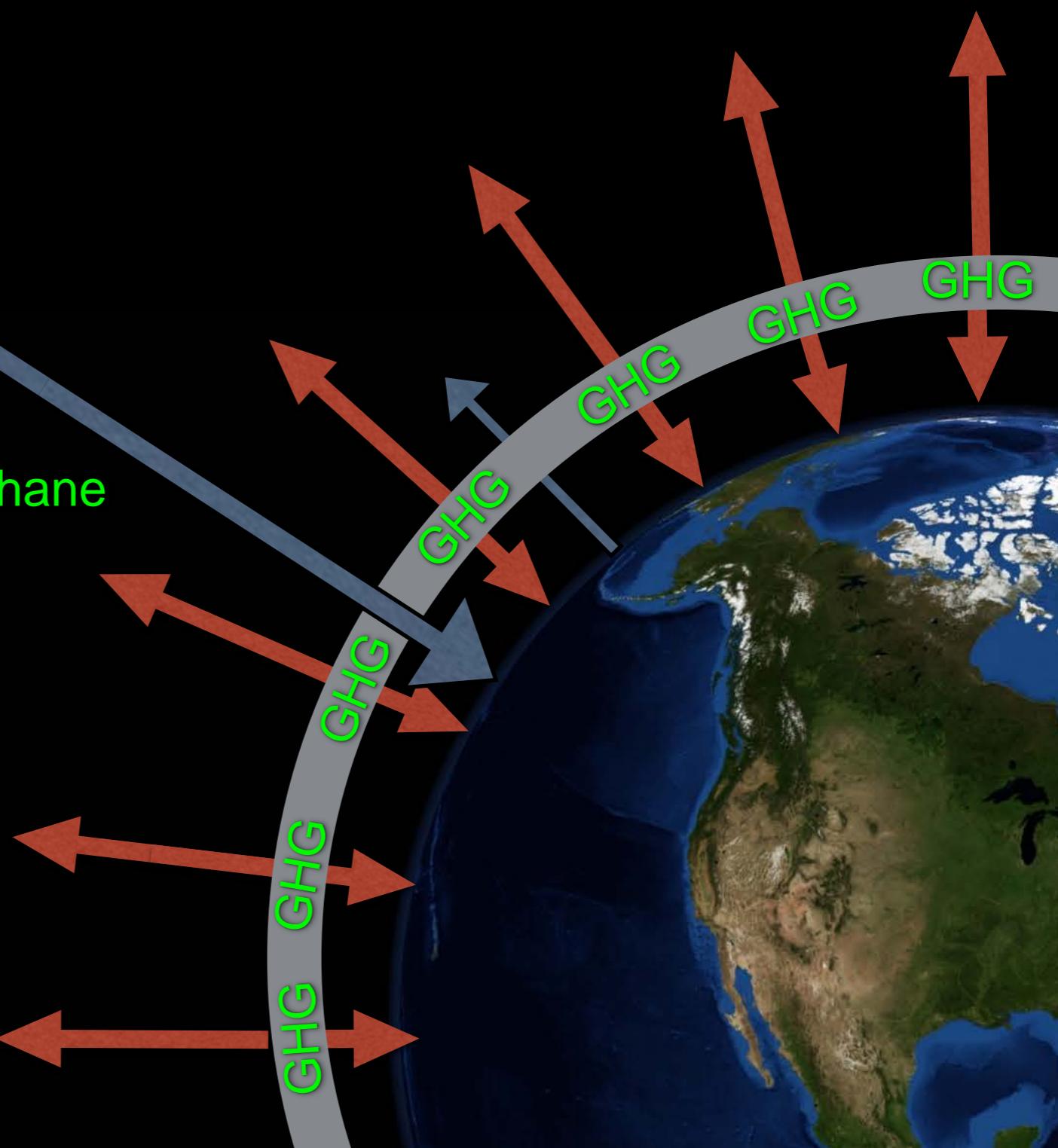


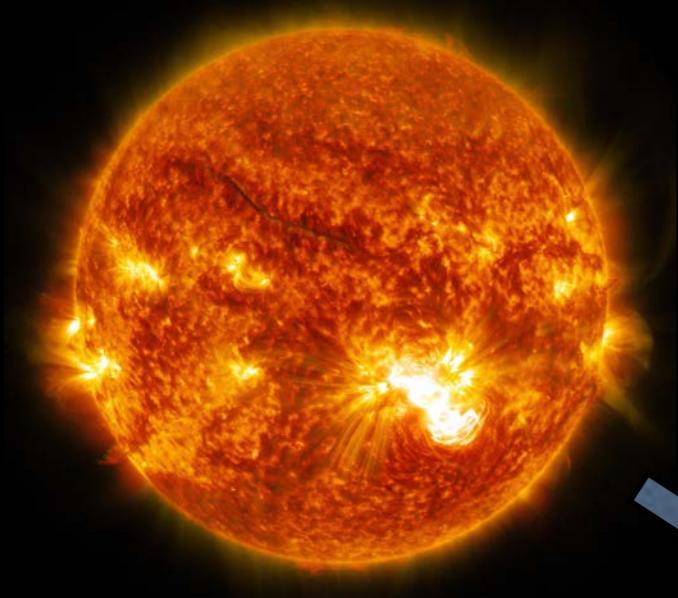
GHG = water vapor, carbon dioxide, methane





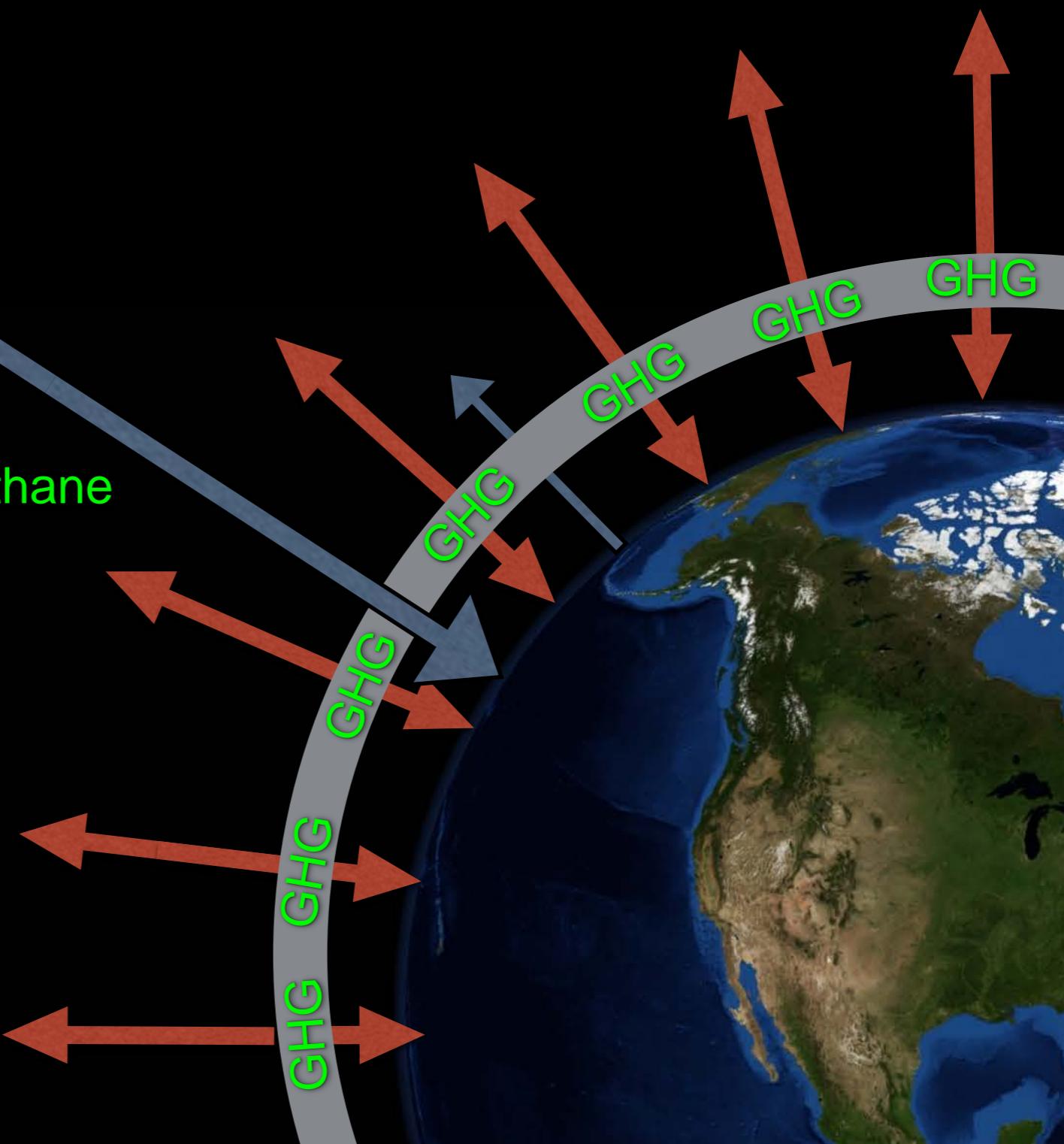
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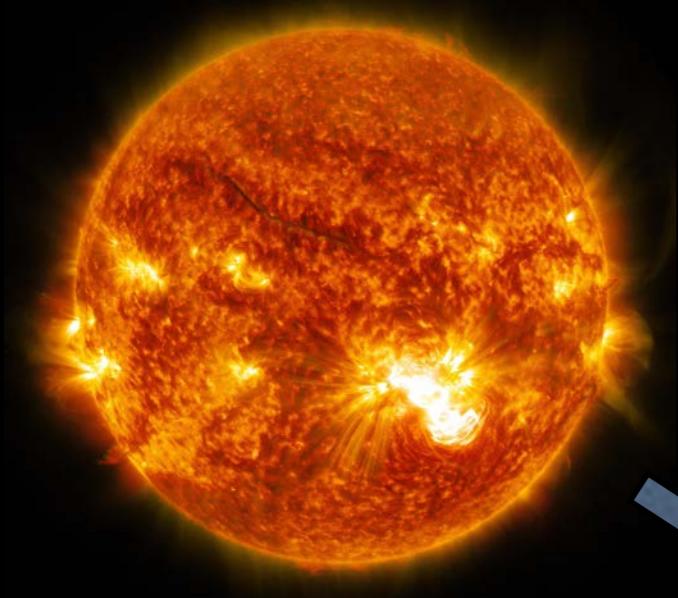




GHG = water vapor, carbon dioxide, methane

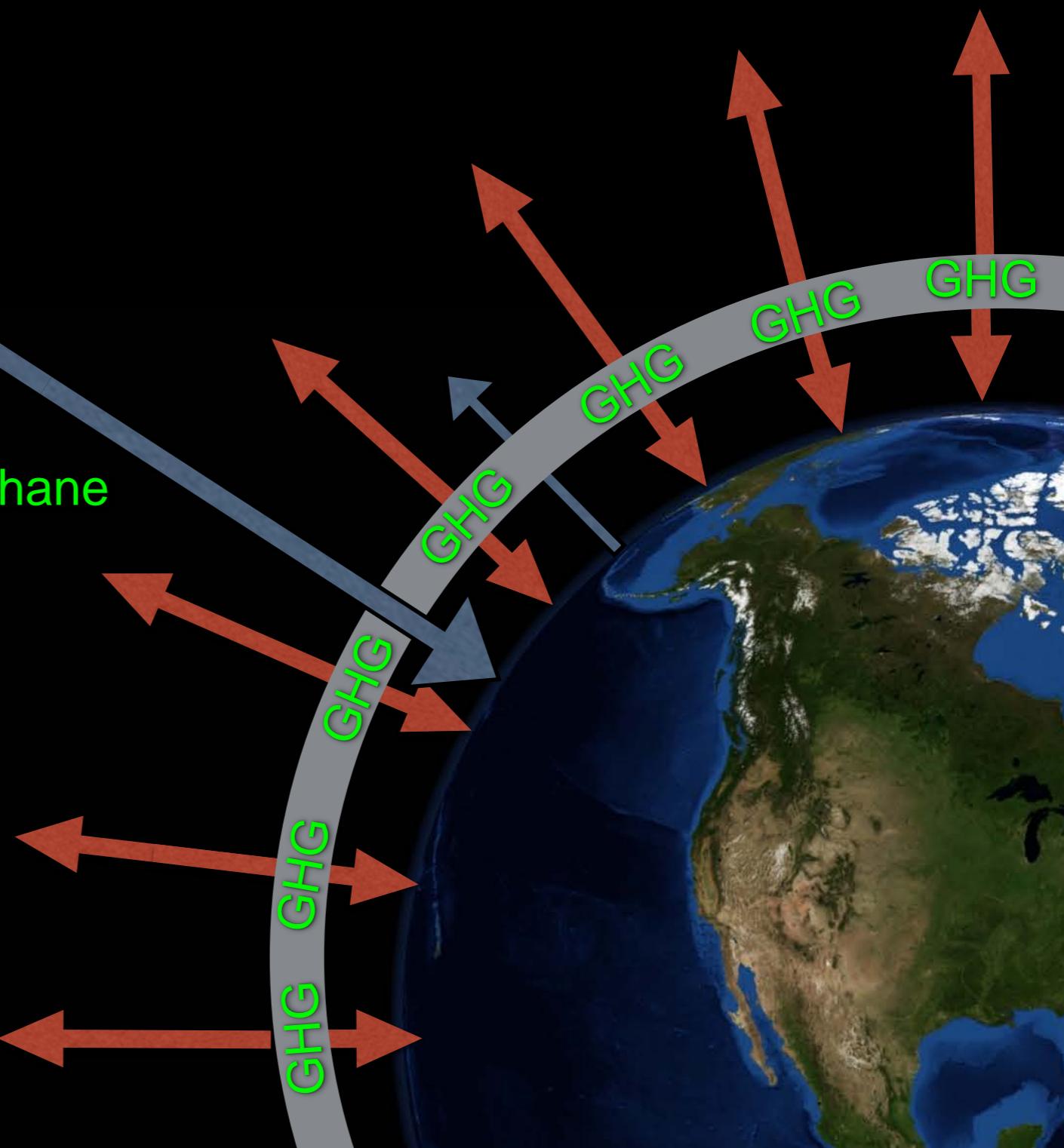
Temperature = + 57.1 °F  
= + 14.0 °C

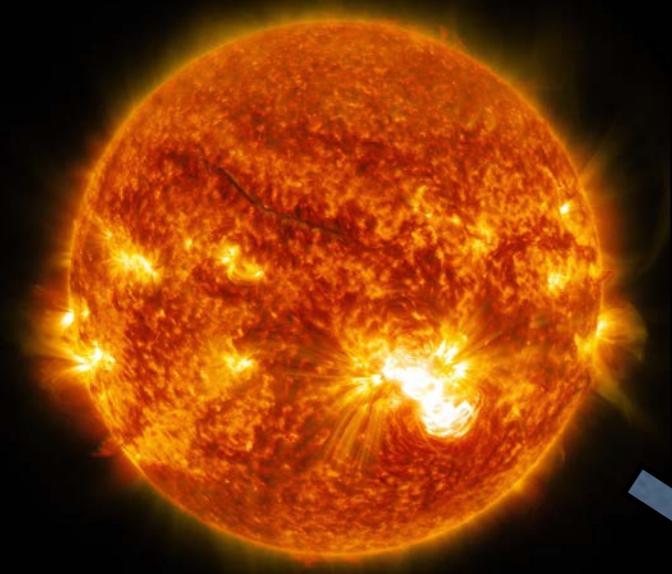




GHG = water vapor, carbon dioxide, methane

Temperature = + 58.4 °F  
= + 14.7 °C





Only two knobs to turn:  
Reflectivity (Albedo) and GHGs

