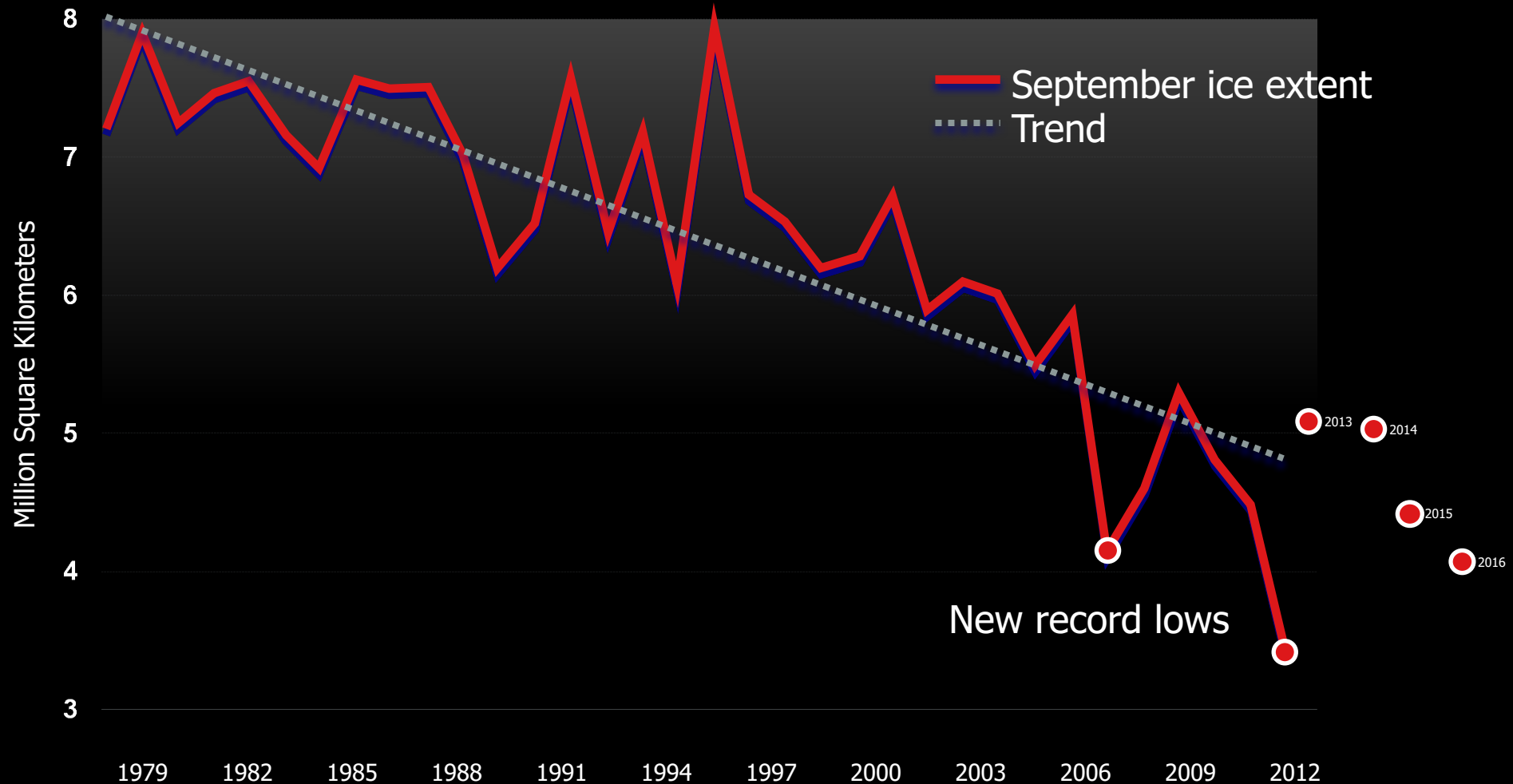


Aug 26, 2012



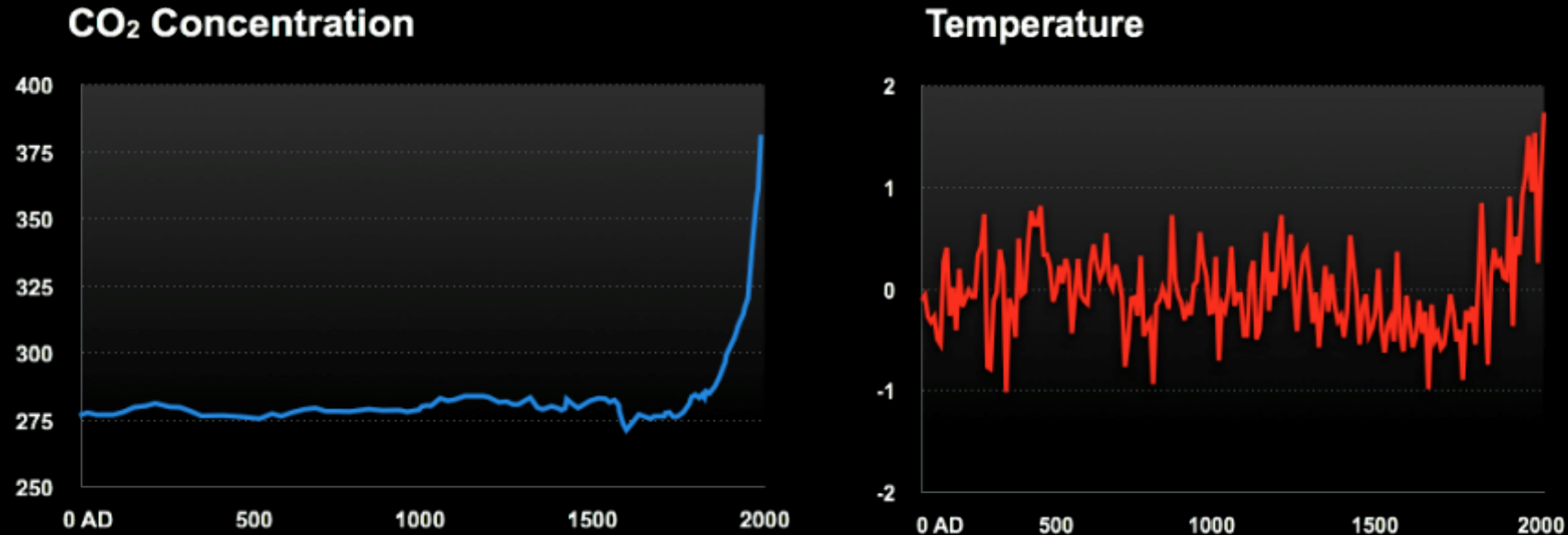
# September Arctic Sea ice extent

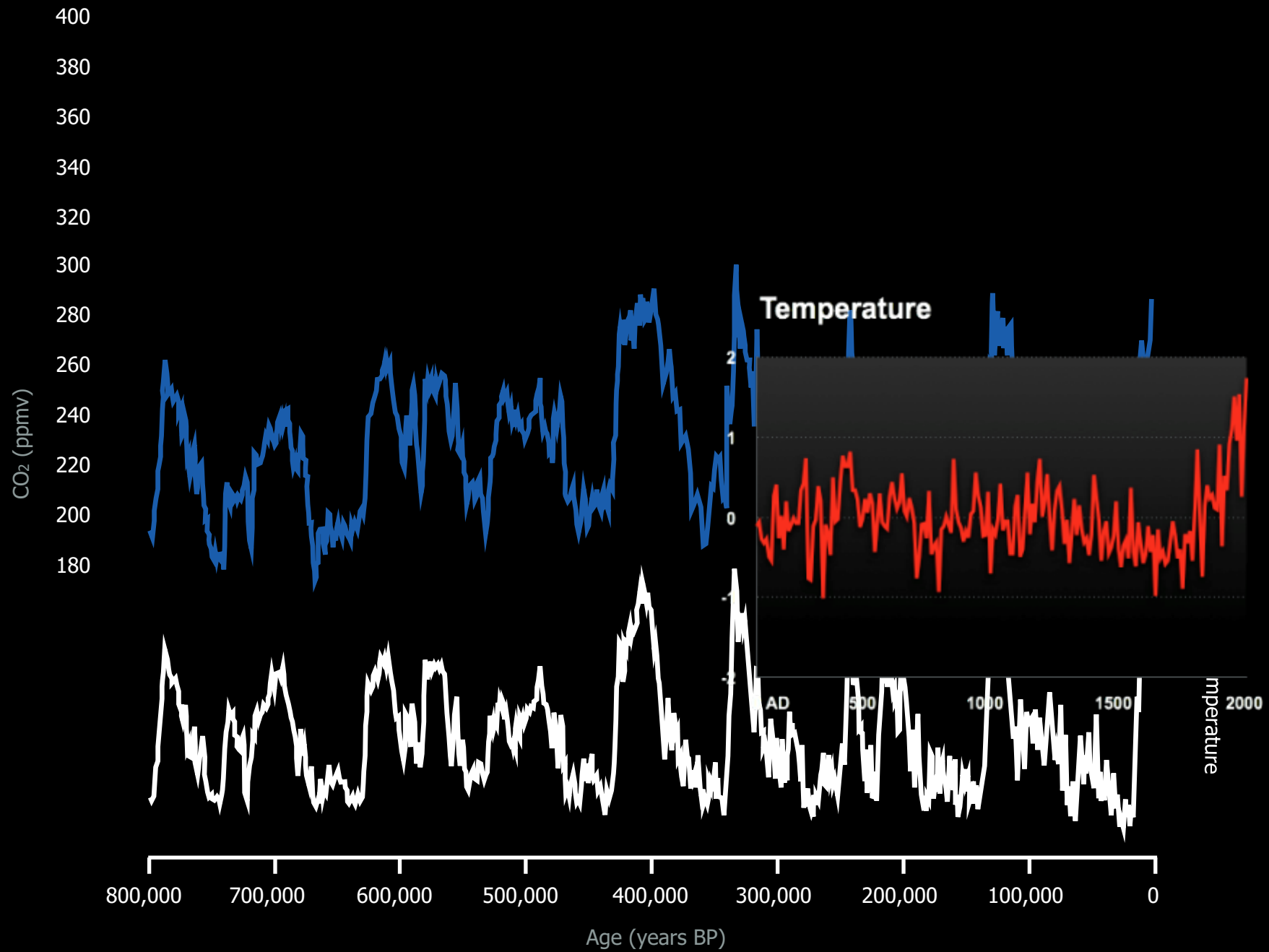
## 1979 – 2016

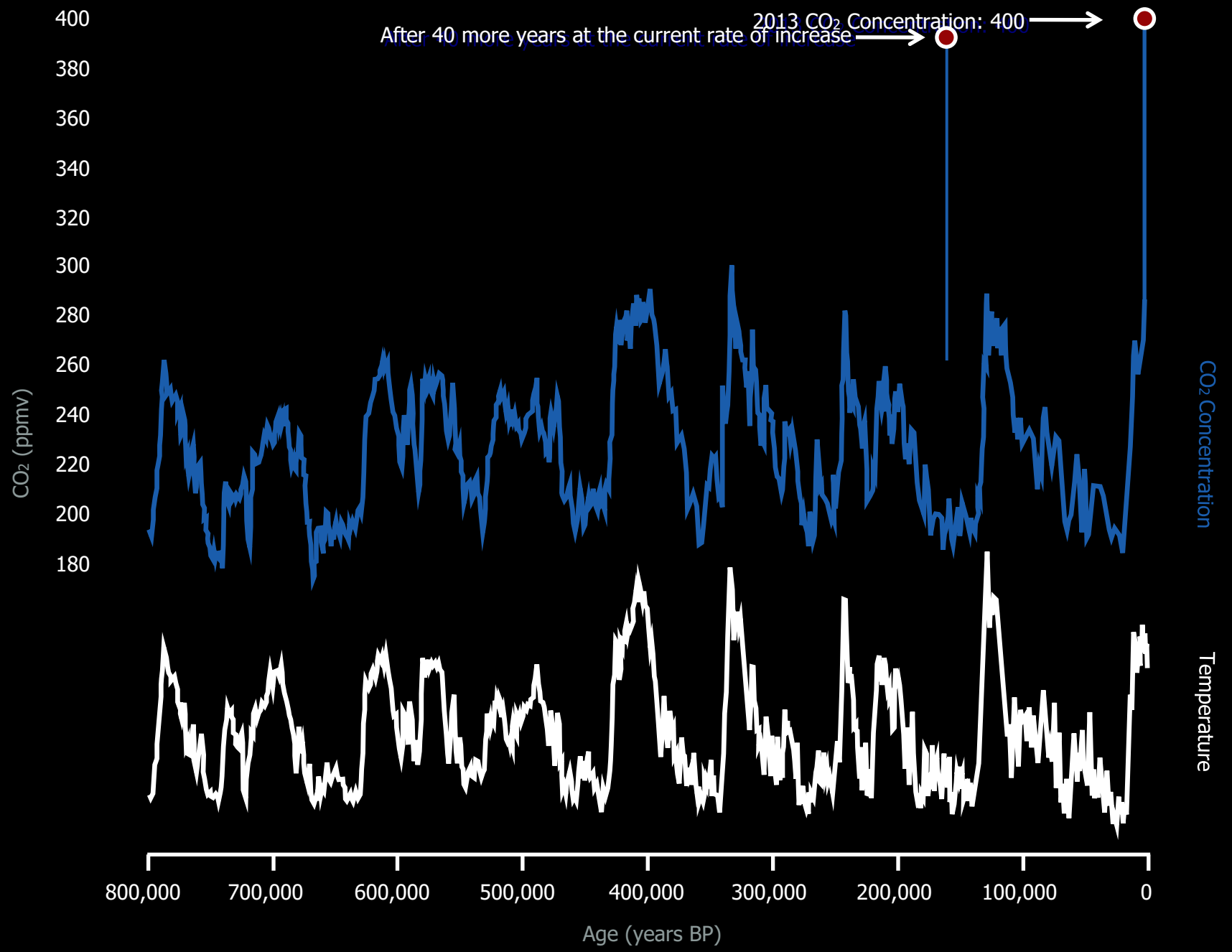


# As CO<sub>2</sub> Increases, So Does the Temperature

## 2000 Years of CO<sub>2</sub> and Global Temperature



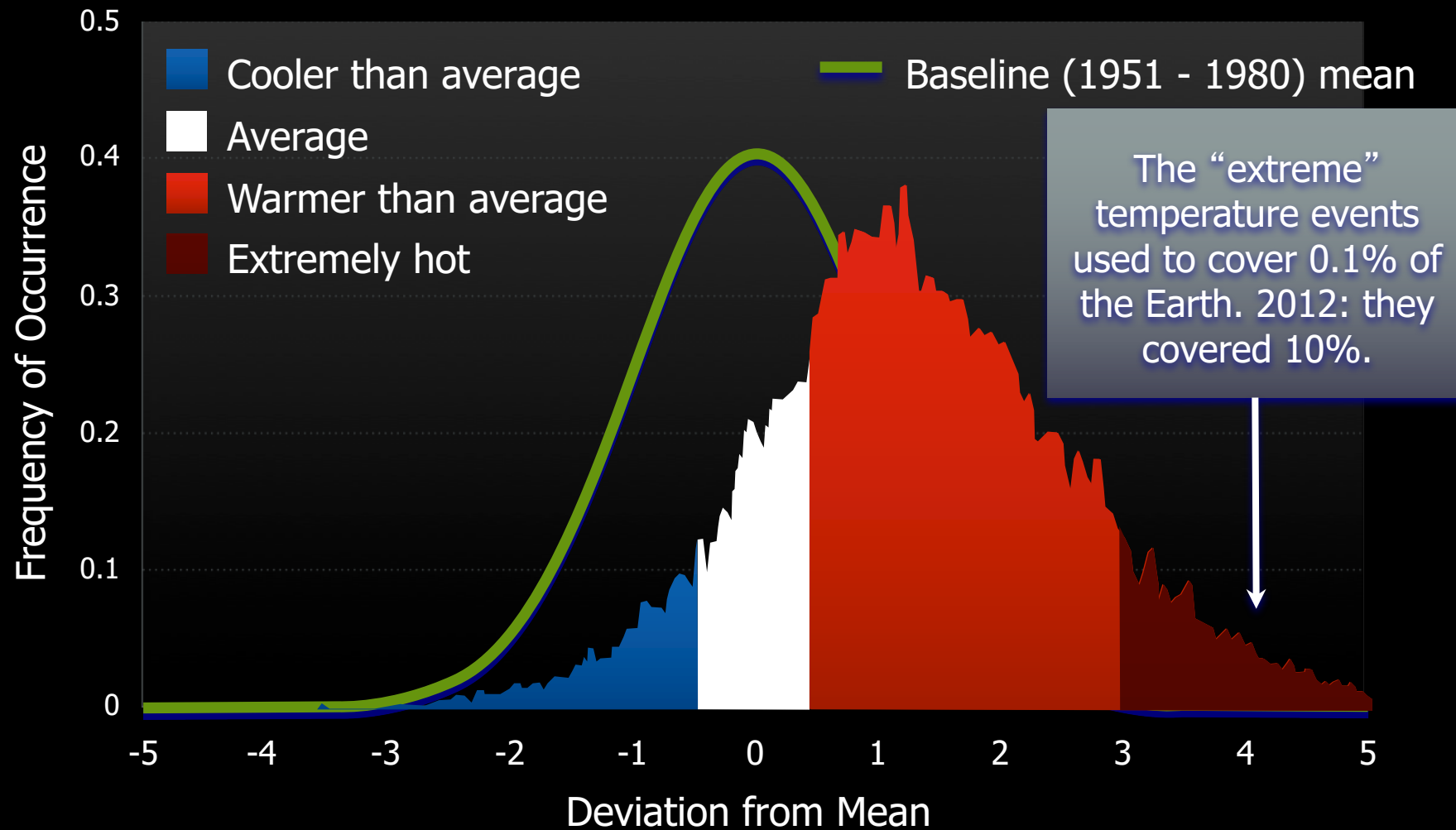




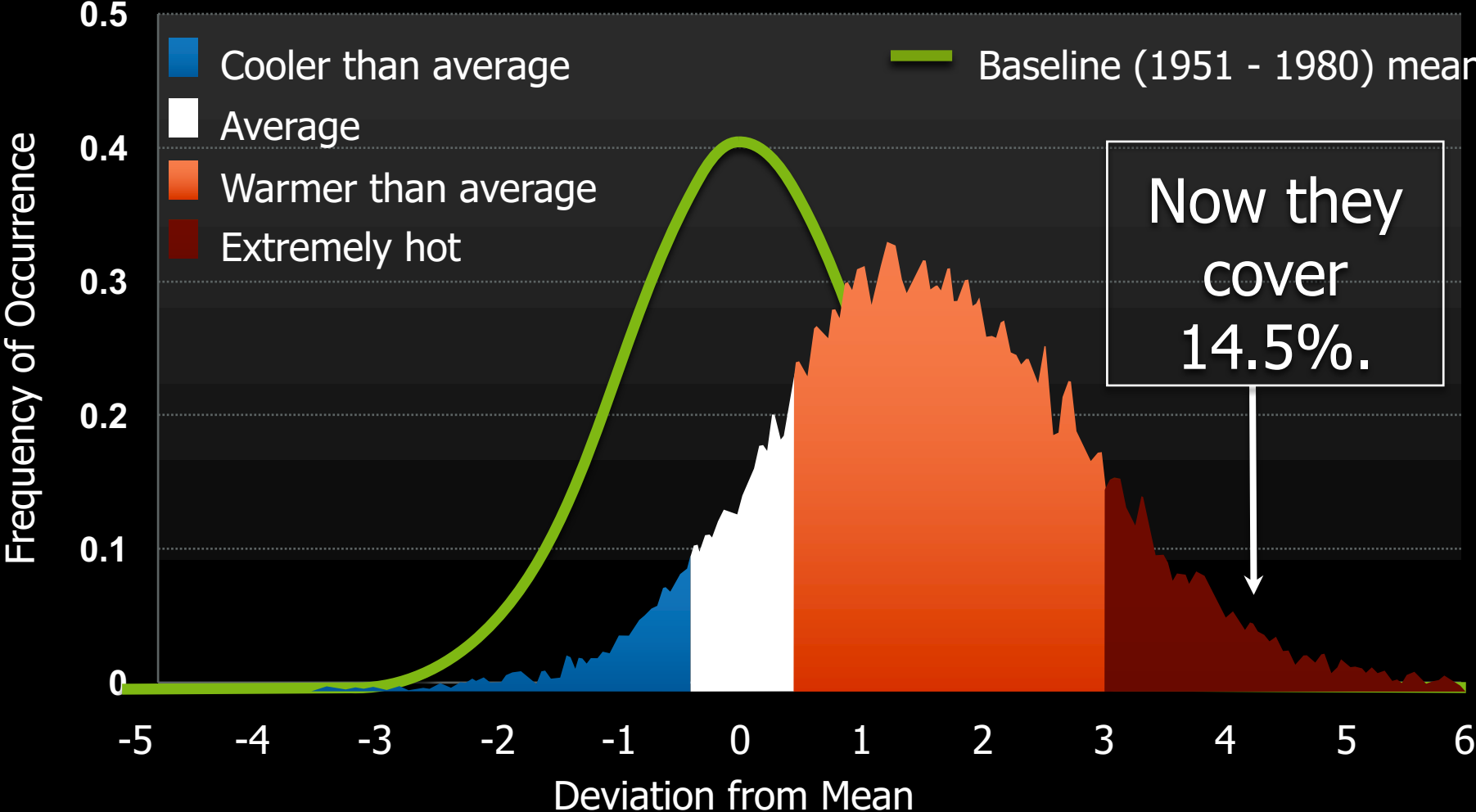
Source: National Climatic Data Center, NOAA

2017 was the **41st** consecutive year with  
a global temperature above  
the 20th century average

# Summer temperatures have shifted



# Look at last 10 years... 2005 to 2015...

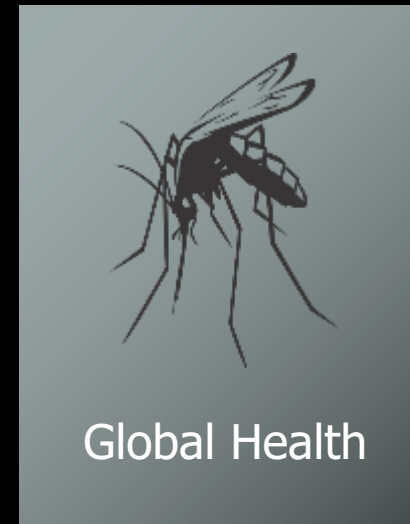
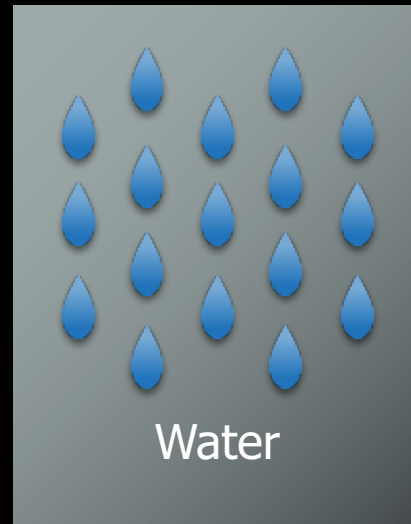


Source: Hansen, et al., "Perceptions of Climate Change," Proc. Natl. Acad. Sci. USA 10.1073, August 2012 – Updated 2016



# Global systems vulnerable to climate

Disruptions ~ Political/societal  
instability



**There is already 4% more water vapor over the oceans than there was only 30 years ago**



# I-10 near Houston August 2017



We have lost  
**more than**  
**half**  
of the animals on  
our planet  
in the last 40  
years

Source: WWF, *Living Planet Report 2014*



# Coral bleaching

- Great Barrier Reef, Australia



The 2015–2016 bleaching event is the worst ever recorded on the Great Barrier Reef.

# Tropical diseases on the move



# The Vatican



# Pay-as-you-go solar power

Low initial costs  
make small solar  
systems affordable  
in developing  
countries

Photo courtesy Azuri Technologies

*Nimule, South Sudan*





**End of This Module**

**Any  
Questions?**

