

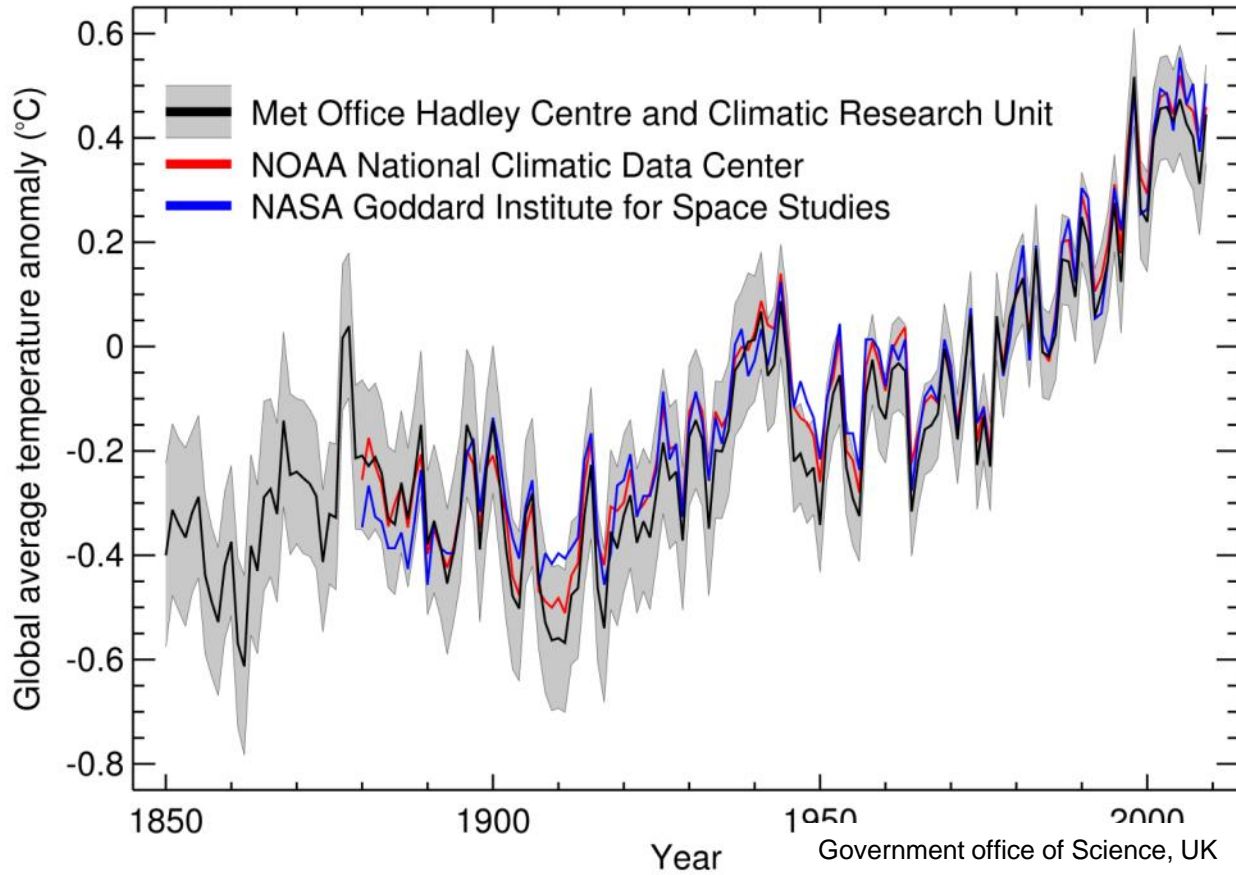
# Climate Change and Sea Level Rise in Boston

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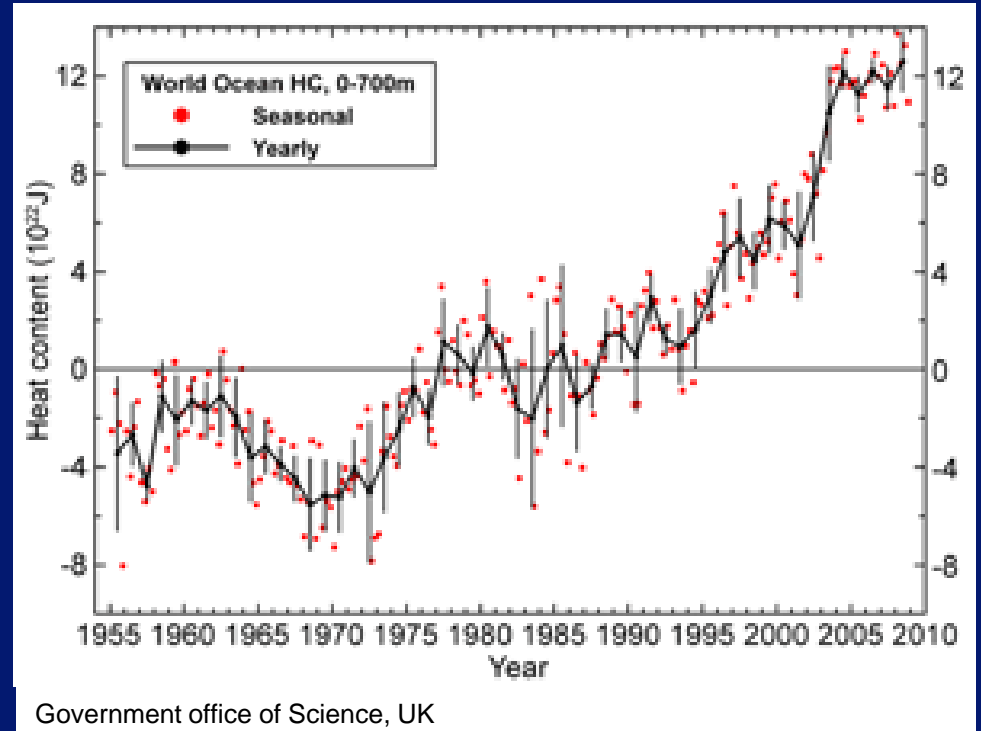


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# Global Temperature is Rising

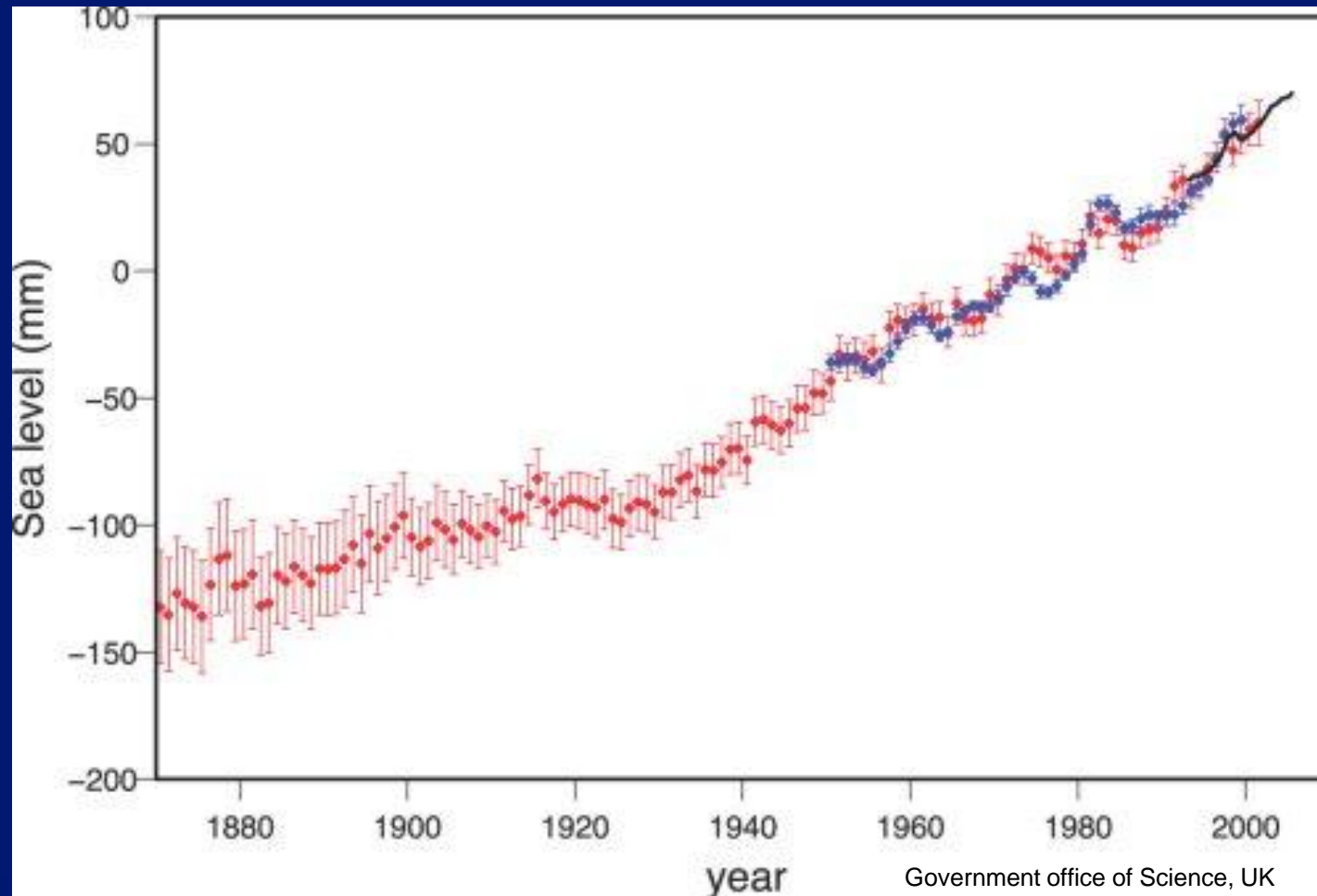


# The Oceans are Heating Up



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# The Seas are Rising

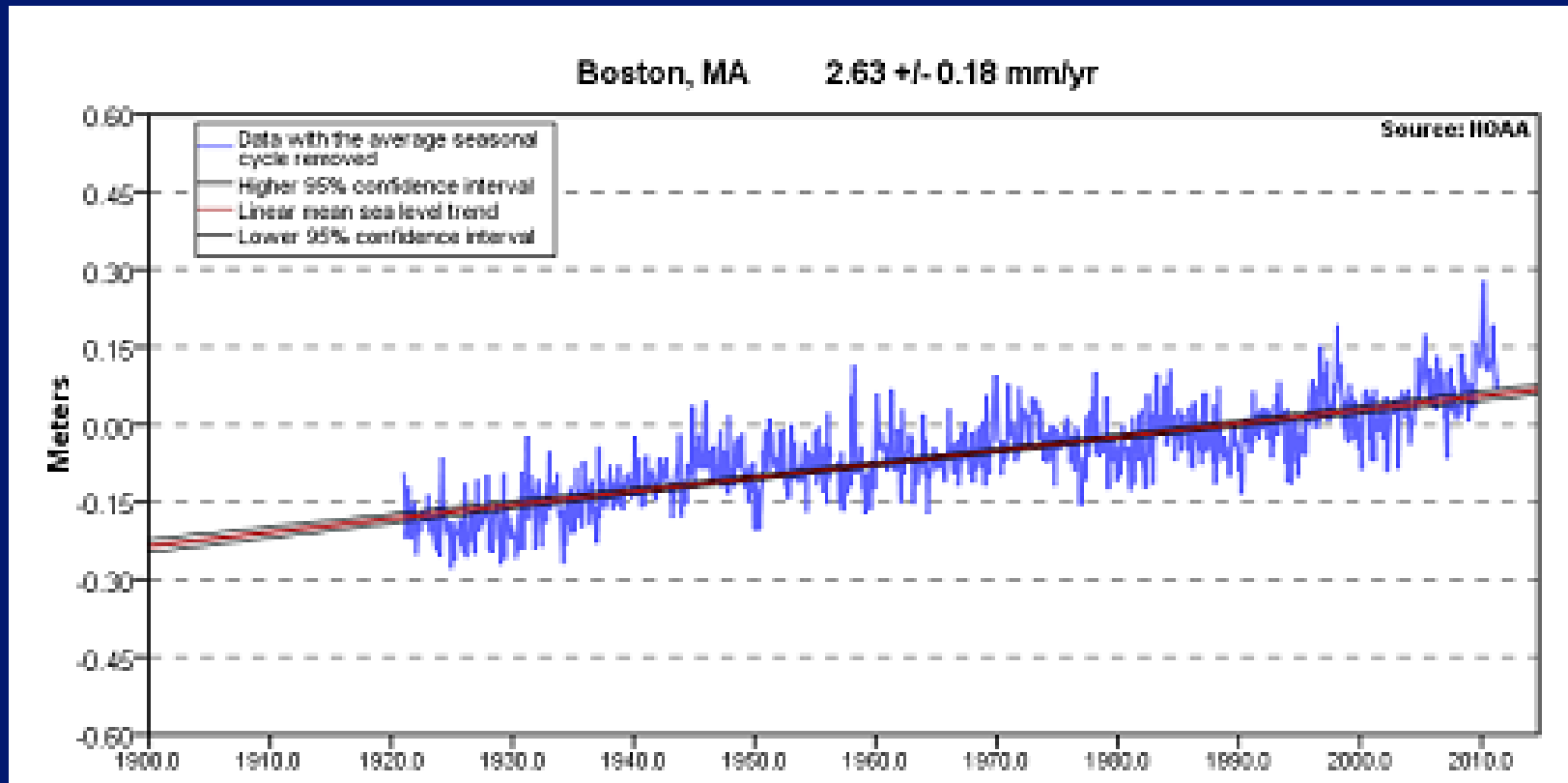


# Causes of Sea Level Rise

- Thermal expansion (#1 contributor to date)
- Melting of ice caps (#2 - increasing)
  - Greenland & Antarctica – ice on land
  - NOT melting of floating sea ice in the Arctic
- Melting of glaciers (#3)
- Current rate:
  - 3.2 mm/year = 1 in./decade = 1 ft./century
- The future:
  - IPCC science: 1 to 3 ft. by 2100 (global average)
  - Boston: 2 to 6 ft. for planning purposes (more vulnerable)



# Sea Level Rise in Boston Harbor



# Other Effects

- Storm surge
  - Compounds SLR problem (e.g. Sandy)
  - Hurricane risk uncertain
- Heat waves
  - More extreme heat in summer with increased air pollution/health risk
  - Shorter /more mild winters
- Increased intensity of precipitation
  - More runoff (5-10% more water today)
  - Stress capacity of drainage infrastructure



# What to do - Prepare for sea level rise

- Identify vulnerable property/people
  - Incremental sea level rise
  - Storm surge
- Protect existing buildings & infrastructure
  - Move critical systems up
  - Minimize flood penetrations
  - Add structural protection if necessary
  - Focus on resilience





# Design/regulate new buildings appropriately

- Elevations matter
- First floor flexibility
- Critical systems up
- Minimize water penetration
- Build in resilience



**Avoid expensive, inflexible options – keep focused on mitigation!**



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