

Sustainable Seattle
PNW Resilience Summit
2 October 2014

Bob Bishop
ICES Foundation (Geneva)
Cascadia Resilience Center

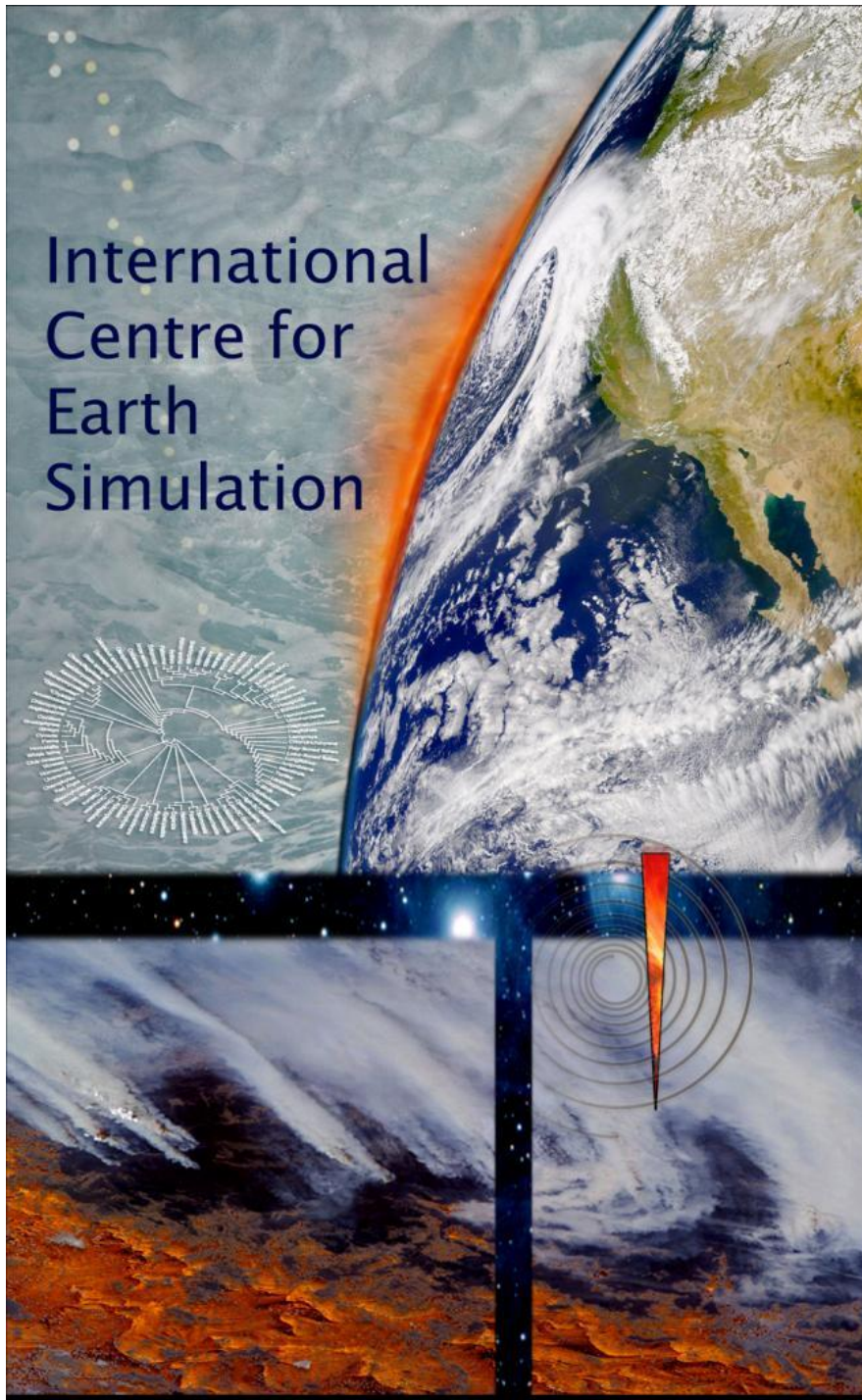
Science-based visual narratives of Planet Earth

- revealing, intuitive, visceral -

- using interactive, immersive visualization
- modelling & simulation
- flowing time

Improving civic engagement, risk analysis, and ability to act!

International Centre for Earth Simulation





Cascadia Resilience Center

Animations of Earth and Sun

Understanding global aerosol transportation

<http://www.youtube.com/watch?v=t9GgII0tbHA>

Understanding ocean eddy currents

<http://www.youtube.com/watch?v=CCmTY0PKGDs>

Understanding the global ocean conveyor belt

http://www.youtube.com/watch?v=3niR_-Kv4SM

Simulation of Antarctic ice flows

<http://www.youtube.com/watch?v=ptqQmPdHDz4>

The Sun is a continuous nuclear reaction

<http://www.youtube.com/watch?v=jt0Hlc9hTVI>

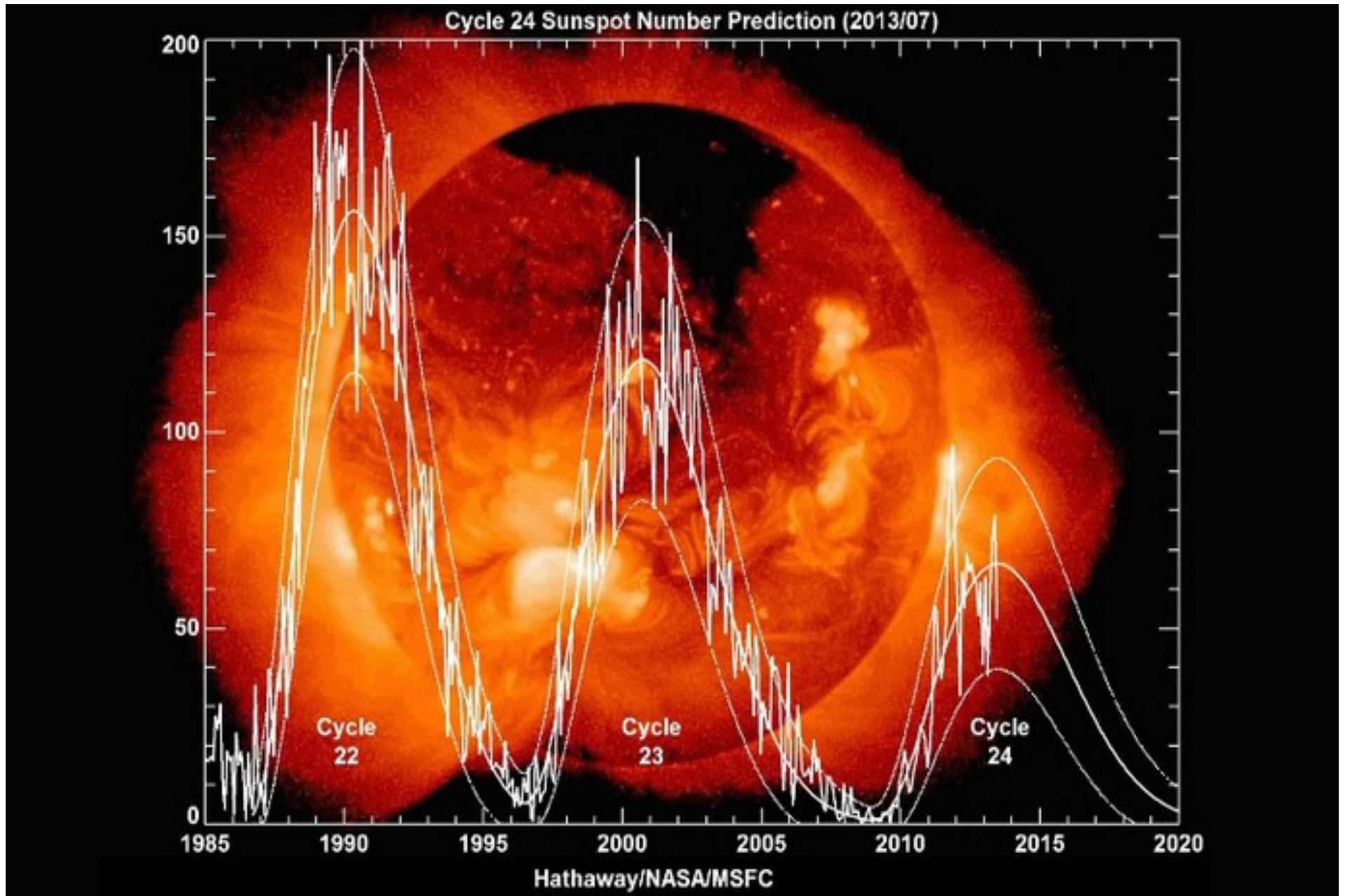
The Sun throws out radiation, high energy particles and CMEs

<http://www.youtube.com/watch?v=sg3NAdOYp8Q>

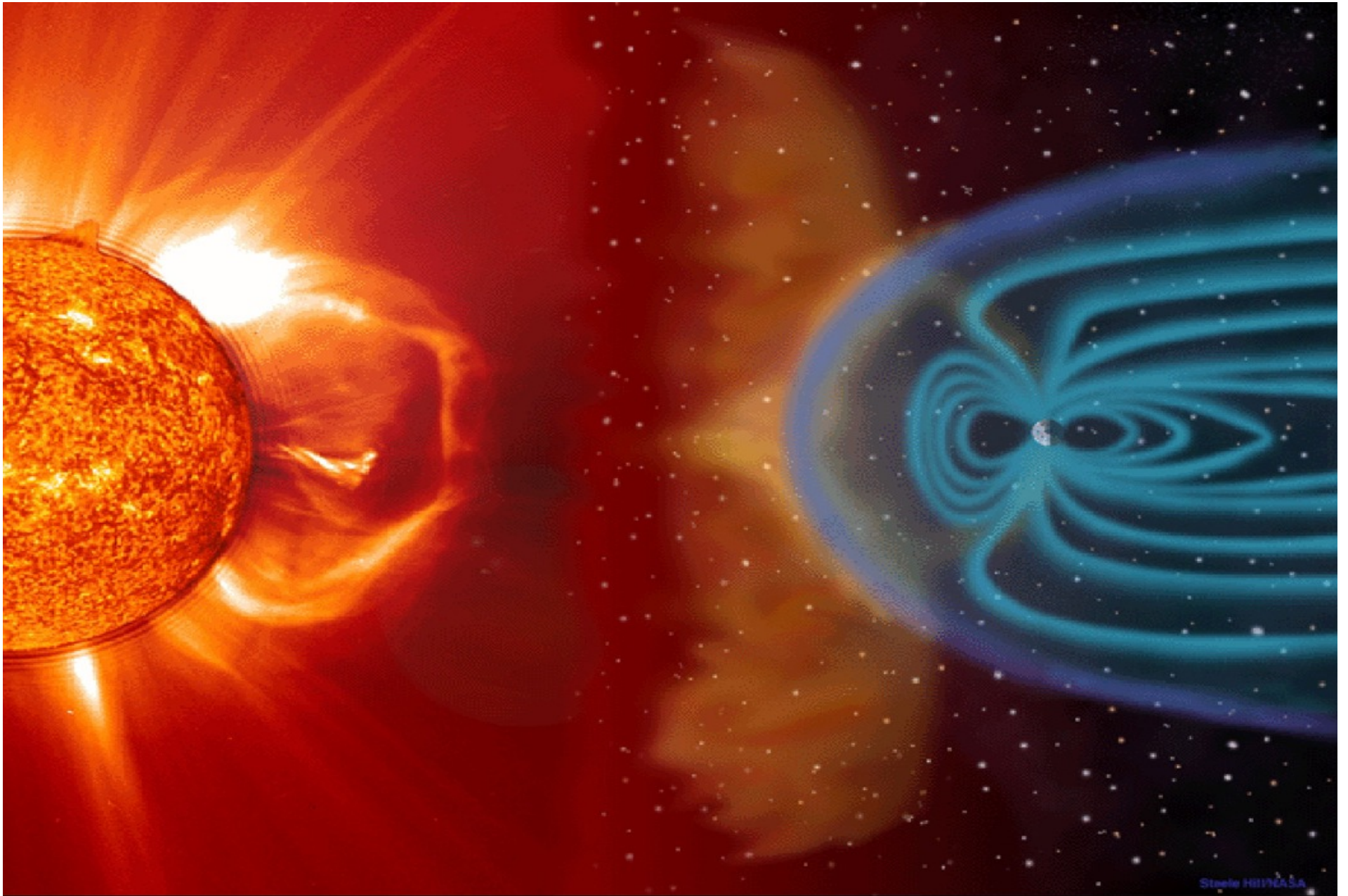
Understanding potential asteroid impacts

<http://www.youtube.com/watch?v=66mHHaWtlt0&list=PL3wsGij5ig-F130HGWL6acsM1xhd8PEm>

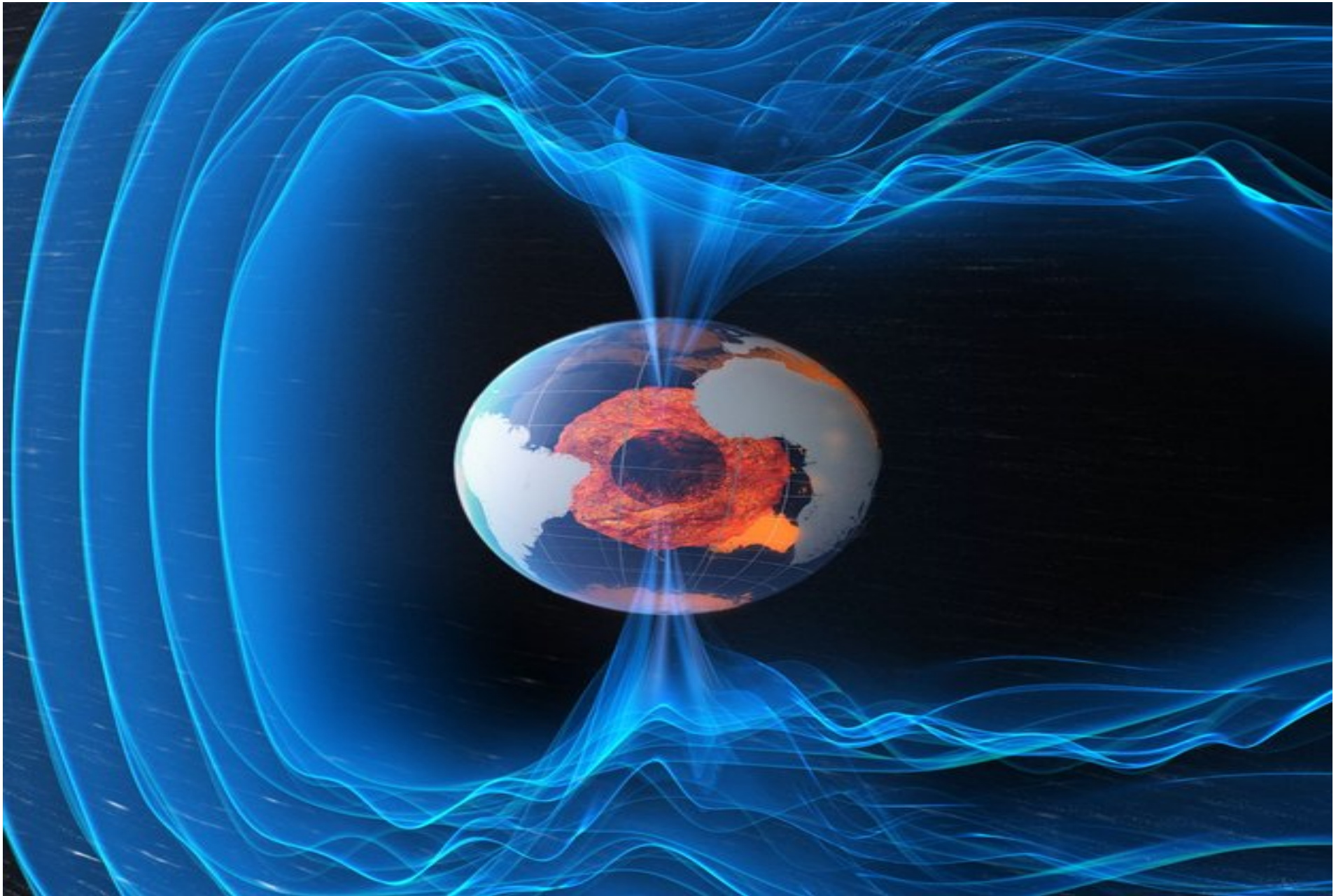
Our Sun has a variable 11-year sunspot cycle



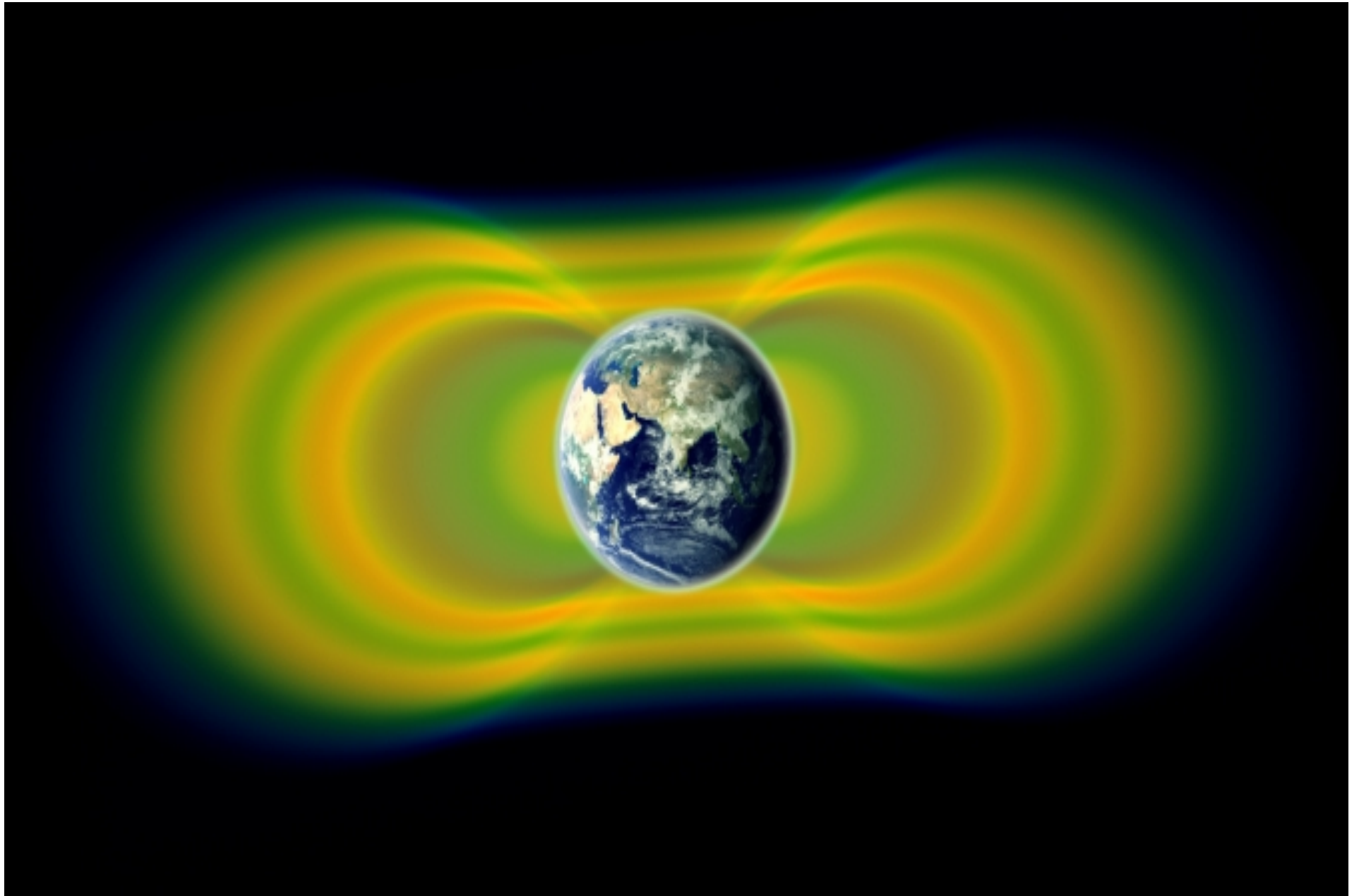
There is violent 'space weather' between Sun & Earth



Fortunately, the magnetosphere is a deflection shield



... inside of which are 3 Van Allen plasma belts



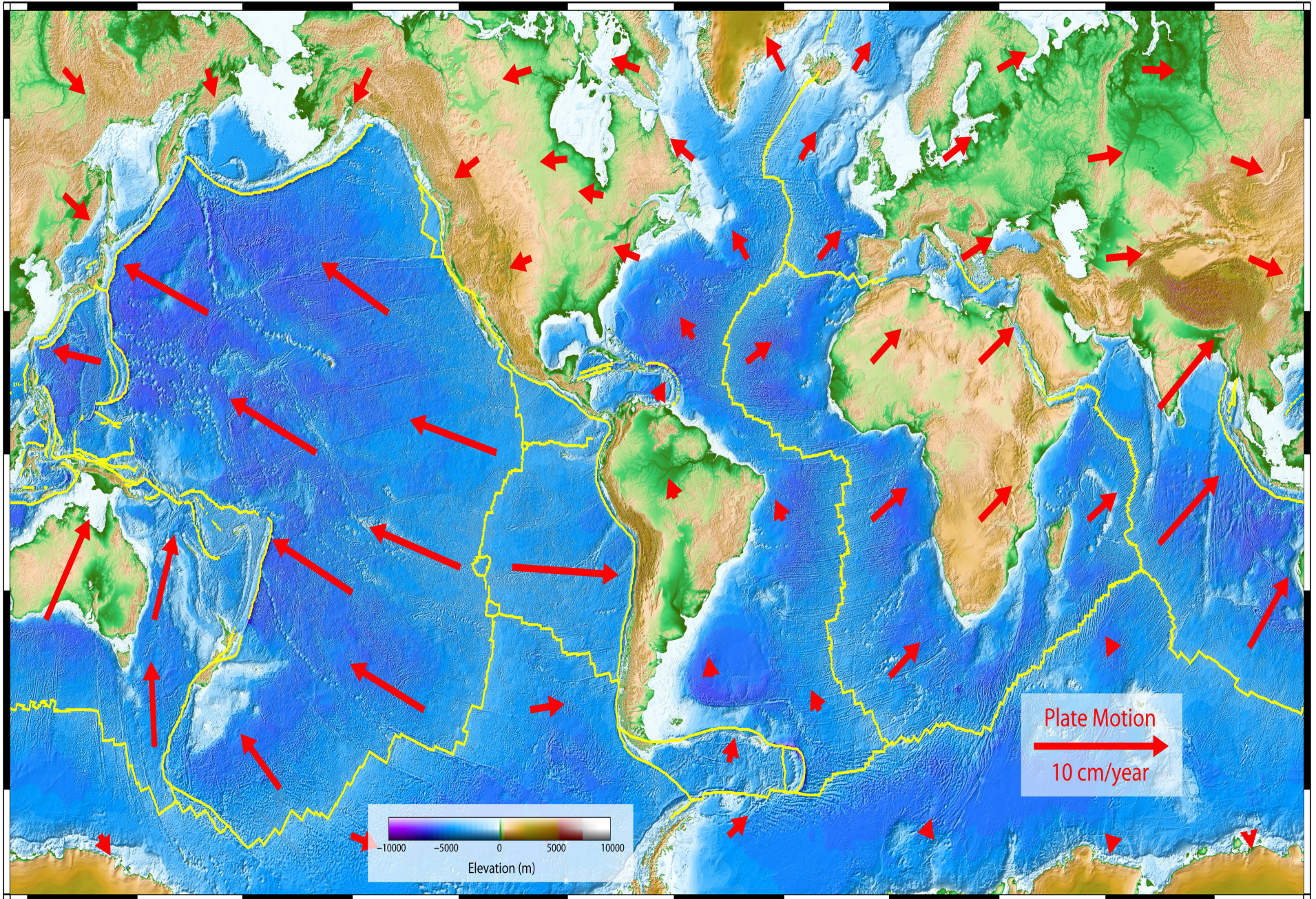
Nevertheless, there are leaks!



... and geomagnetic superstorms (Carrington 1859)



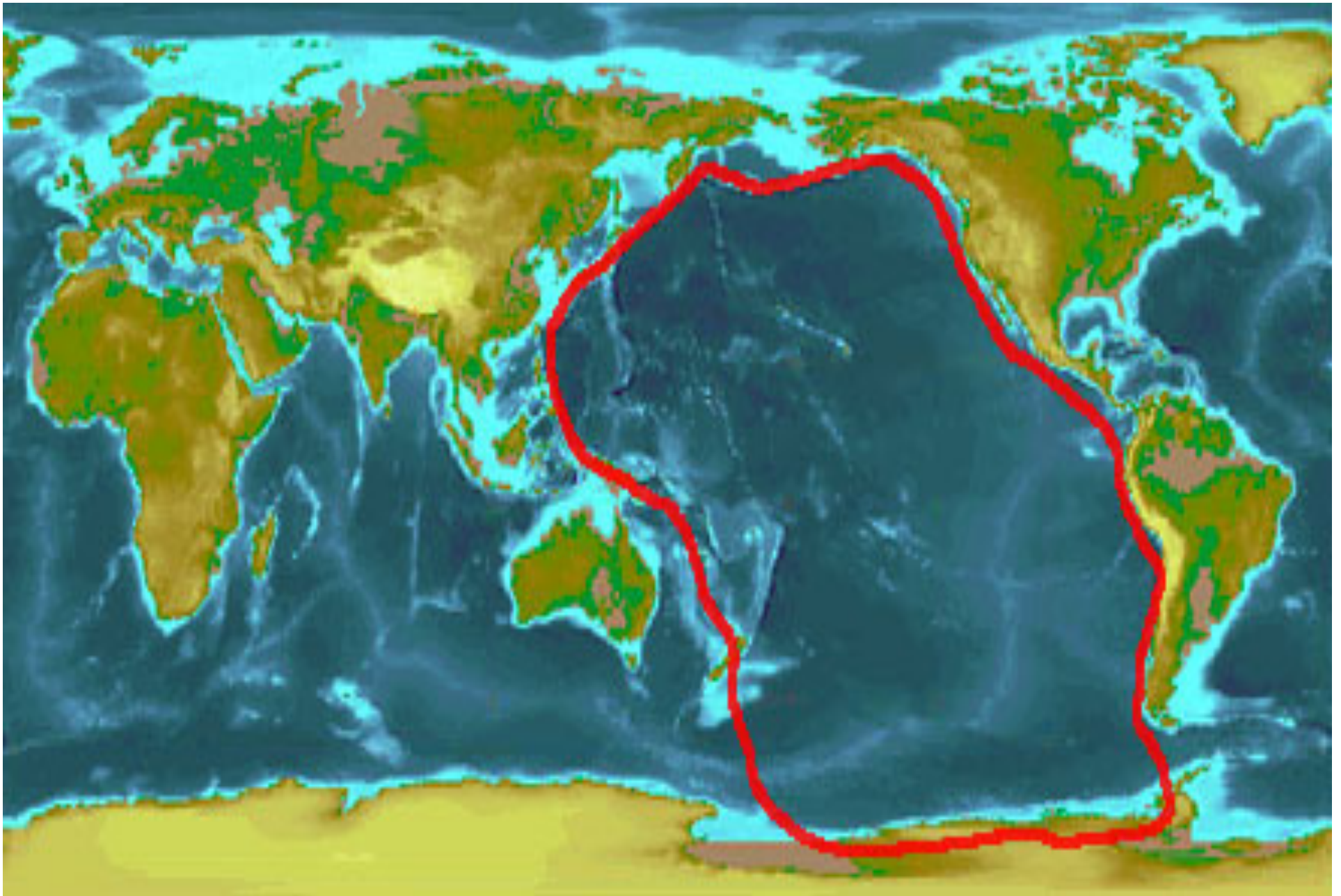
Plate tectonics, continental drift & subduction prevail



Subduction zones create volcanoes



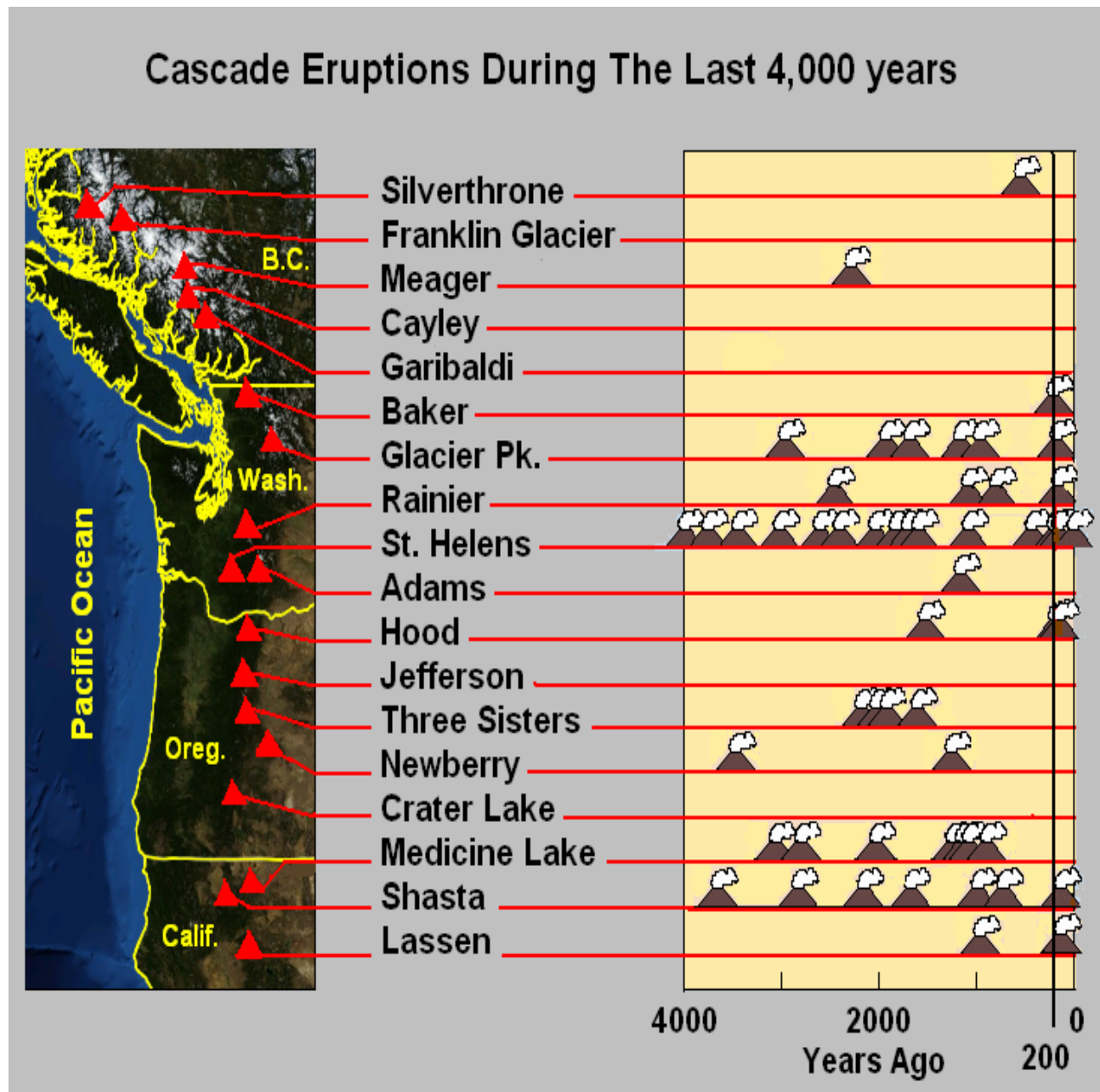
The Ring of Fire includes 452 major volcanoes!



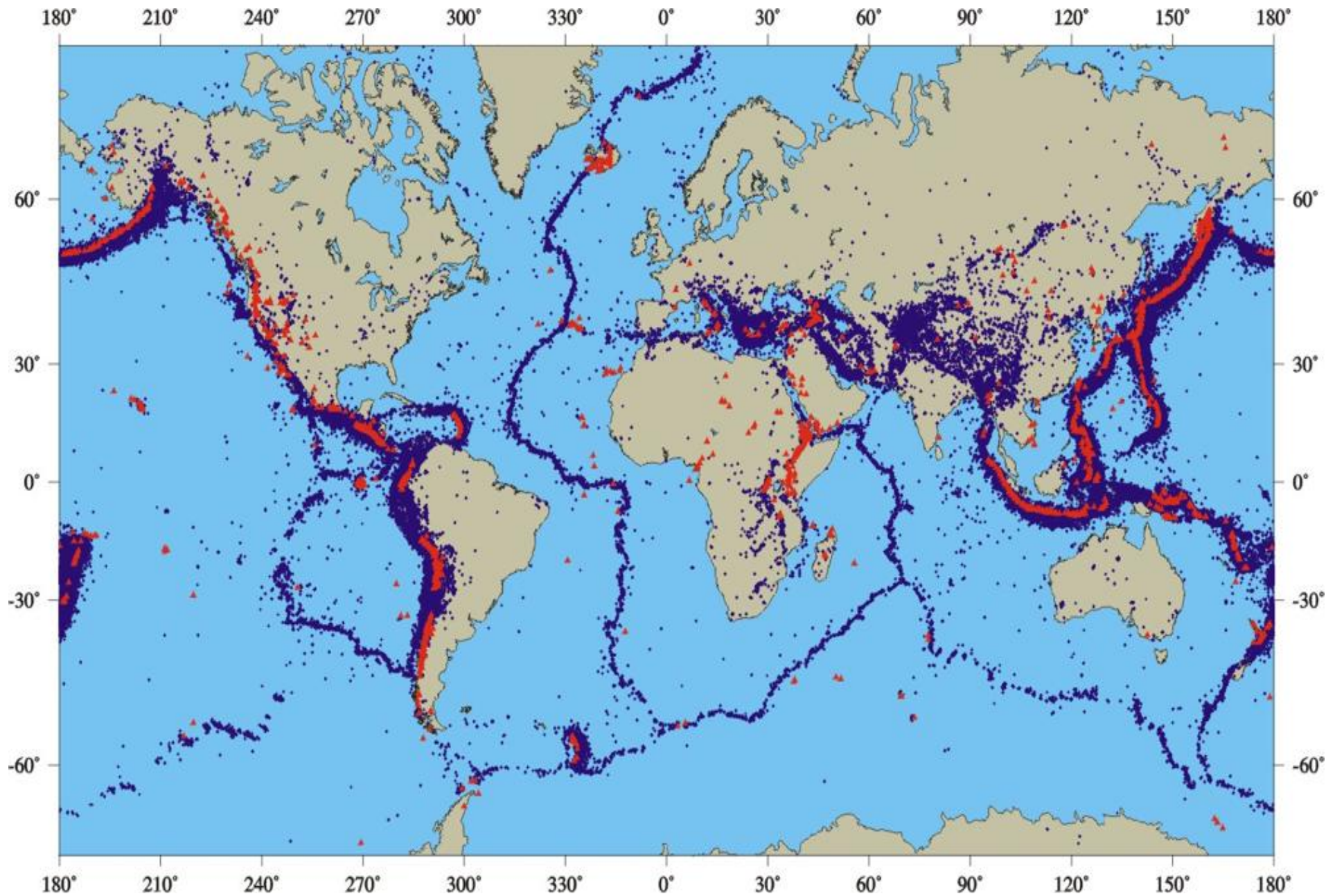
Cascadia subduction zones have created 18 volcanoes



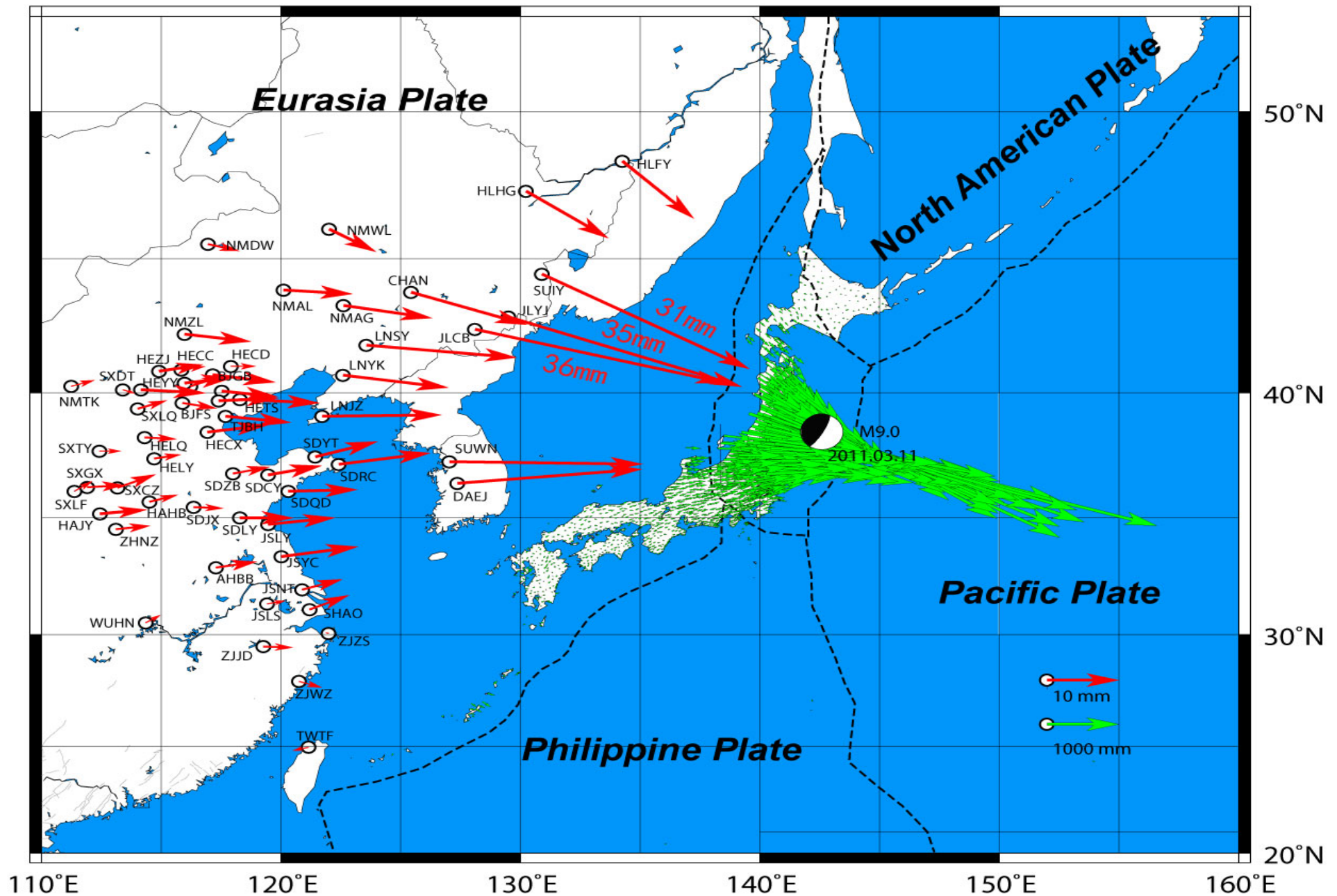
Historical activity of Cascadia volcanoes



Global earthquakes are a daily occurrence



The Great East Japan Earthquake 11 March 2011

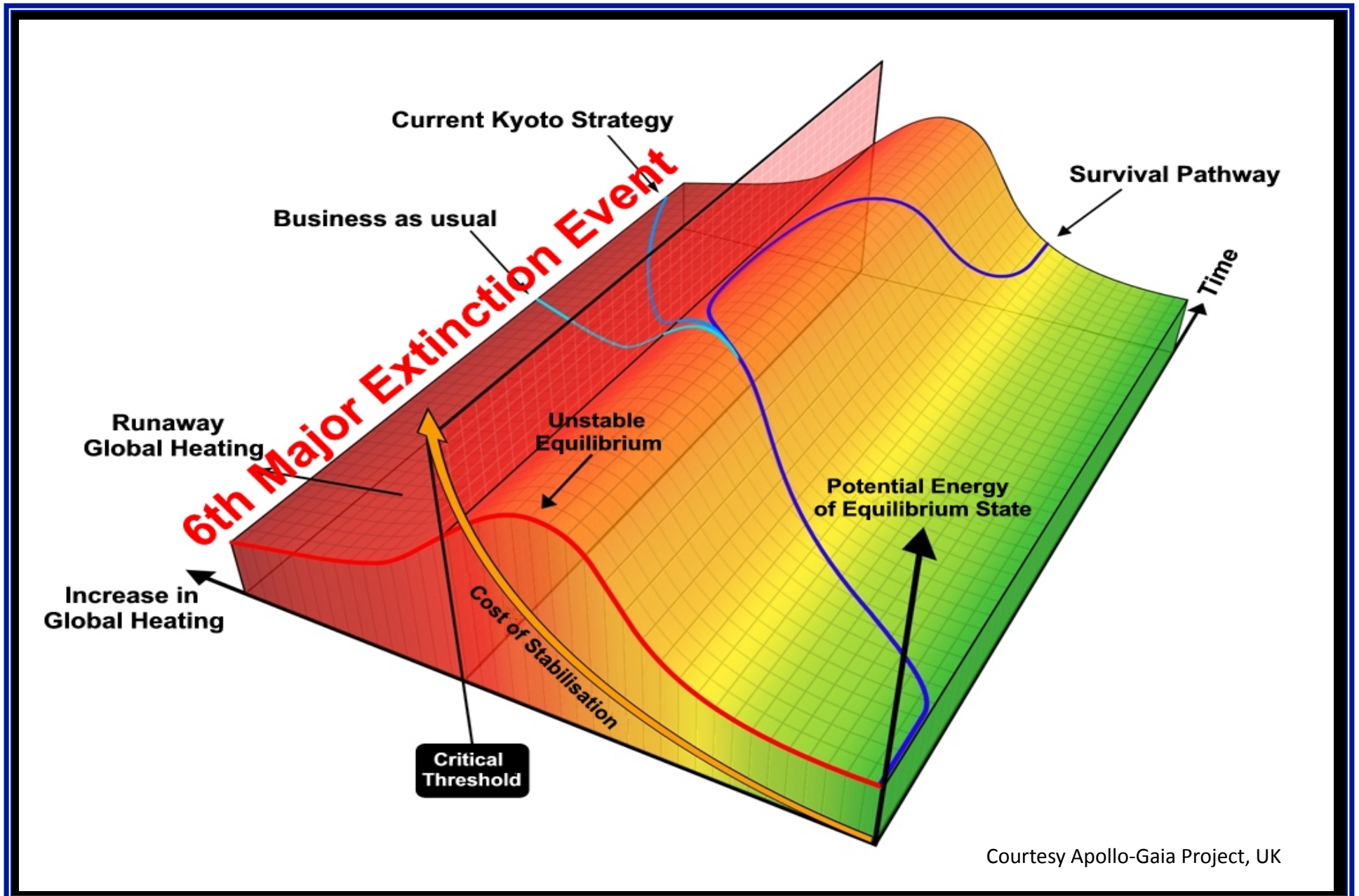


Cascading domino effects

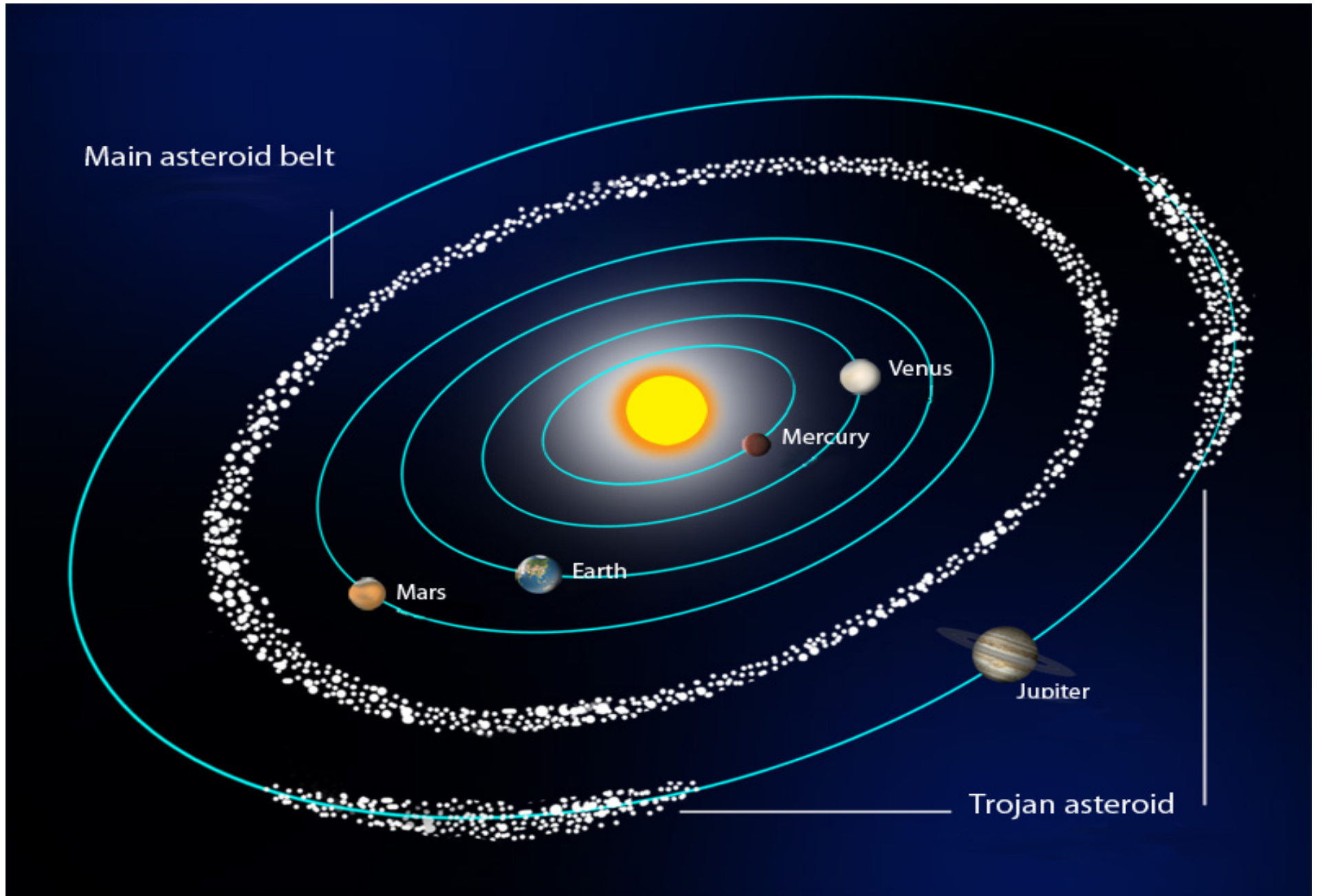


U.S. Navy photo by Mass Communication Specialist 3rd Class Kevin B. Gray/Released

Are we pushing the planet beyond its boundaries?

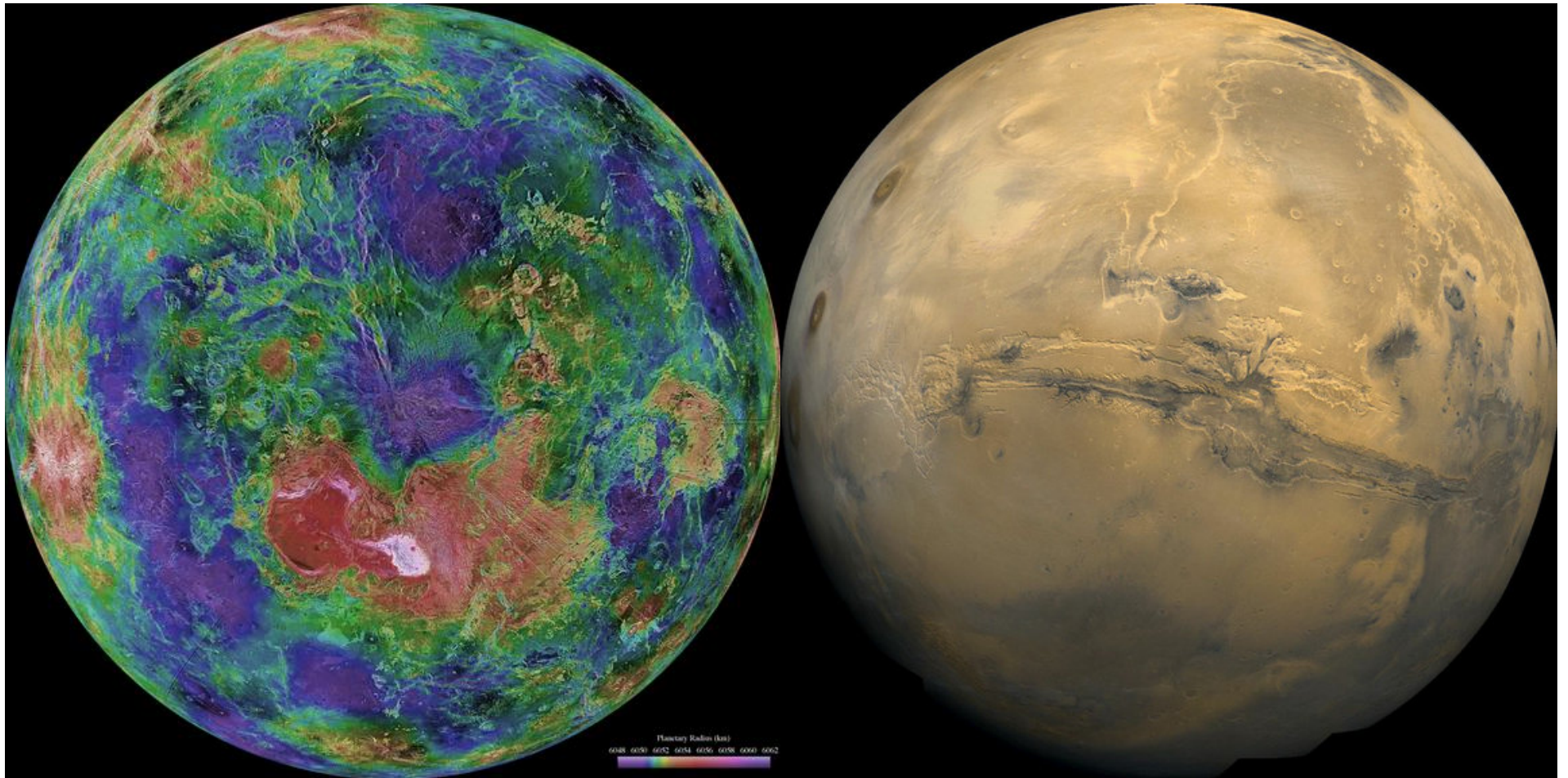


What else should we be worried about?



The Road Ahead

Could Future Earth = Venus? Mars?





**Helping guide the successful transformation of human society
in an era of rapid climate change and frequent natural disasters.**

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