The GEO Blue Planet Initiative: Understanding the Role of the Oceans in the Earth Life Support System

Presented by
Hans-Peter Plag

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Sustainability
The Challenge
The Blue Planet Initiative
Integrating Sustainability and BPI

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Sustainability

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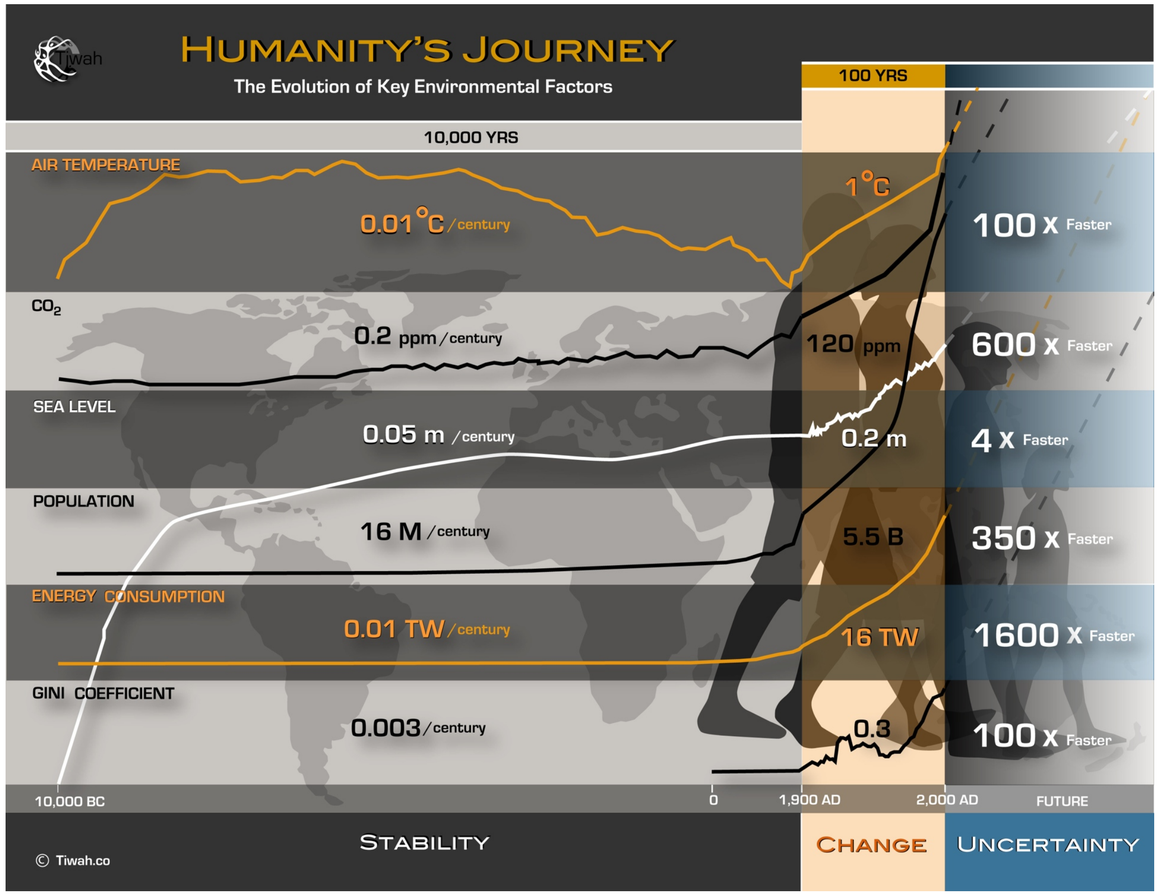

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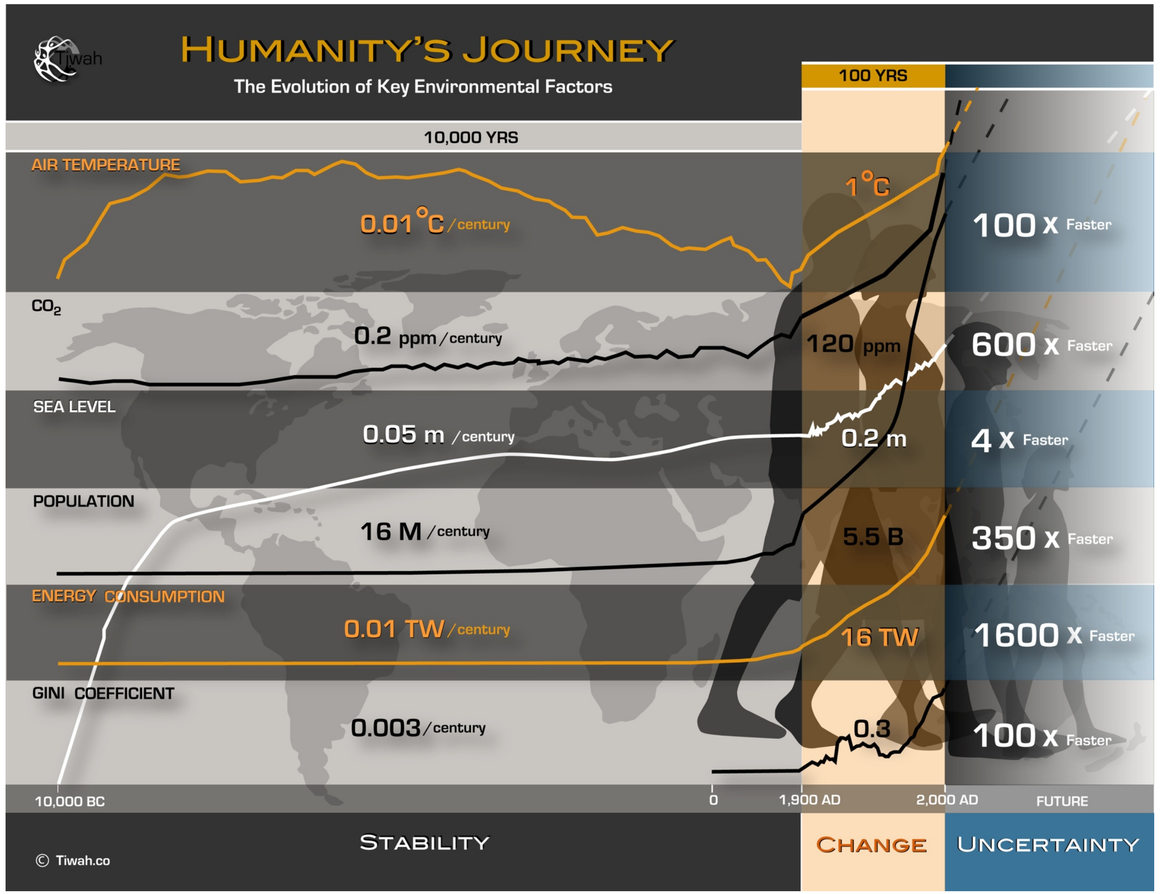

Energy usage increased in the last 100 years 1,600 faster than *on average throughout the Holocene* (OATH)

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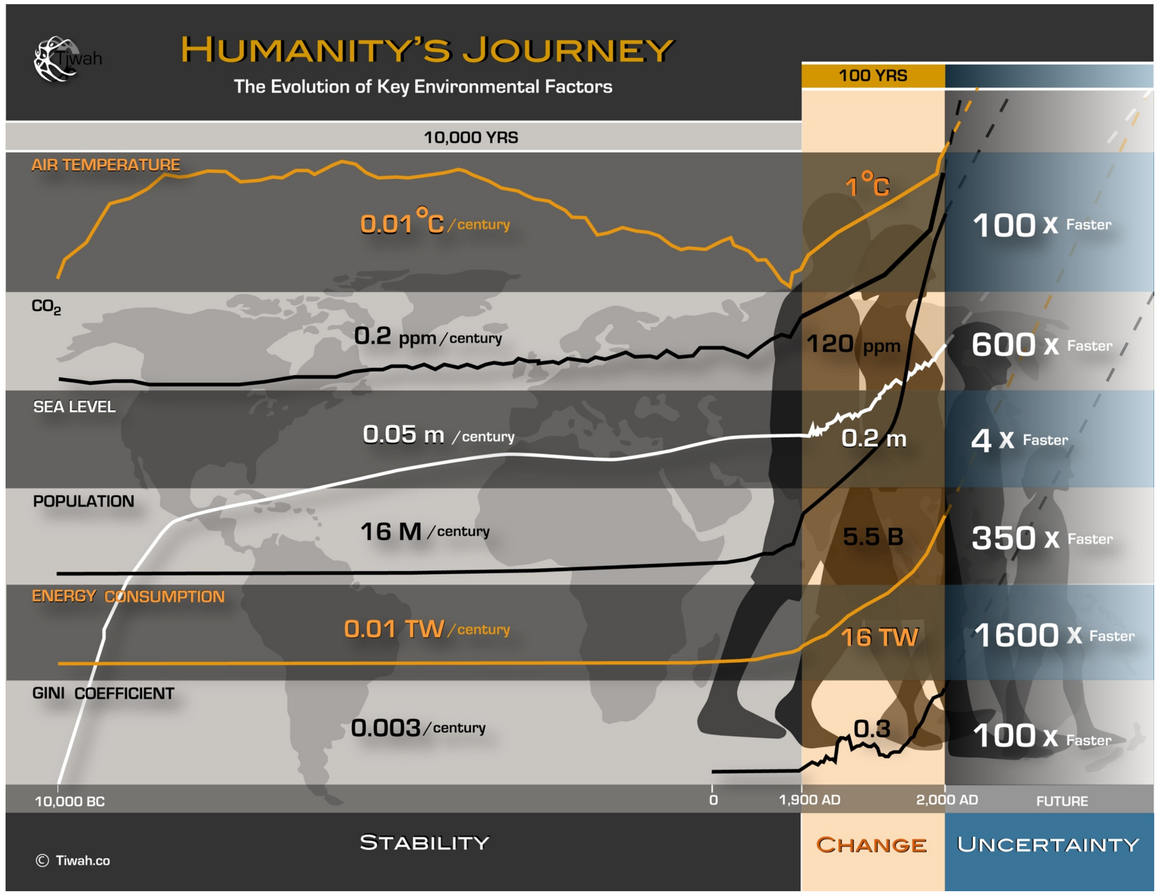

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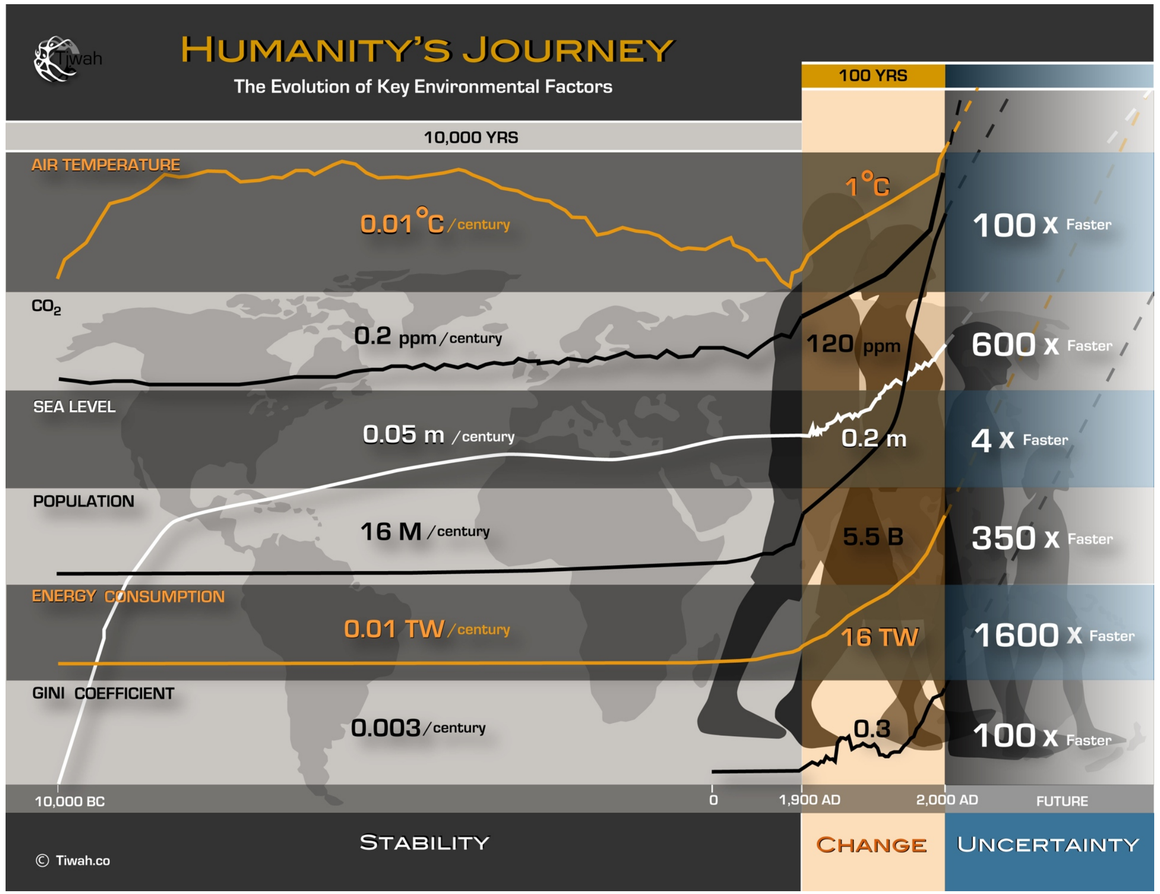

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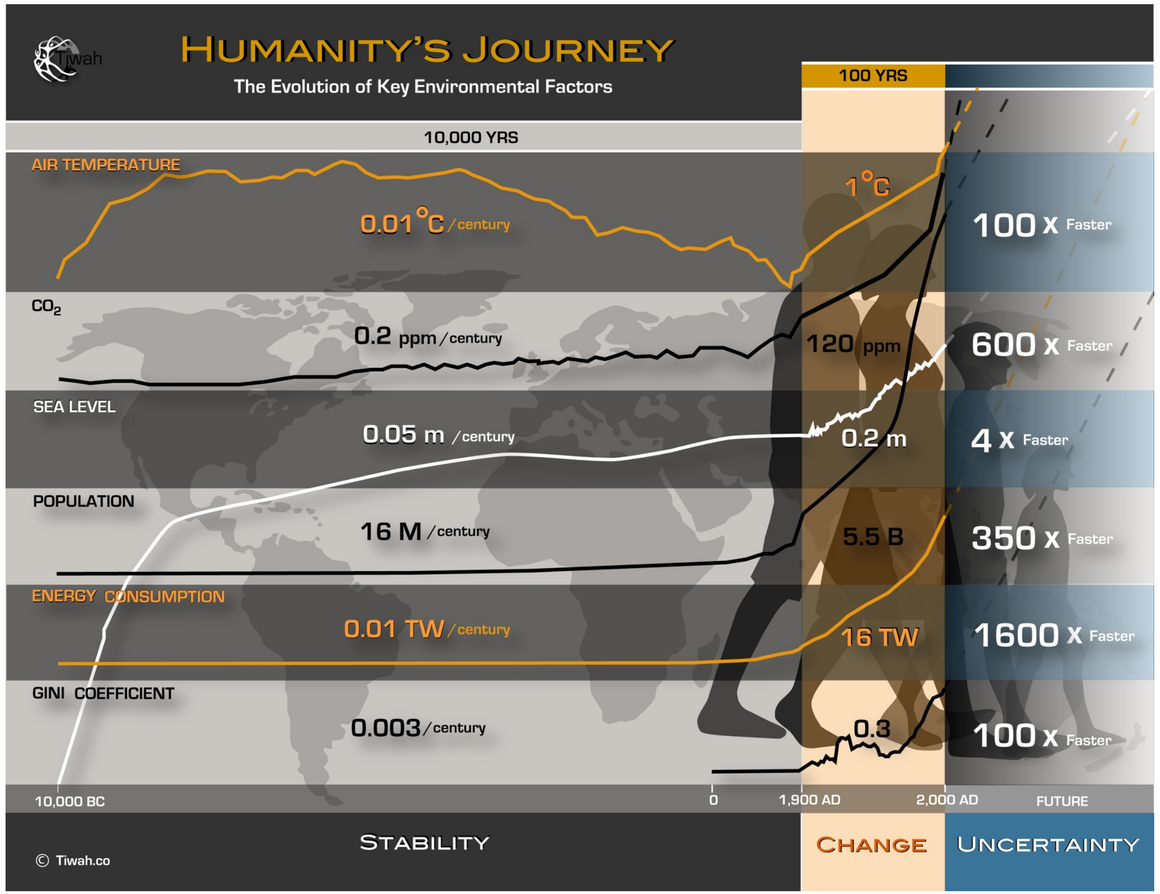

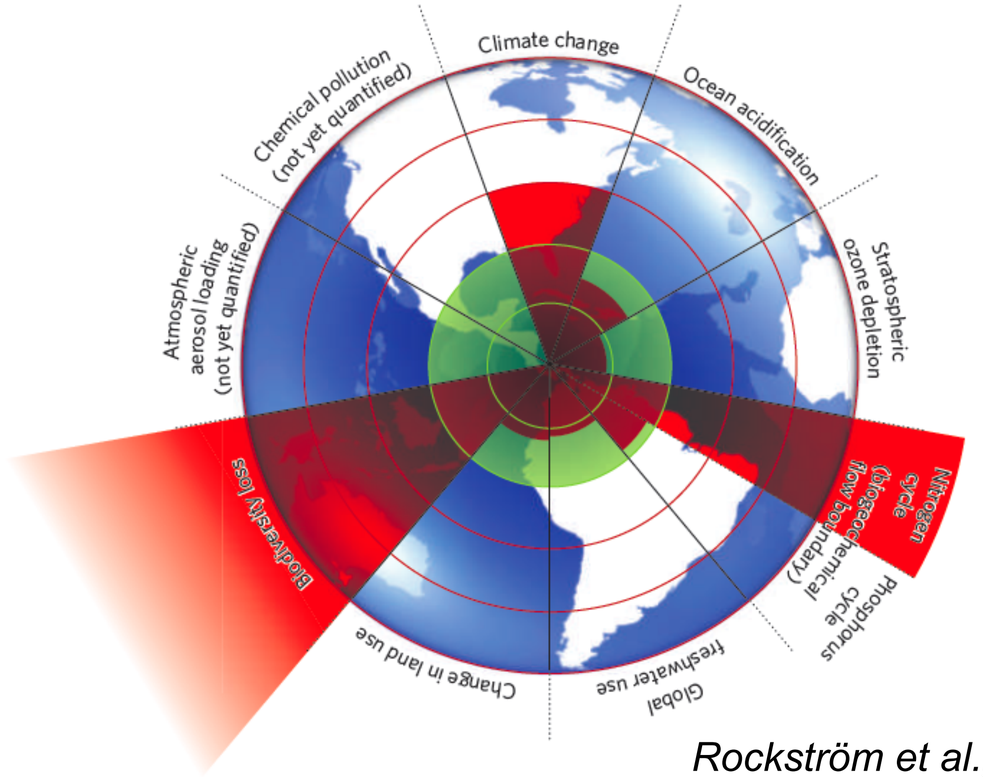

Rockström et al.,

Figure 1 | Beyond the boundary. The inner green shading represents the proposed safe operating space for nine planetary systems. The red wedges represent an estimate of the current position for each variable. The boundaries in three systems (rate of biodiversity loss, climate change and human interference with the nitrogen cycle), have already been exceeded.

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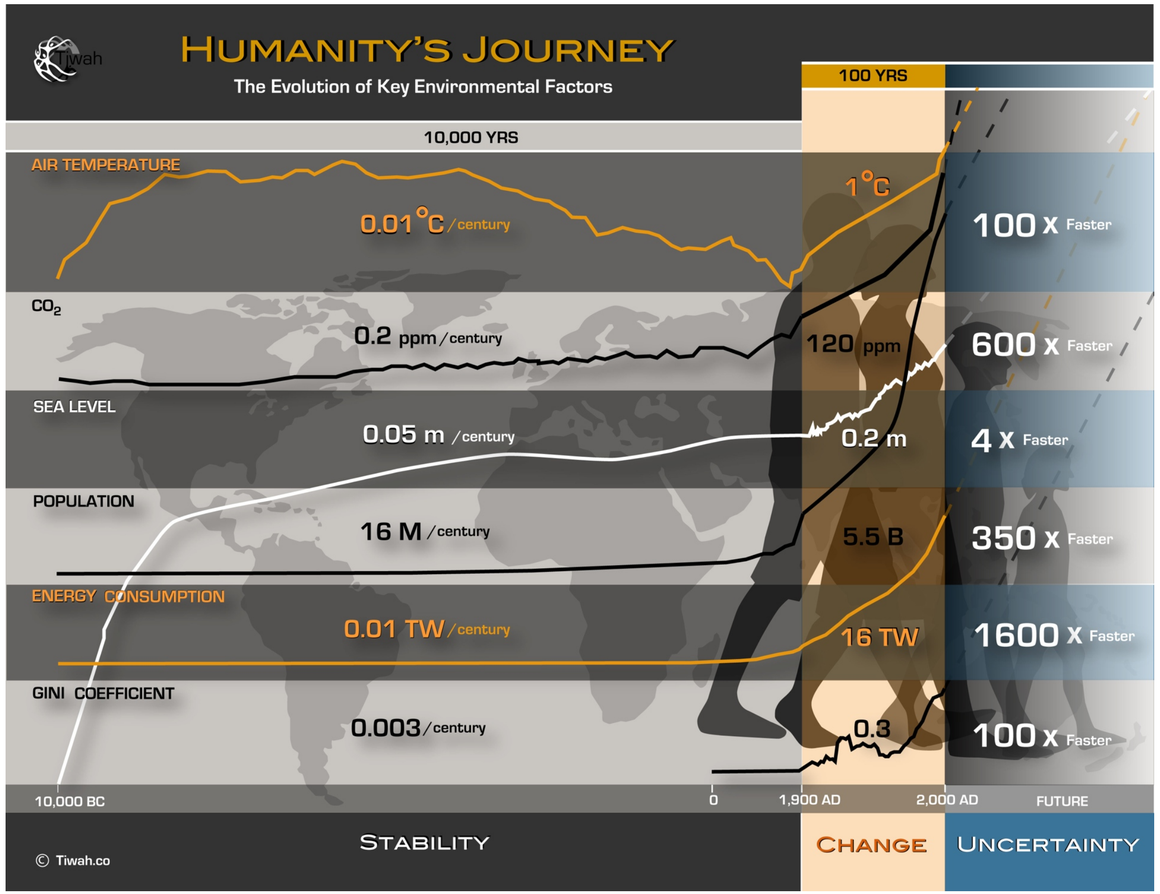

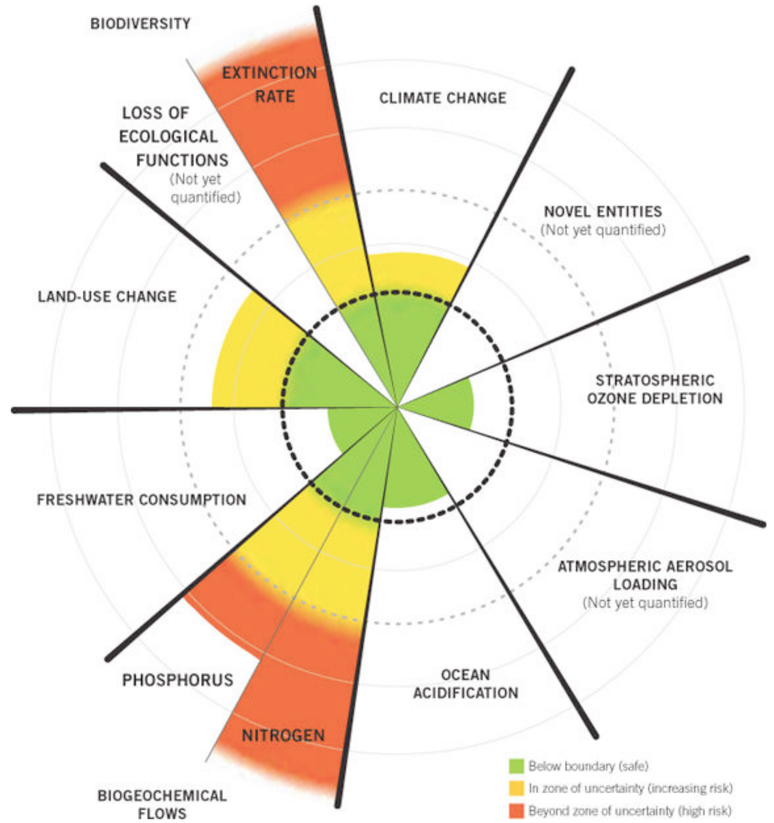

From Rockström and Klun (2015)

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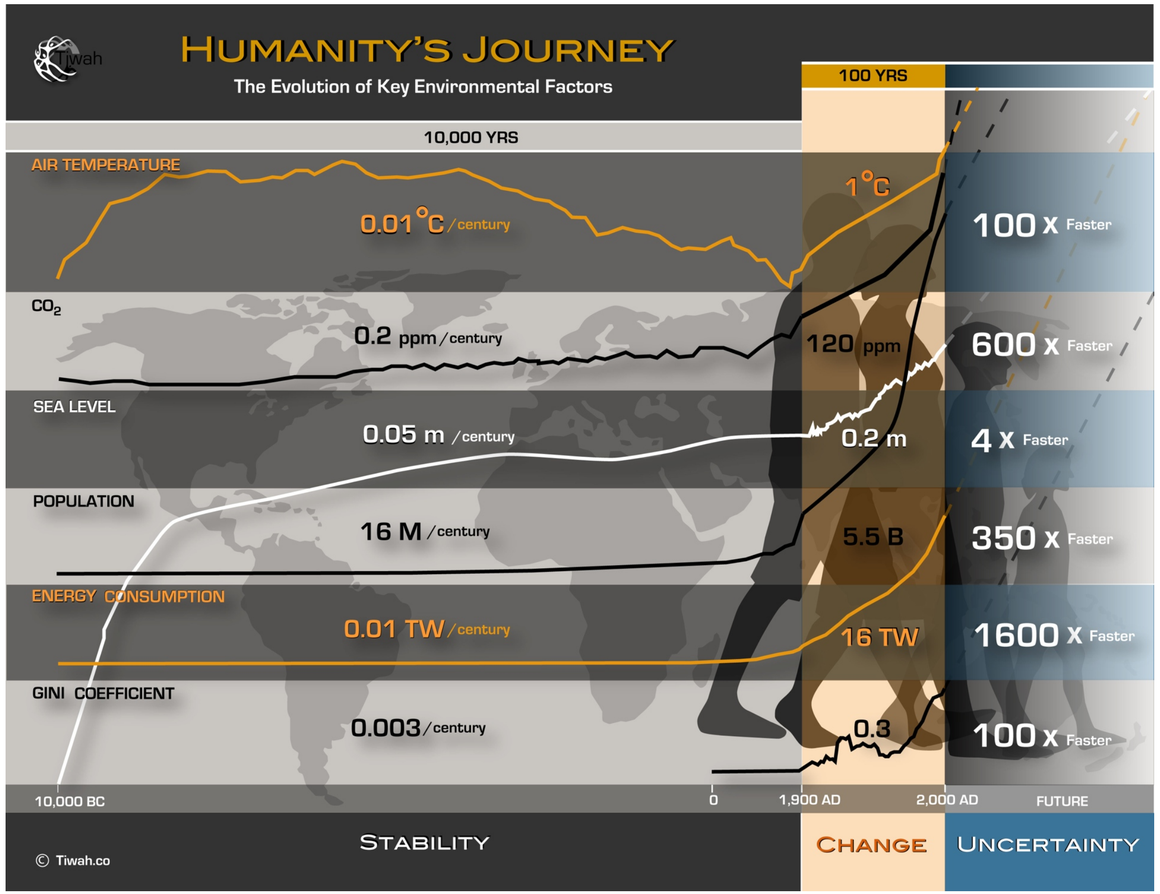

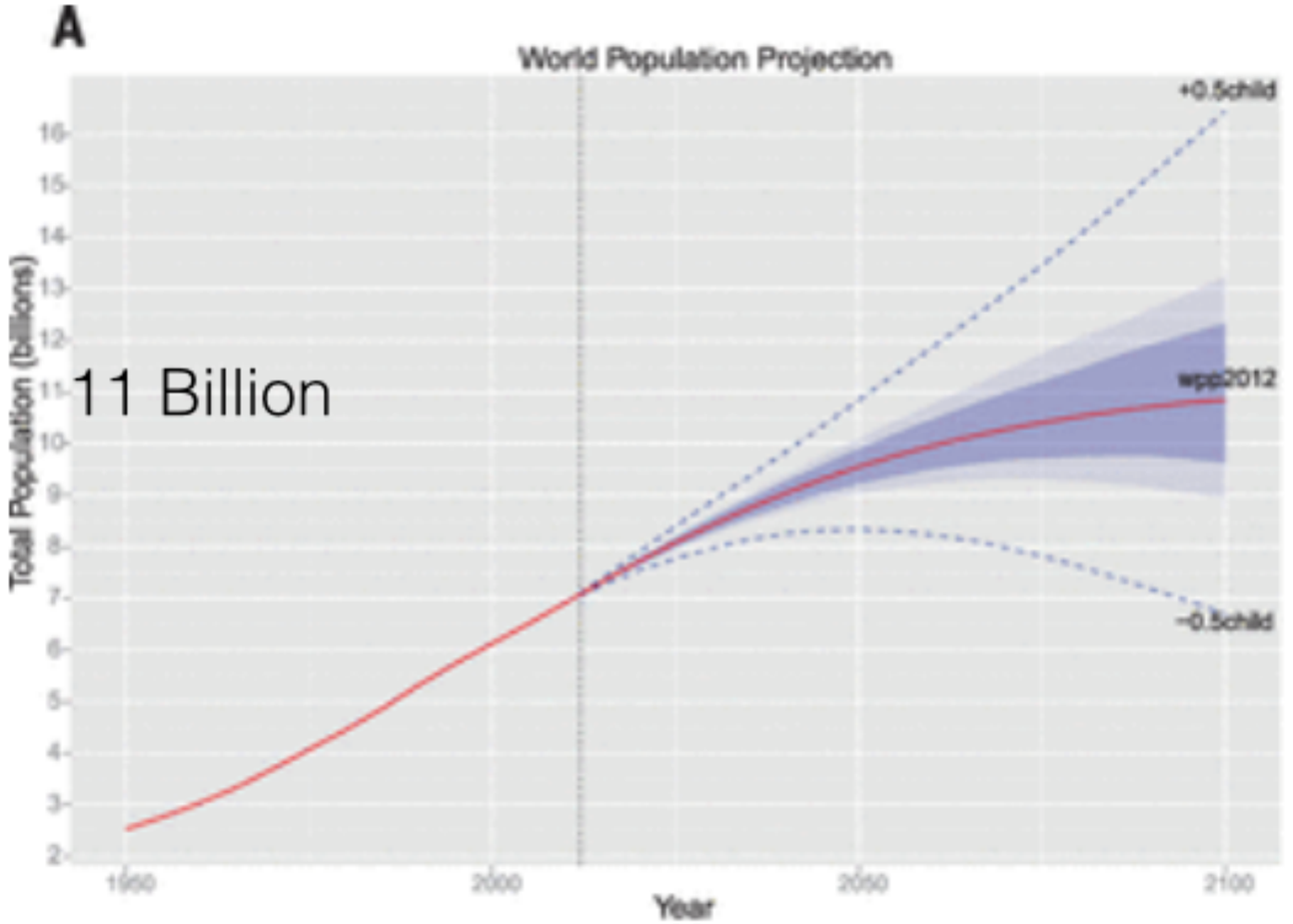

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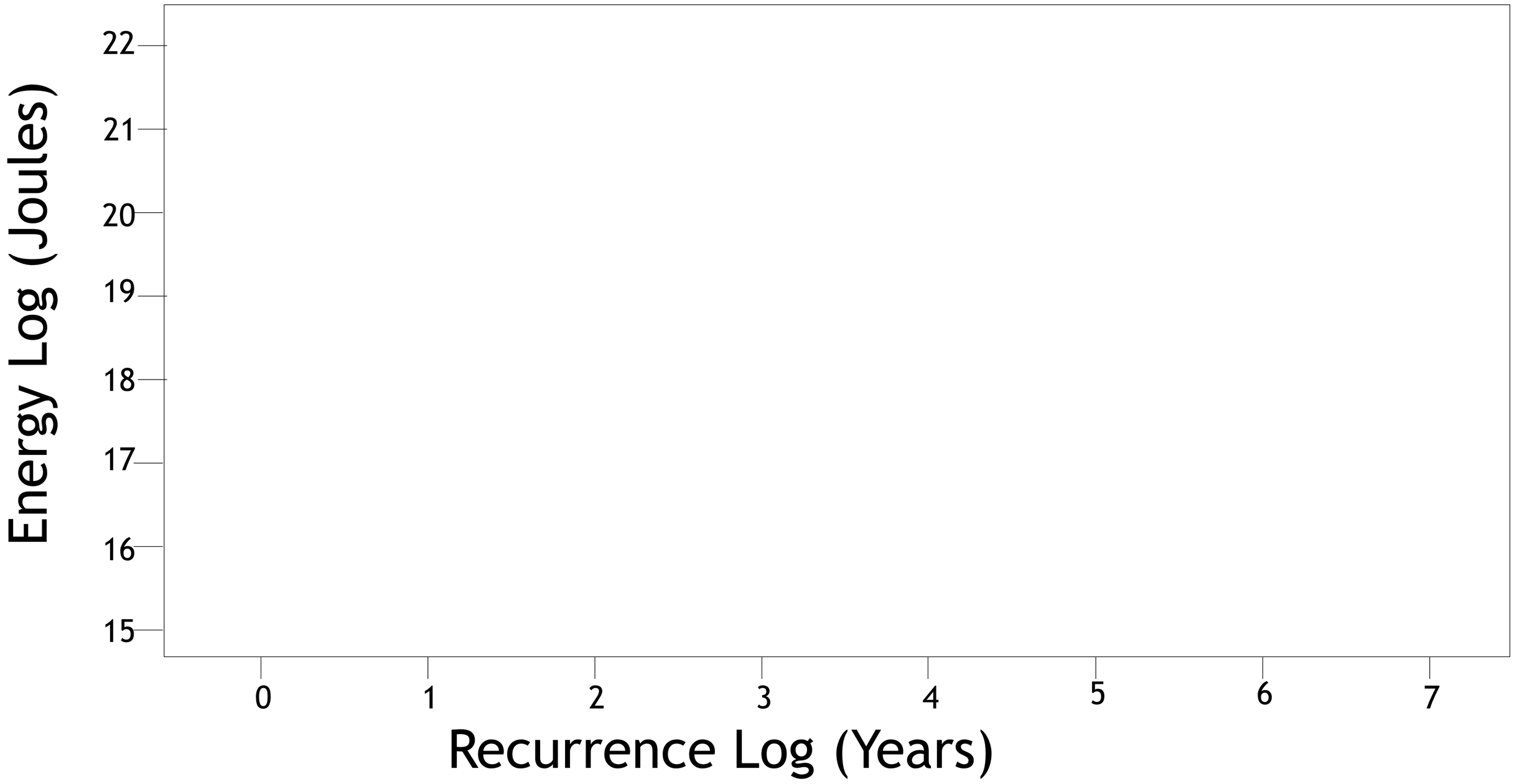
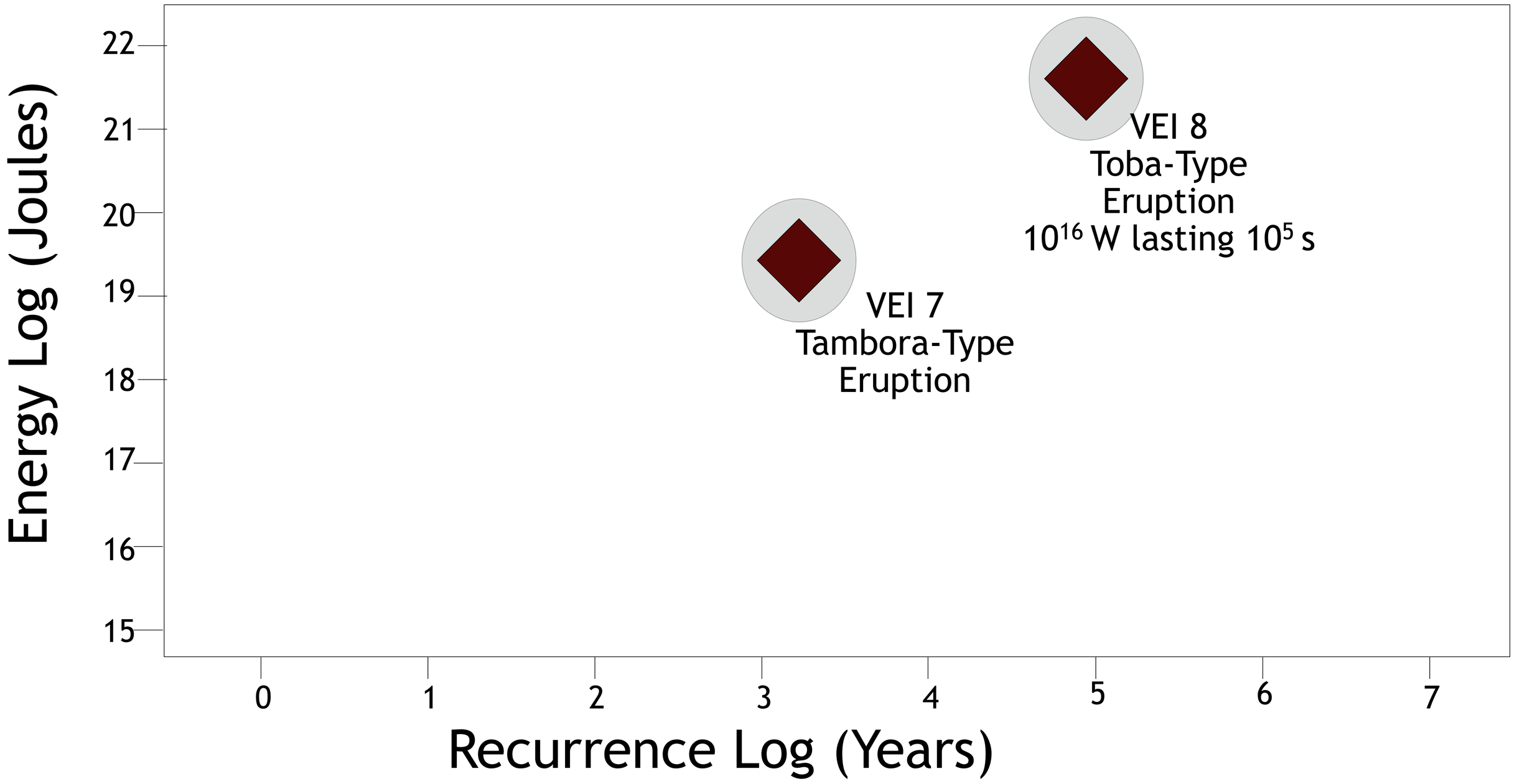
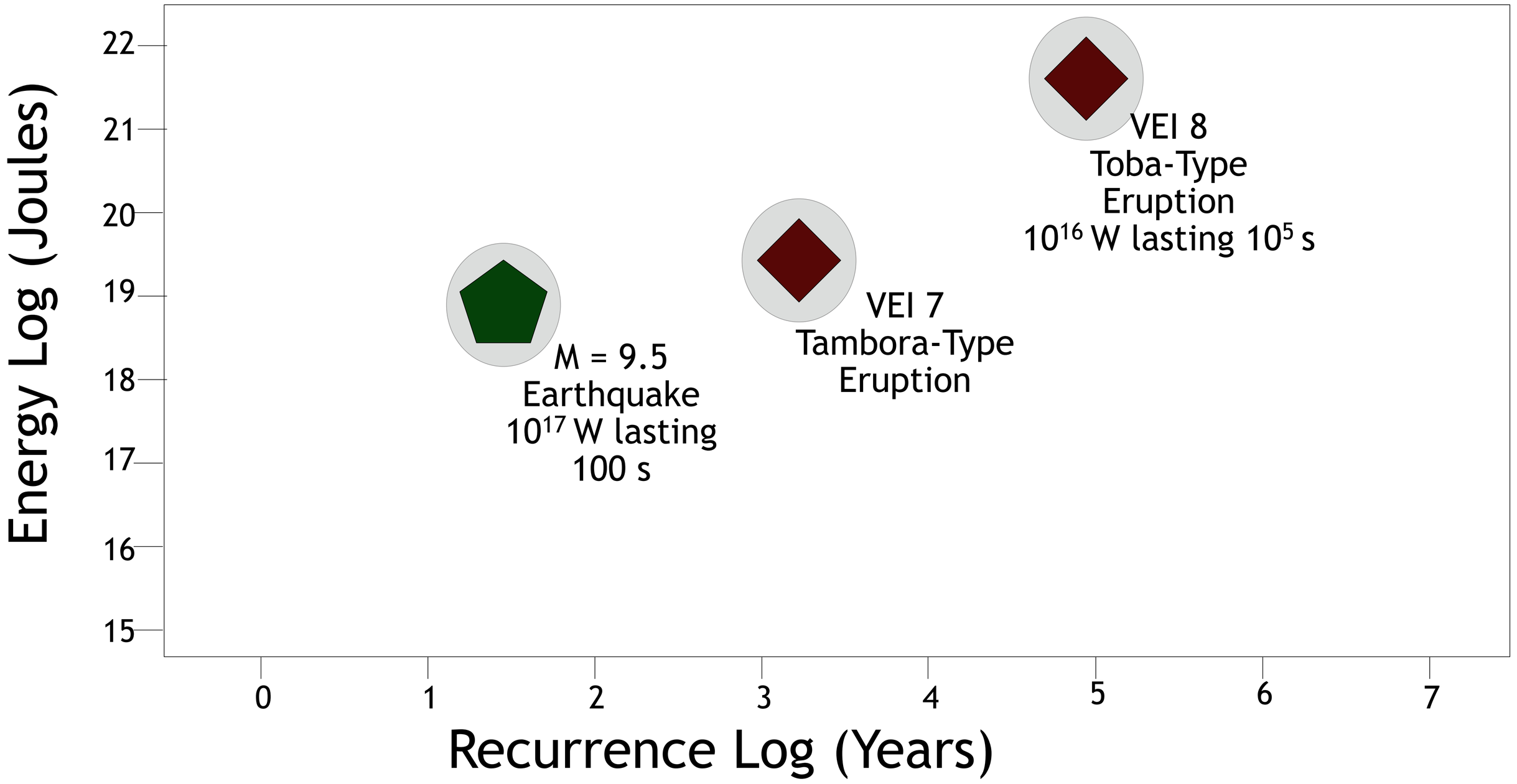
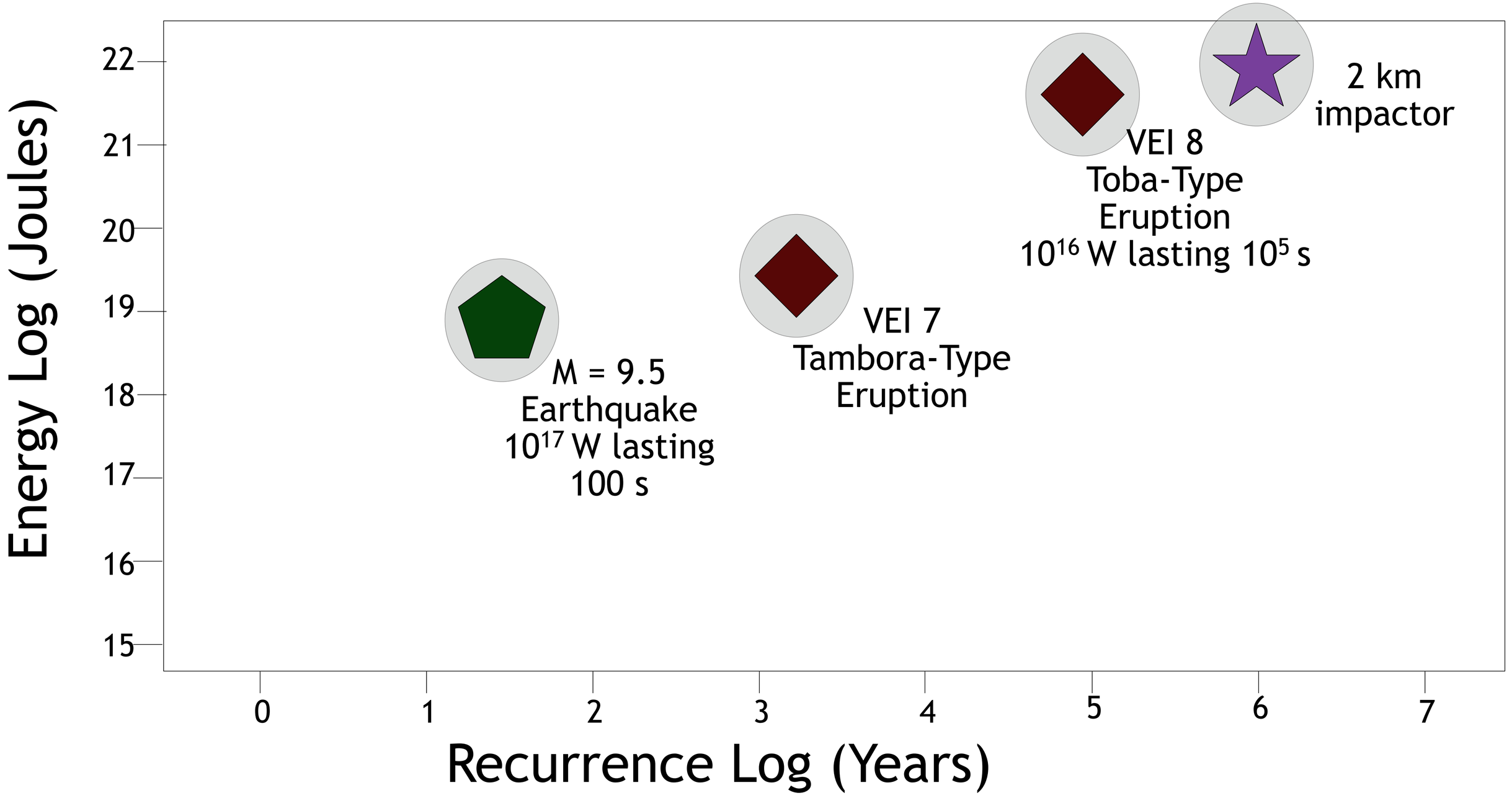

Energy Log (Joules)
22
21
20
19
18
17
16
15
0
1
2
3
4
5
6
7
Recurrence Log (Years)


Energy Log (Joules)
22
21
20
19
18
17
16
15
VEI 8
Toba-Type
Eruption
10^{16} W lasting 10^{5} s
VEI 7
Tambora-Type
Eruption
0
1
2
3
4
5
6
7
Recurrence Log (Years)


Energy Log (Joules)
22
21
20
19
18
17
16
15
0
1
2
3
4
5
6
7
Recurrence Log (Years)
M = 9.5
Earthquake
10^17 W lasting
100 s
VEI 7
Tambora-Type
Eruption
VEI 8
Toba-Type
Eruption
10^16 W lasting 10^5 s


Energy Log (Joules)
22
21
20
19
18
17
16
15
0
1
2
3
4
5
6
7
Recurrence Log (Years)
2 km
impactor
VEI 8
Toba-Type
Eruption
10^16 W lasting 10^5 s
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Earthquake
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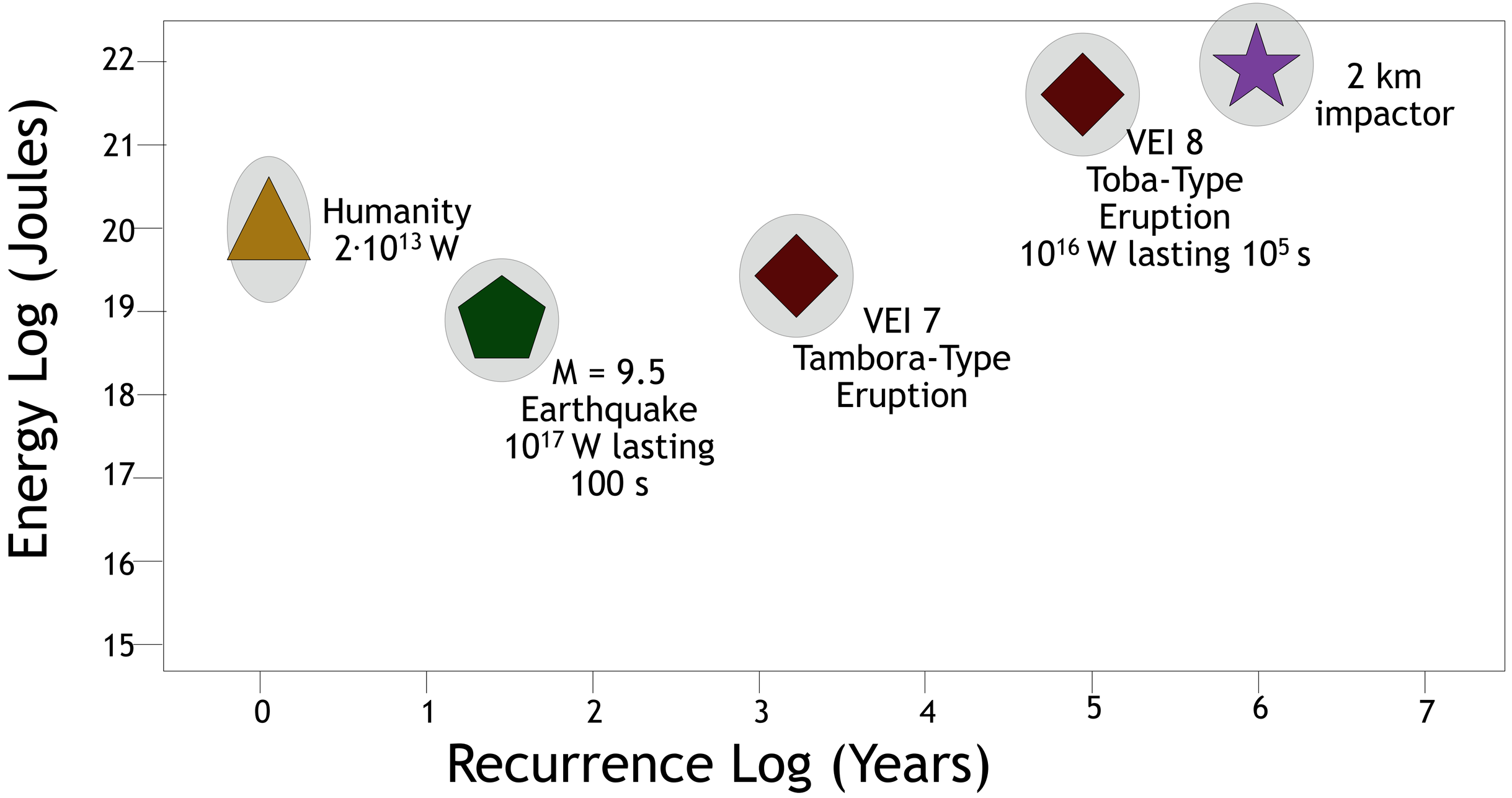
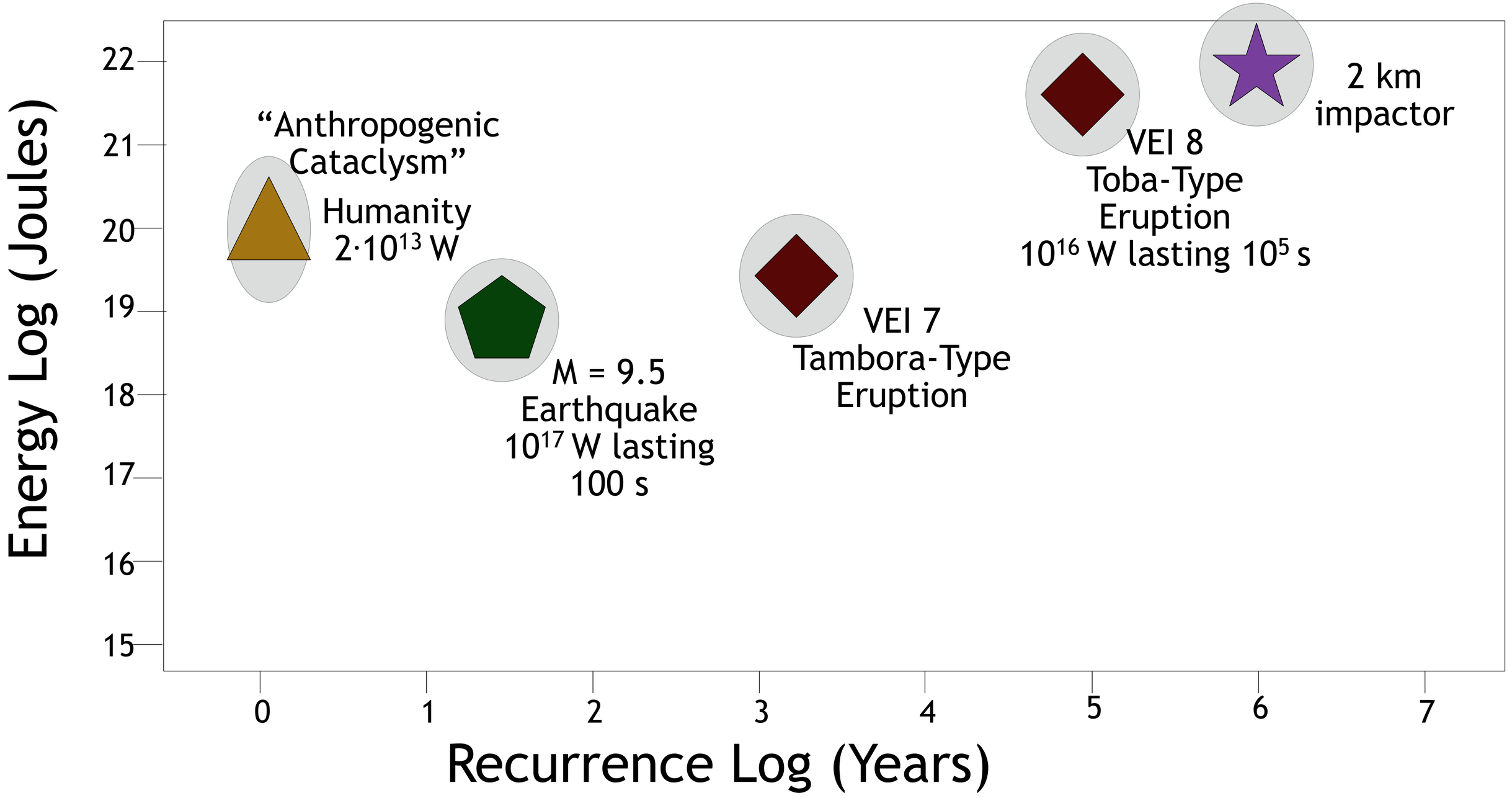

Energy Log (Joules)
22
21
20
19
18
17
16
15
Humanity
$2 \cdot 10^{13}$ W
M = 9.5
Earthquake
10^{17} W lasting
100 s
VEI 7
Tambora-Type
Eruption
VEI 8
Toba-Type
Eruption
10^{16} W lasting 10^{5} s
2 km
impactor
0
1
2
3
4
5
6
7
Recurrence Log (Years)


Energy Log (Joules)
22
21
20
19
18
17
16
15
0
1
2
3
4
5
6
7
Recurrence Log (Years)
“Anthropogenic Cataclysm”
Humanity
2·10^13 W
M = 9.5
Earthquake
10^17 W lasting
100 s
VEI 7
Tambora-Type
Eruption
VEI 8
Toba-Type
Eruption
10^16 W lasting 10^5 s
2 km
impactor

The Challenge

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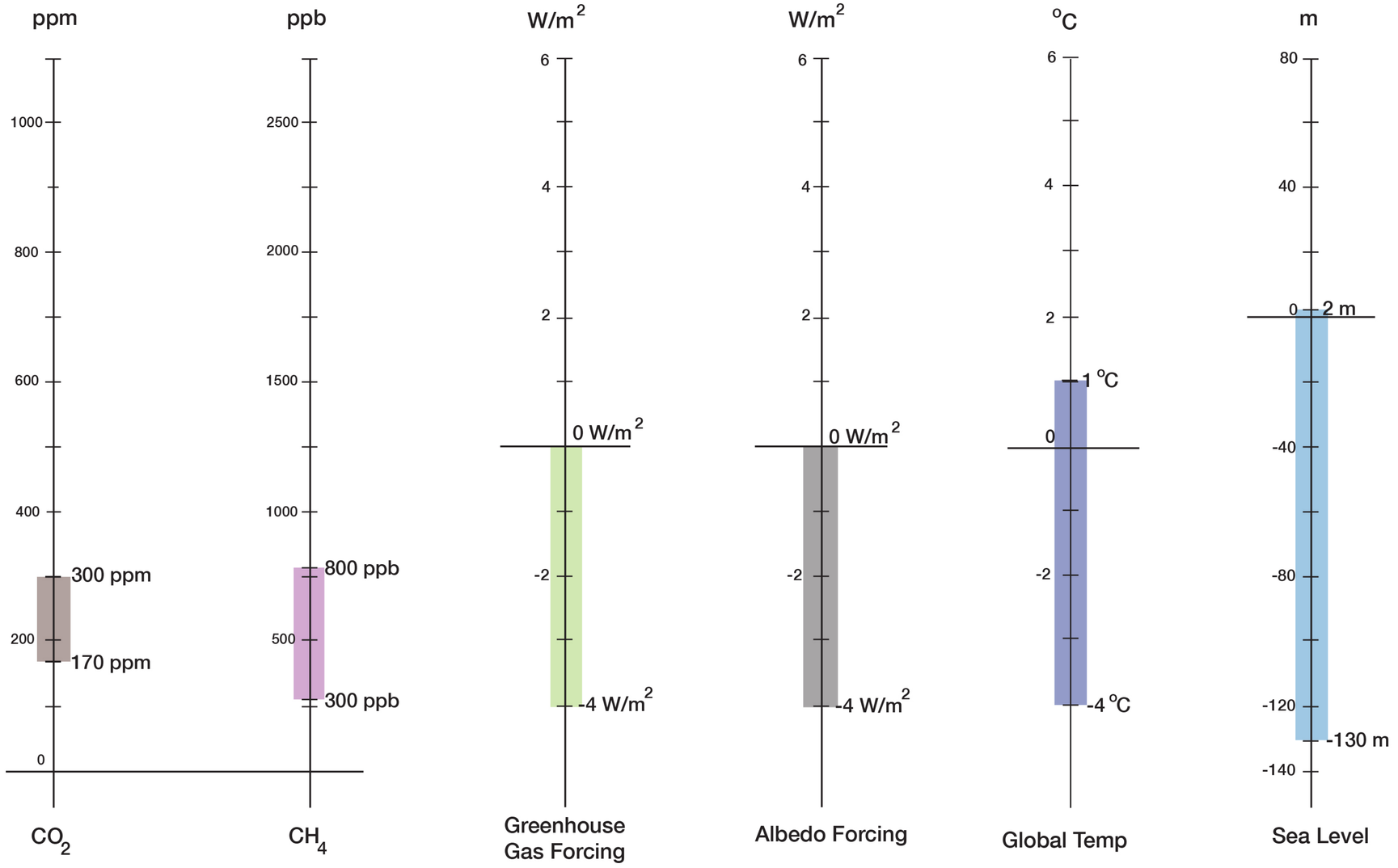
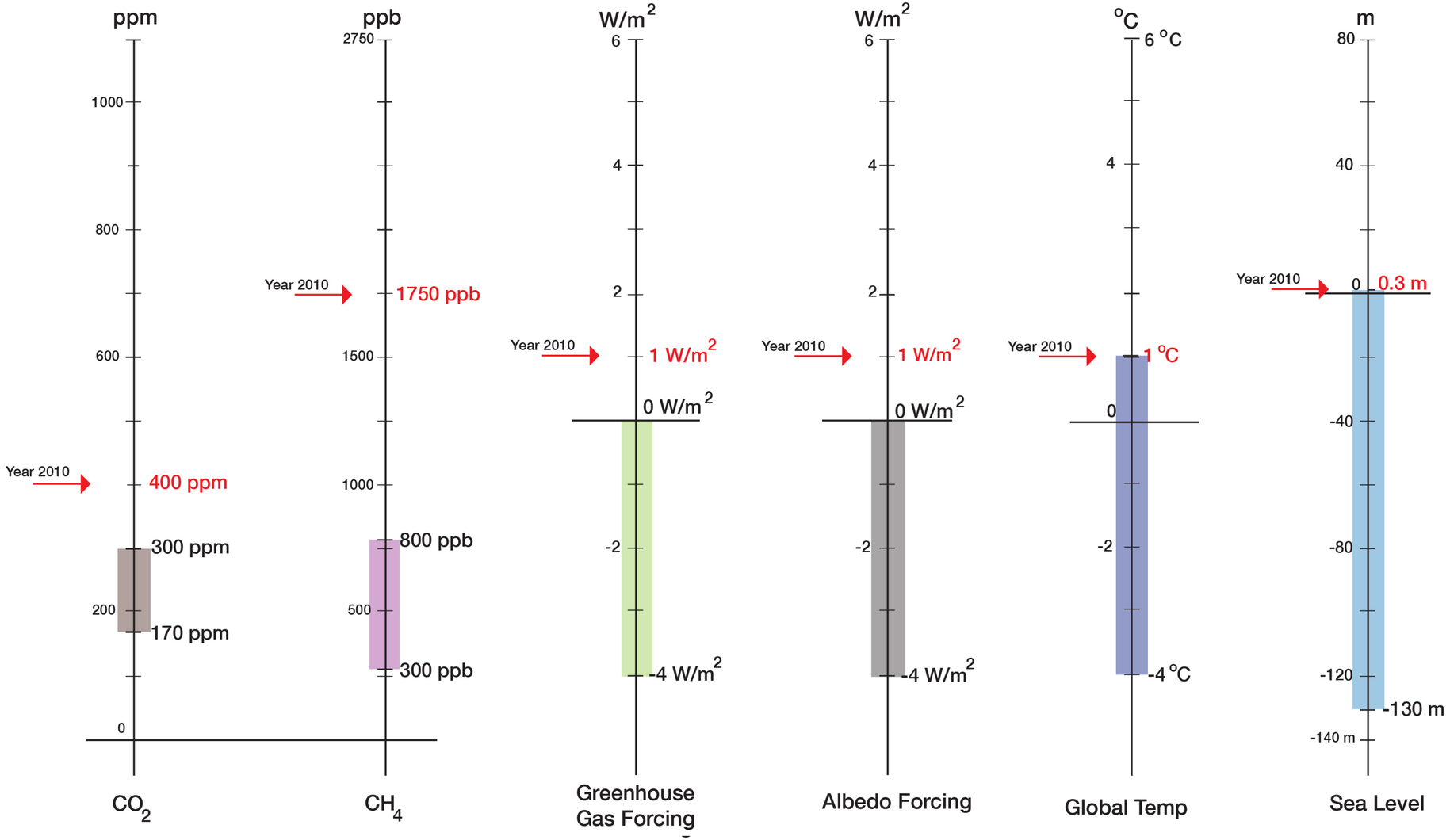


"Normal Range"
(800,000 years)

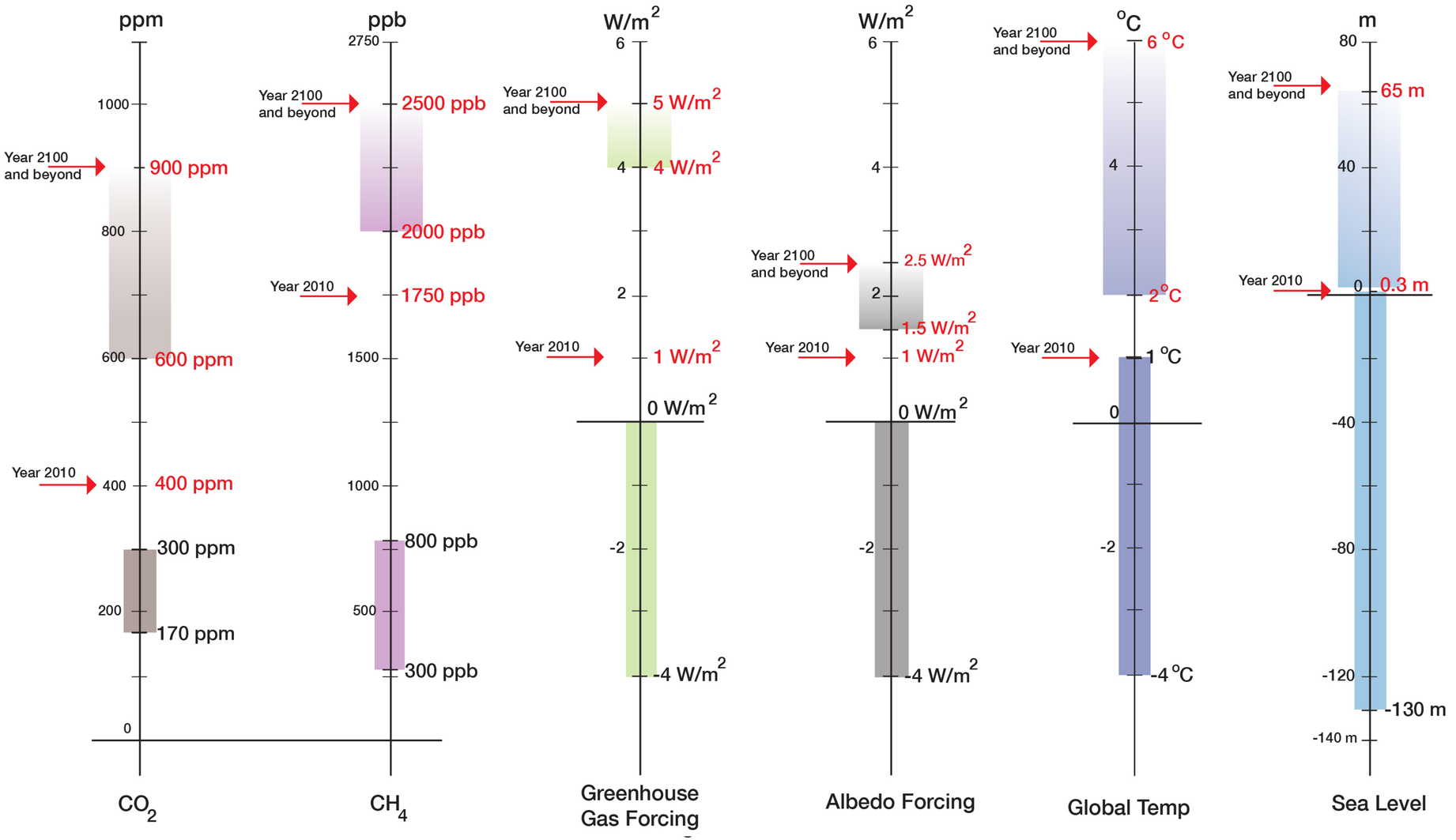
The Challenge



"Current State"

"Normal Range"
(800,000 years)

The Challenge

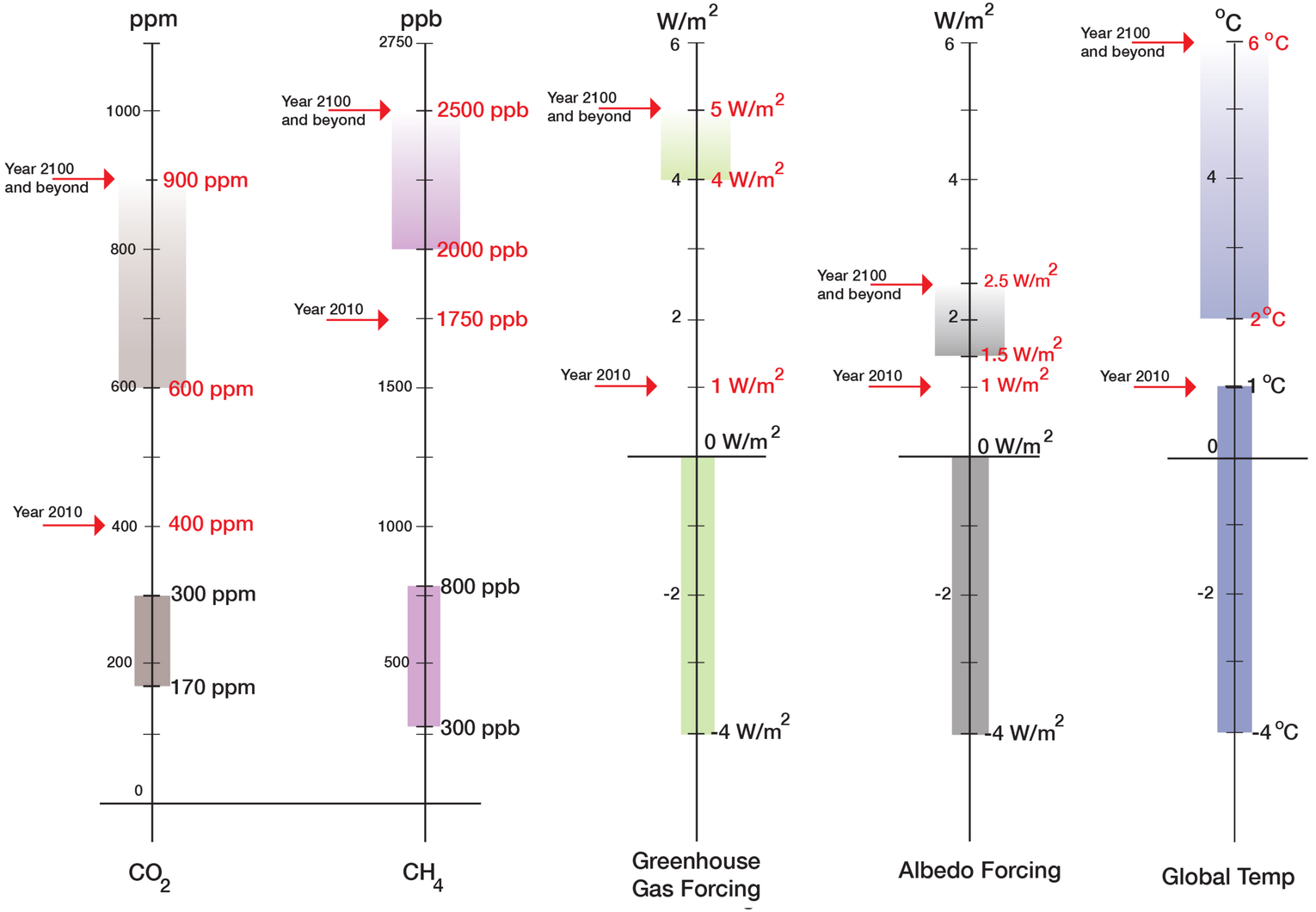


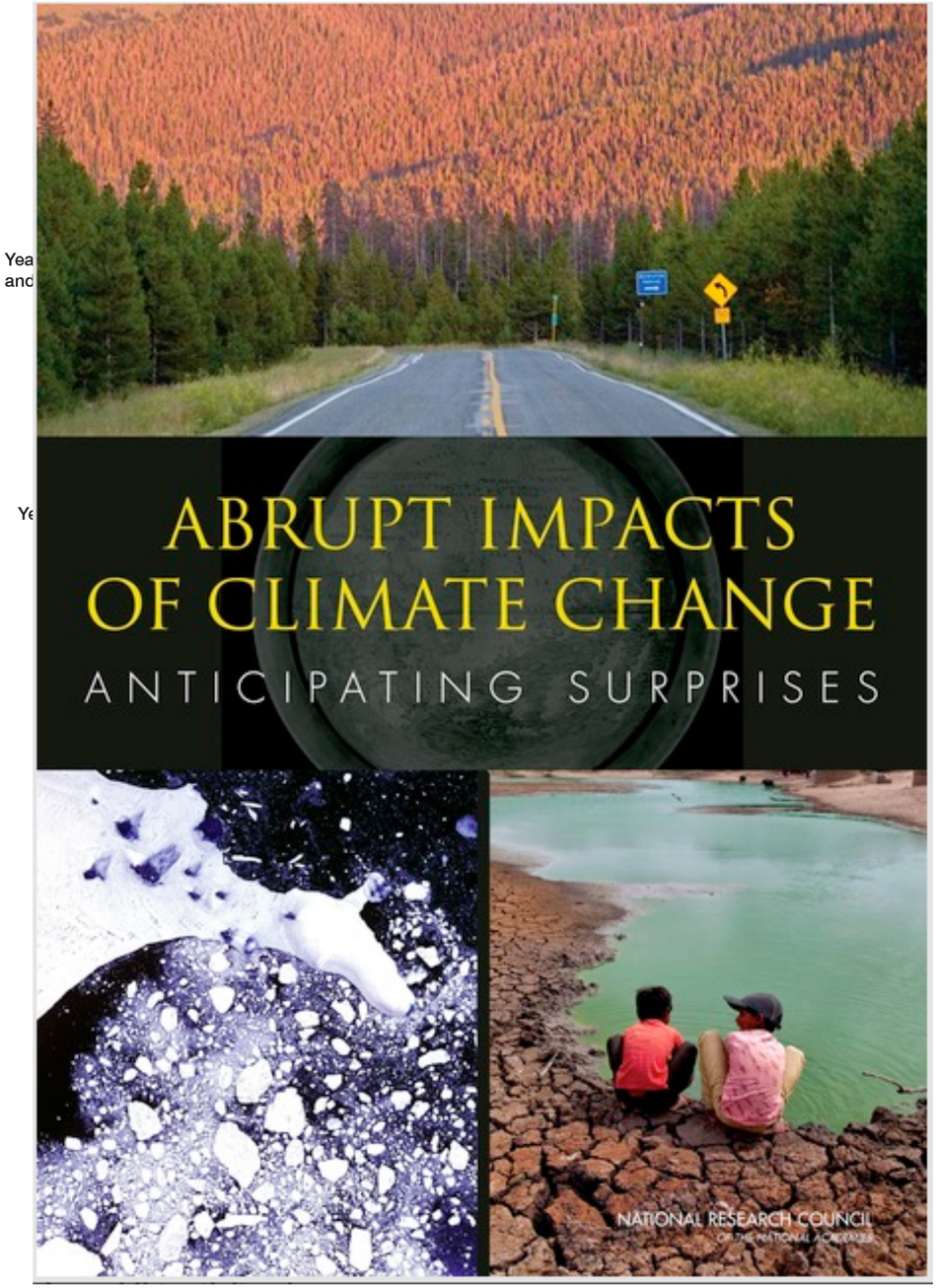
"Prognosis"

"Current State"

"Normal Range"
(800,000 years)

The Challenge

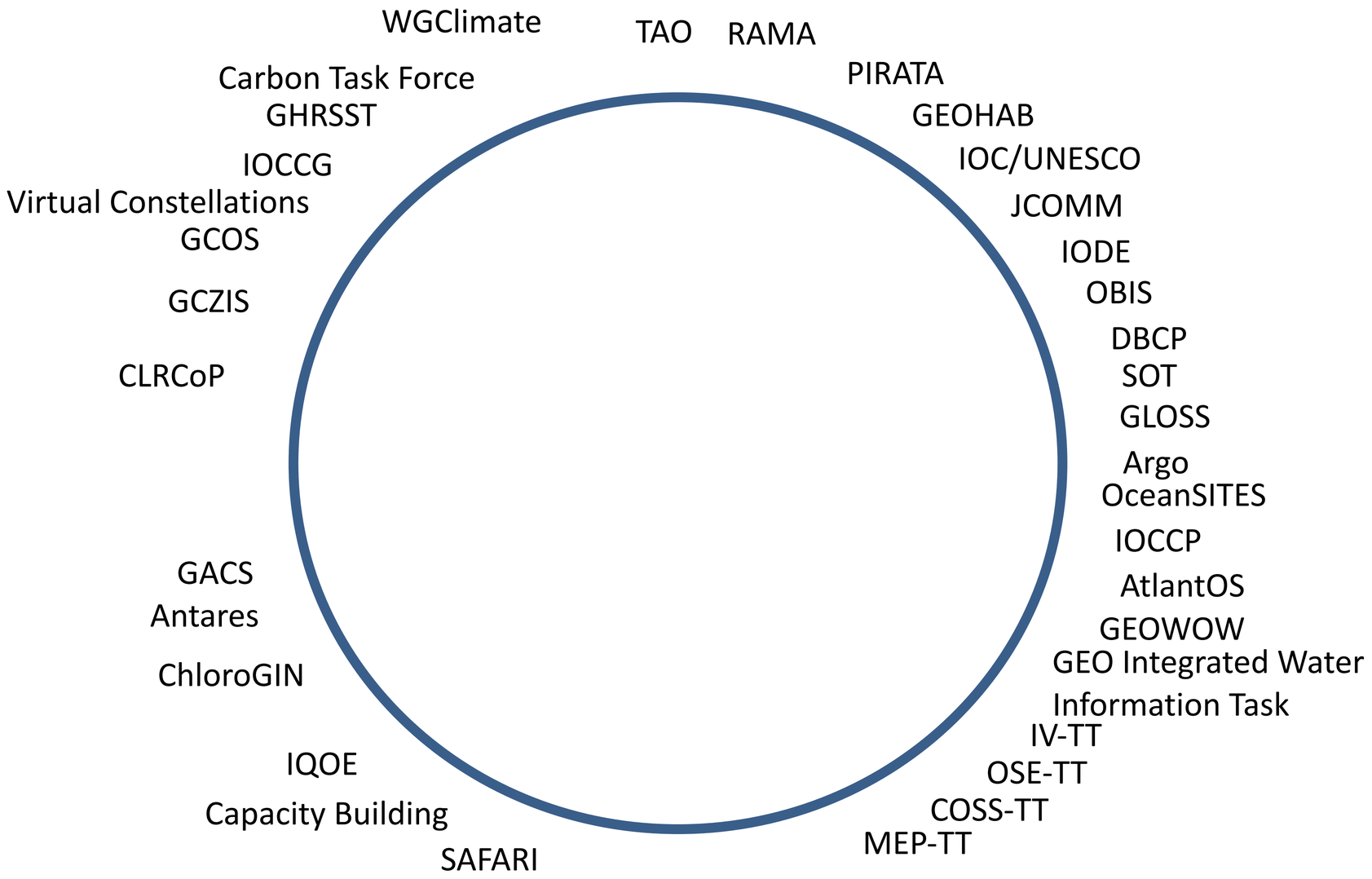




GROUP ON EARTH OBSERVATIONS

BLUE PLANET Oceans and Society

Seeking integration in a complex and crowded scene



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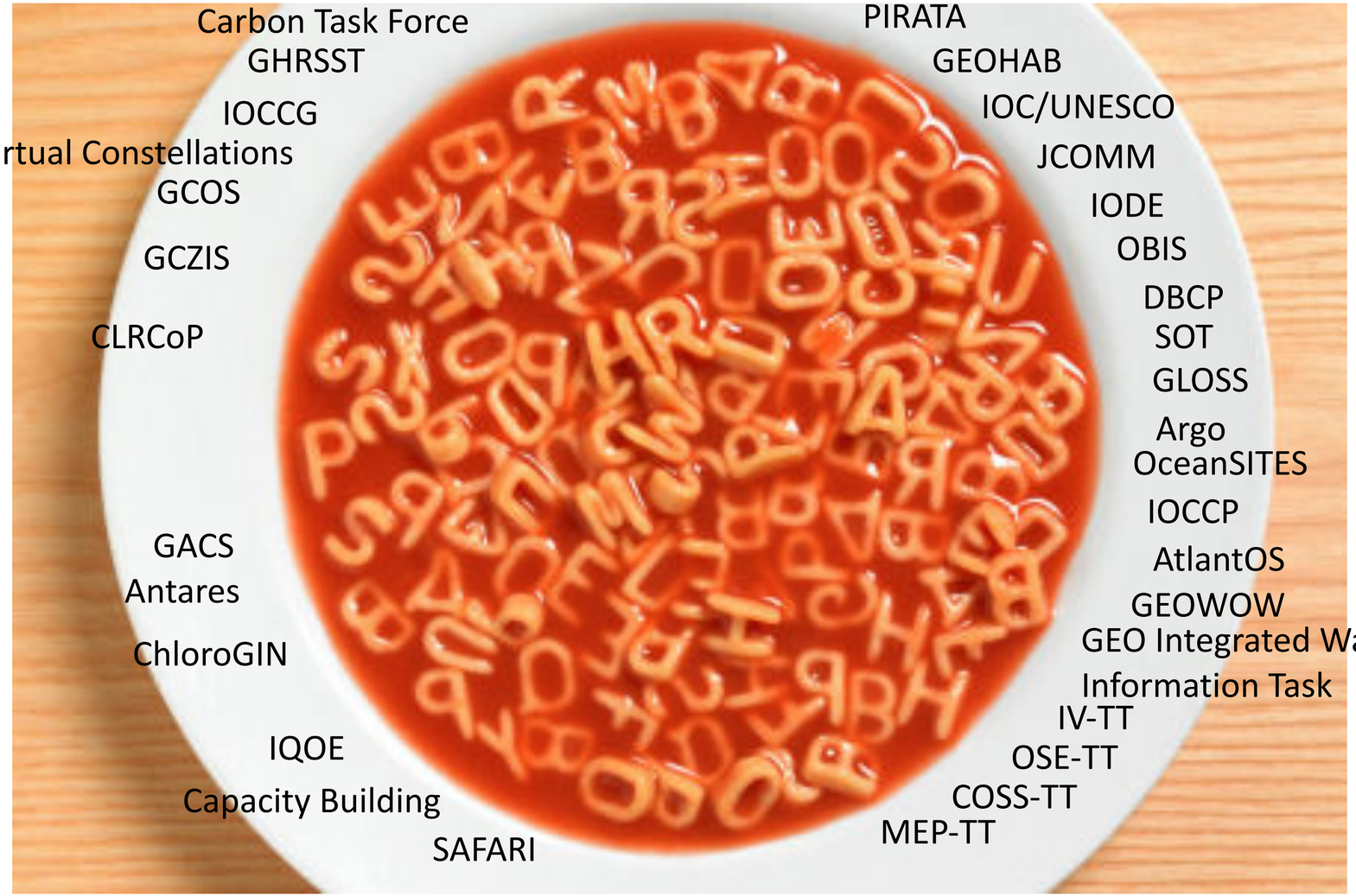

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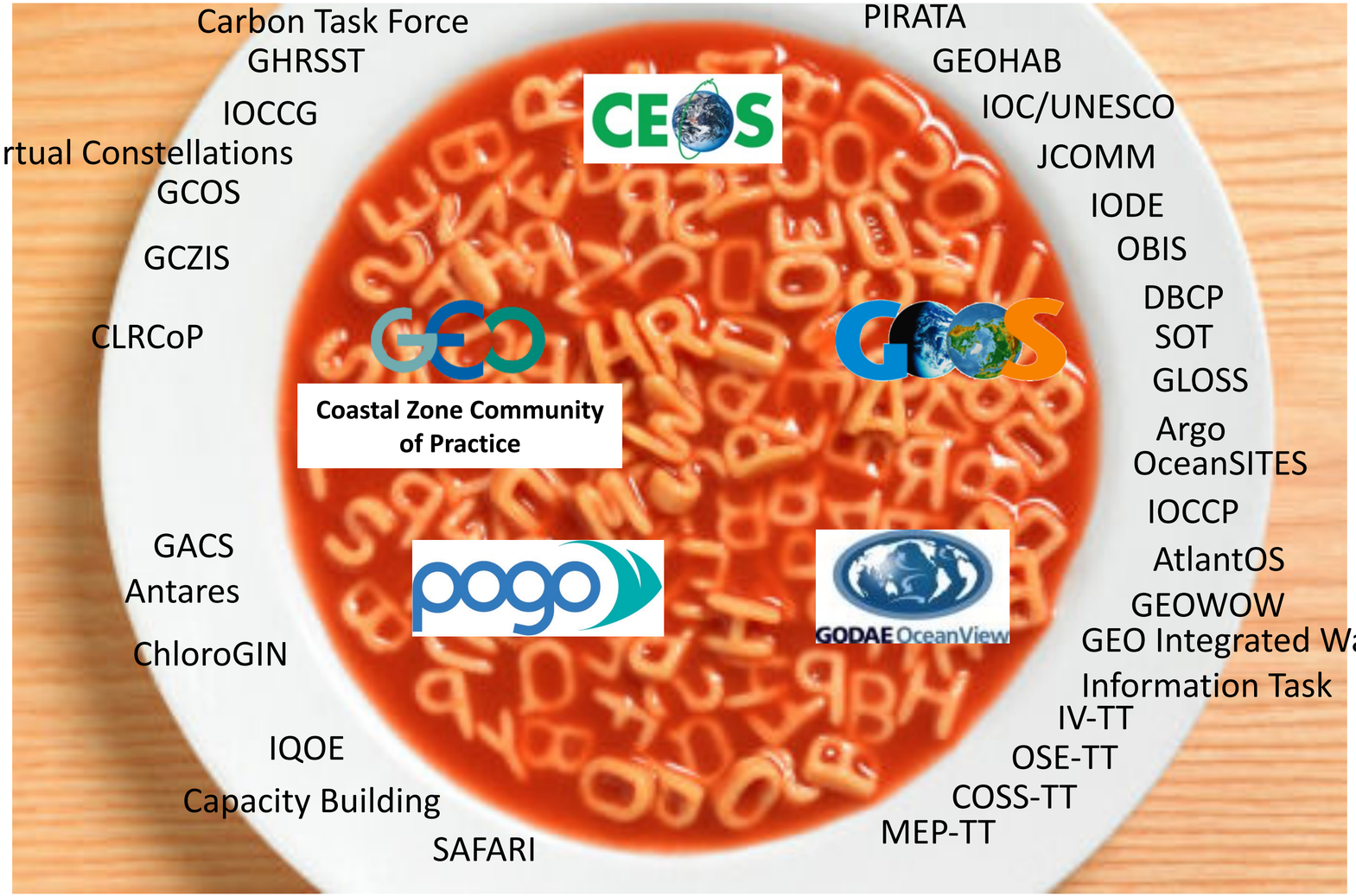

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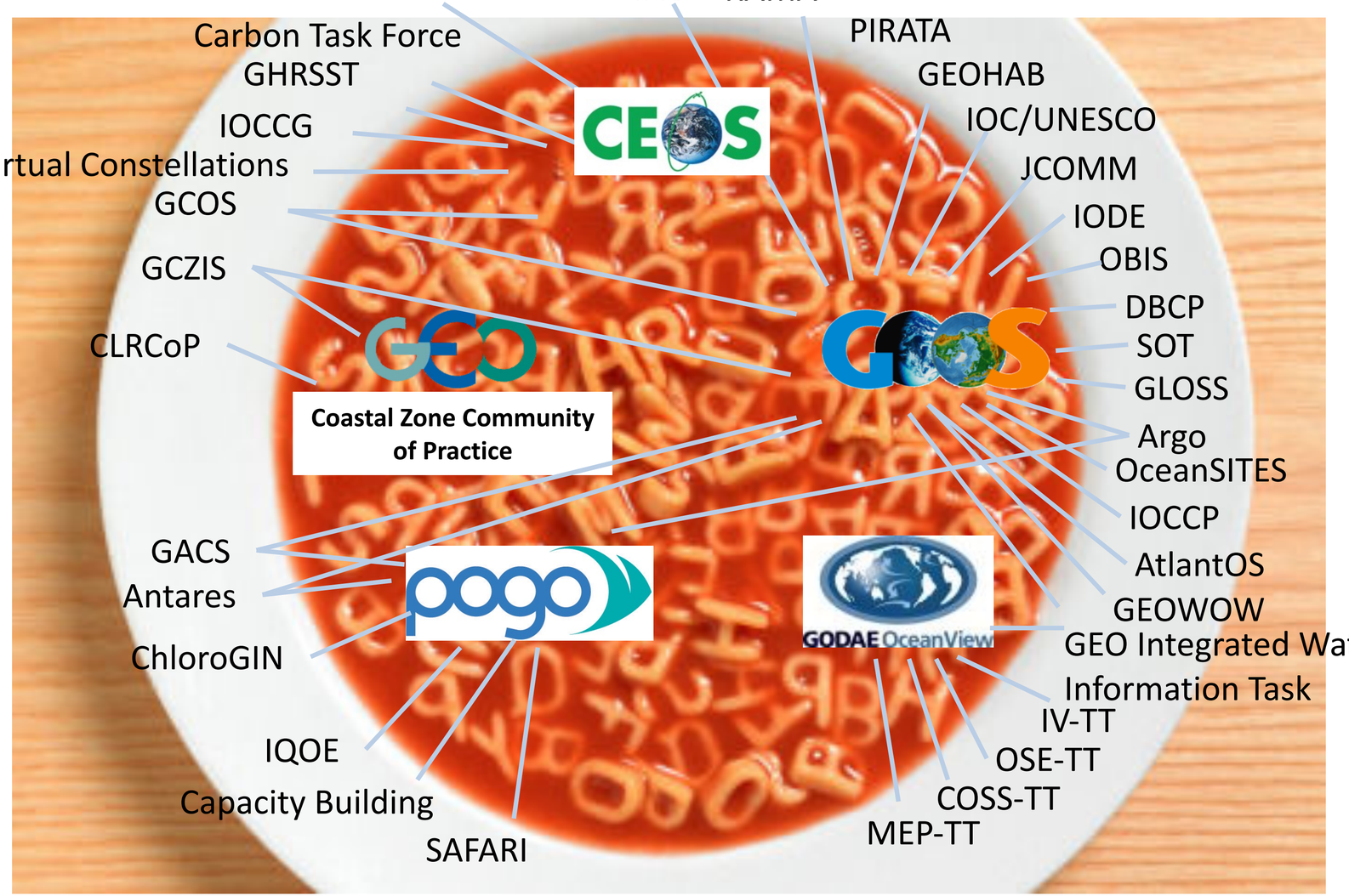

Building on Existing Efforts

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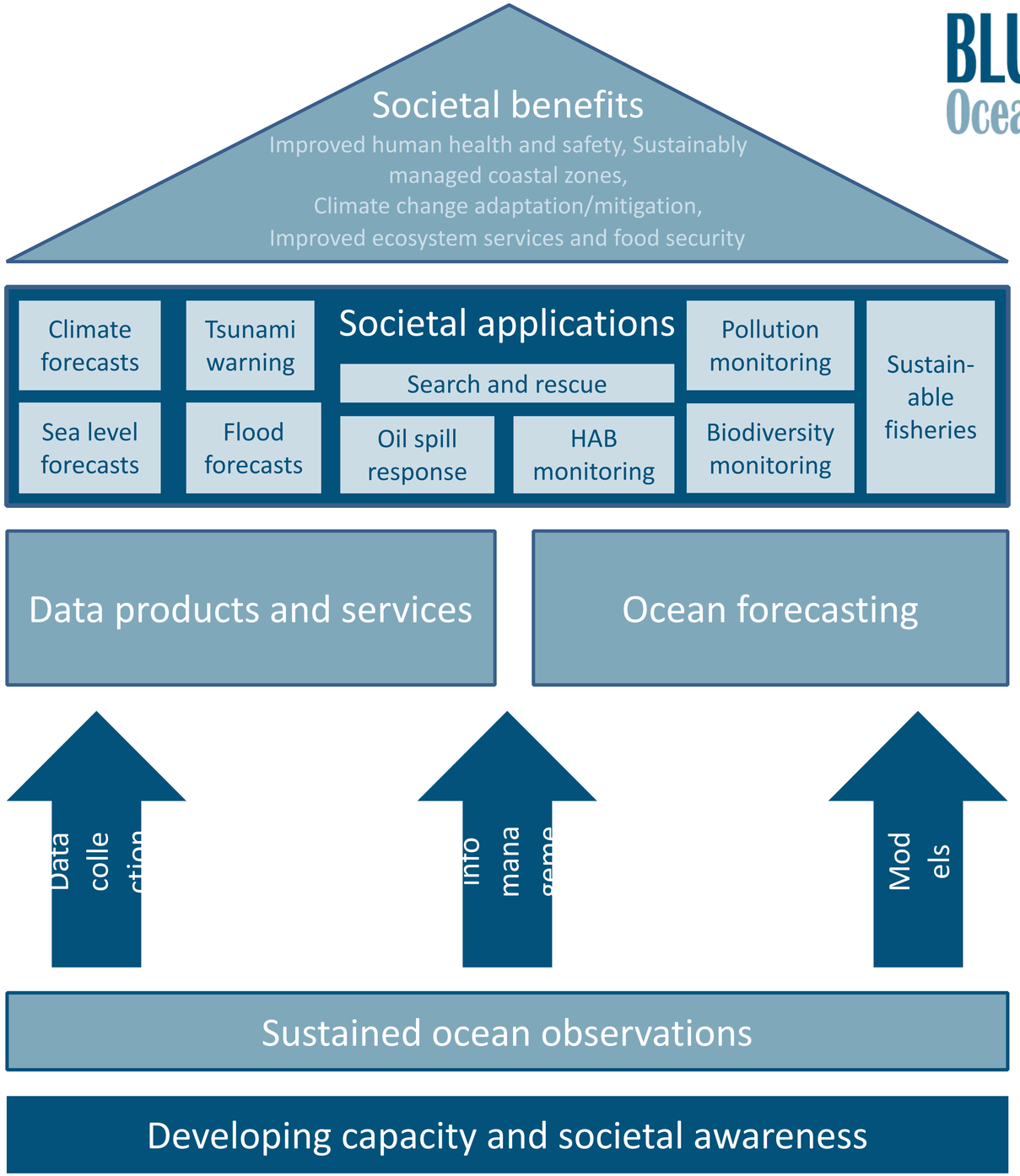
  - Linking data to products and information to increase knowledge
  - Demonstrating societal benefits
  - Where possible, making a concerted effort to link to relevant policies and policy frameworks.


Societal benefits
Improved human health and safety, Sustainably managed coastal zones,
Climate change adaptation/mitigation,
Improved ecosystem services and food security
Societal applications
Climate forecasts
Tsunami warning
Search and rescue
Pollution monitoring
Sustain-able fisheries
Sea level forecasts
Flood forecasts
Oil spill response
HAB monitoring
Biodiversity monitoring
Data products and services
Ocean forecasting
Data collection
Info management
Models
Sustained ocean observations
Developing capacity and societal awareness

Blue Planet in the post-2015 GEO Work Programme

Various oceanic programs and communities

program

community

users

providers

Blue Planet Initiative

BLUE PLANET
Oceans and Society

Potential Flagships

- Water quality service
- Sea level rise service
- Small Island Developing State System

Pathway to GEO Flagship Implementation

- Implementation Plan
- Resource Plan
- Timeline for development
- Key partners, participants, stakeholders

New Vision and Mission
(Aug 2015)

Vision

An informed society that recognises the oceans' crucial role in Earth's life-support system and is committed to stewardship of the oceans for a healthy, safe and prosperous future for all.

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An informed society that recognises the oceans' crucial role in Earth's life-support system and is committed to stewardship of the oceans for a healthy, safe and prosperous future for all.

Mission

To advance and exploit synergies among the many observational programmes devoted to ocean, coastal and inland waters; to improve engagement with a variety of users for enhancing the timeliness, quality and range of services delivered; and to raise awareness of the societal benefits of ocean observations at the public and policy levels.

Components revisited

- C1: Developing capacity and societal awareness
- C2: Sustained ocean observations
- C3: Data access and visualisation
- C4: Ocean forecasting and services
- C5: Healthy ecosystems and food security
- C6: Services for the coastal zone
- C7: Ocean climate and carbon
- C8: Integrated maritime services
- C9: User engagement

BLUE PLANET
Oceans and Society

Blue Economy & sustainable livelihoods

Ocean stewardship

Human health & safety

Bringing knowledge to users
C5, C6, C7, C8, C9

Data access & visualisation
C3

Transforming data into information & knowledge

Ocean forecasting
C4

Sustained ocean observations C2

Developing capacity and societal awareness C1

GODAE OceanView

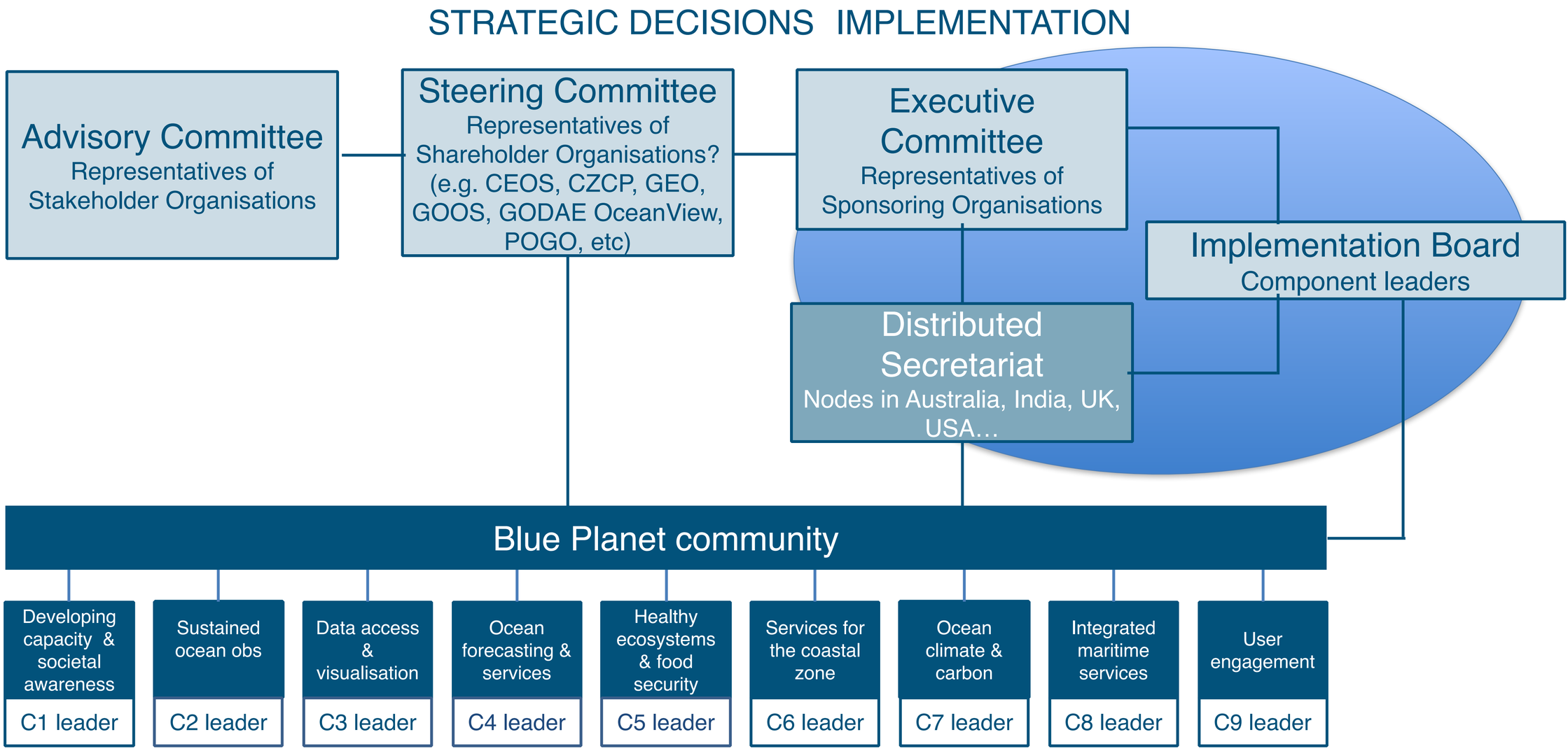
The Global Ocean Observing System

GOOS

CEOS

pogo

New Governance Structure for Blue Planet



Integrating Sustainability and BPI

3rd Blue Planet Symposium

The Role of the Oceans in Earth's Life-Support System

Spring 2017

USA

The Oceans in Earth's Life-Support System: In support of humanity's quest to meet our needs while safeguarding the Earth's life-support system, on which the present and all future generations depend, the crucial role of the oceans in this system provides the overarching focus of the 3rd Blue Planet Symposium with the goal to detail the state of knowledge and the monitoring, forecasting and research needs.

Integrating Sustainability and BPI

3rd Blue Planet Symposium

The Role of the Oceans in Earth's Life-Support System

Spring 2017

USA

Sustainable use of ocean resources: Human wellbeing depends on a wide range of ocean resources and the economic activities that depend on utilizing ocean resources are numerous. The impacts of these activities of the oceans need to be better understood and approaches that meet our needs while safeguarding the functioning of the oceans in the Earth's life-support system need to be developed.

Threats from pollution, warming and acidification: The health of marine ecosystems and their productivity are exposed to threats from pollution, the warming of the oceans, and an increasing acidification. The current and future impacts of these threats on the marine biosphere need to be understood and ways to limit the threats need to be developed.

The changing oceans: Climate change involves major changes in the oceans, including changes in ocean circulation and dynamic sea surface topography, a changing role in the global climate system, sea level rise, and a potentially ice-free Arctic ocean. These changes present new economic opportunities to utilize the oceans and they pose new environmental, social, and economic risks from local to global scales.

Processes and life at the Interfaces with the oceans: The oceans are integrated in the global system of systems with many interdependencies between them, the land and the atmosphere. There are many potential cascading effects, leading from disturbances and changes in one system to large impacts in the other systems. Therefore, understanding the processes at the interfaces between oceans, land and atmosphere is crucial in order to take interdependencies into consideration and avoid as far as possible cascading effects.

Integrating Sustainability and BPI

White paper to detail how the BPI components map into the themes

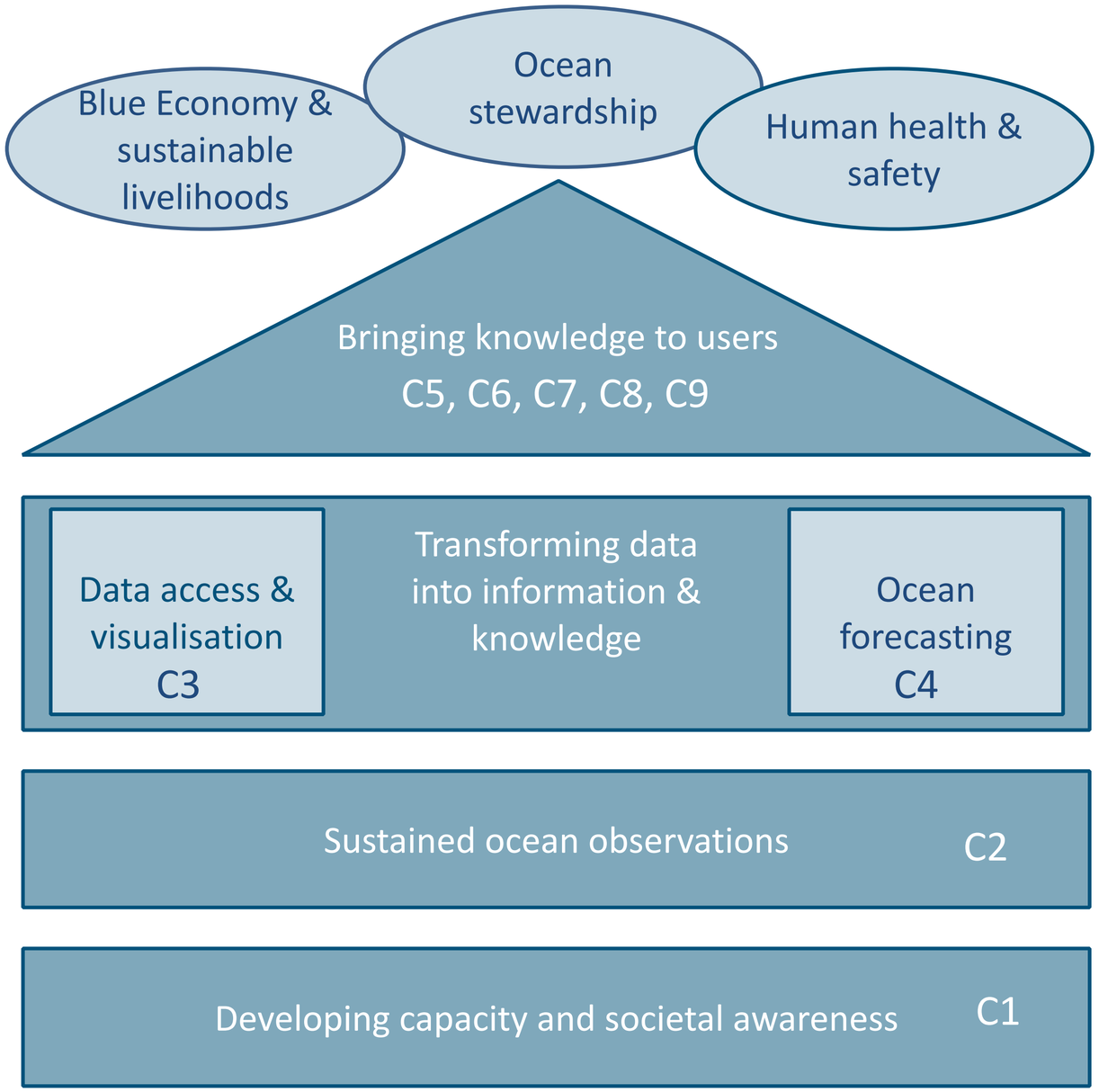
- Sustainable Use of Ocean Resources
- Threats from Pollution, Warming, and Acidification
- The Changing Ocean
- Processes and Life at the Interfaces with the Oceans

Sustainable Use of Ocean Resources

Threats from Pollution, Warming, and Acidification

The Changing Ocean

Processes and Life at the Interfaces with the Oceans



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pogo