Mitigation and Adaptation Studies

Class 16 (continued):
Vulnerabilities of Natural and Human Built Environment; Economy, Inequality and Injustice

Contents

- Terminology: What are risk, vulnerability, resilience, adaptation?
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Inequality in Time

Inequality in Time

19.20.21.org:
19 cities in the world with 20 million people in the 21st century

Inequality in Time

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Inequality in Time

19.20.21.org:
19 cities in the world with 20 million people in the 21st century

"..., almost all of the cities to be studied in 19.20.21 are cities that border the oceans of the world, and will be affected by the rise in sea levels

Inequality in Time

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"What would you like to tell your 20 year old self?"

Eva Wilkerson, 2013

Inequality in Time

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Eva Wilkerson, 2013

Separating the **Signal** from all the **Noise**

Inequality in Time

The Virginian-Pilot

PilotOnline.com

GUEST COLUMNIST

Plag: A talk with a younger self

By Hans-Peter Plag
Apr 20, 2014

The things I always want to hear are the truth, the facts, the options:

n The most likely single cause of premature death for young people today is an i
such as heat waves, droughts, storms, food and water shortages, new sickn
migration of large populations, civil unrest like in North Africa and Syri
anything and want to do something to reduce your worries, you shou
climate change. Do everything you can to mitigate climate change an
mitigated. Even using conservative predictions of global warming, scie
as 2 billion people could die prematurely because of climate change - ma
by 2050. Of course, the risk is not distributed evenly over the globe, and peopl
the world have a much higher chance to die prematurely. Such is the environmental j
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The most likely single cause of premature death for young people today is an impact of climate change, such as heat waves, droughts, storms, food and water shortages, new sicknesses and pandemics, migration of large populations, civil unrest like in North Africa and Syria, and wars.

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+ extinction

Inequality between Species

IN THEATERS NOW - CHECK 'SCREENINGS' BELOW FOR A THEATER NEAR YOU

Inequality between Species

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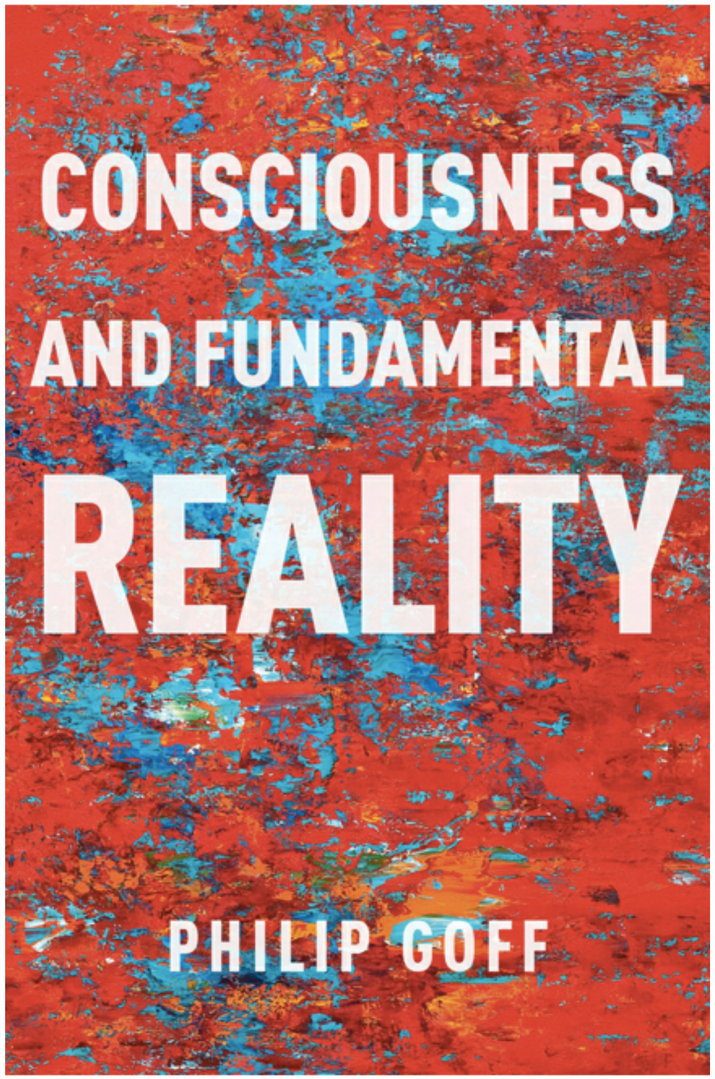
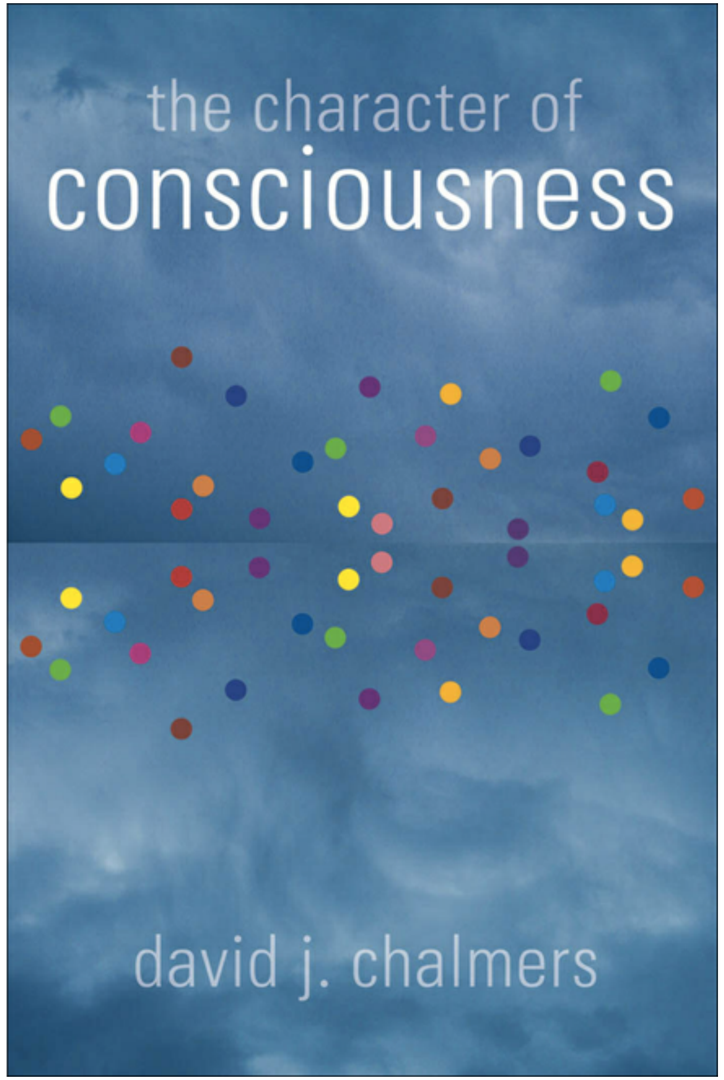
Chimps May Be Capable of Comprehending the Minds of Others

A gorilla-suit experiment reveals our closest animal relatives may possess "theory of mind"

By Catherine Caruso on October 6, 2016 Véalo en español

Inequality between Species





What is consciousness? How can it be explained? Can there be a science of consciousness? What is the neural basis of consciousness? What is the place of consciousness in nature? Is consciousness physical or nonphysical? How do we know about consciousness? How do we think about consciousness? What are the contents of consciousness? How does consciousness relate to the external world? What is the unity of consciousness?

Chalmers, David J.. The Character of Consciousness (Philosophy of Mind) (p. xi). Oxford University Press. Kindle Edition.

Will a rising tide sink all homes?

Zillow

Nationwide, almost 1.9 million homes (or roughly 2 percent of all U.S. homes) worth a combined $882 billion are at risk of being underwater by 2100 if sea levels rise by six feet. Some states will be hit harder than others.

State	Number of Potentially Underwater Properties	Fraction of Total Housing Stock Underwater	Total Value of Potentially Underwater Properties
California	42,353	0.44%	$49.2B
Texas	46,804	0.61%	$12B
New York	96,708	2.10%	$71B
Florida	934,411	12.56%	$413B
Pennsylvania	2,661	0.06%	$730M
Georgia	24,379	0.75%	$10.2B
North Carolina	57,259	1.64%	$20.6B
New Jersey	190,429	7.35%	$93.1B
Virginia	46,287	1.77%	$14.4B
Washington	31,235	1.32%	$13.7B
Massachusetts	62,069	3.10%	$51.2B
Maryland	64,299	3.09%	$19.6B
Alabama	12,735	0.77%	$3.8B
South Carolina	83,833	4.42%	$45B
Louisiana	80,080	5.88%	$13.2B
Oregon	4,959	0.37%	$1B
Connecticut	18,173	1.61%	$13.2B
Mississippi	5,572	0.72%	$1B
Hawaii	37,556	9.07%	$25.3B
Maine	5,412	0.98%	$3.1B
New Hampshire	4,064	0.71%	$1.7B
Rhode Island	4,853	1.47%	$2.9B
Delaware	11,670	3.09%	$3.6B

Source: National Oceanic and Atmospheric Administration (NOAA); Zillow data

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Joe Romm Follow
Dr. Joe Romm is Founding Editor of Climate Progress, "the indispensable blog," as NY Times co...
4 days ago · 6 min read

The U.S. is about to lose a trillion dollars in coastal property values

Trump isn't helping.

Florida Coastal flooding. Credit: Florida Sea Grant, Dorothy Zimmerman/Flickr

Mitigation and Adaptation Studies

Mitigation and Adaptation Studies

Class 17: Developing Foresight

Contents

- Uncertainty
- Foreseeability
- Decision Making and Foreseeability

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Uncertainty

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"A **good understanding of the climate system** is essential to allow society to prepare for the future. Increasing populations, diminishing resources, changing weather patterns and extreme events in combination with water scarcity and changing crop yields will all put pressure on communities. The only sure thing is that the climate and weather in the coming years will continue to have a **degree of uncertainty and surprise us**."

Nature Clim. Change, Editorial, 2013

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Epistemic uncertainties: systemic uncertainties,
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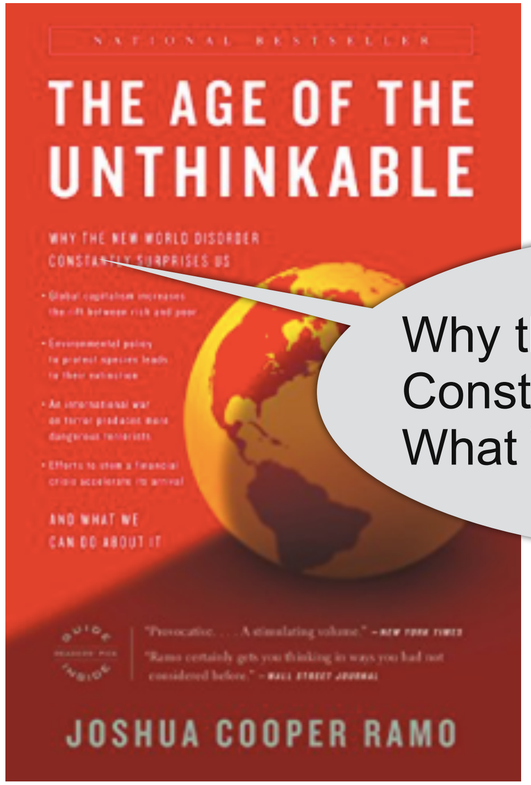
Complex systems:
Aiming at understanding what the system might do, instead of trying to predict what it will do …



Why the New World Disorder Constantly Surprises Us And What We Can Do About It

Uncertainty

WORKING WITH A CHANGING CLIMATE, NOT AGAINST IT

PROJECT REPORT

Hydro-Meteorological Disaster Risk Reduction: A Survey of Lessons Learned for Resilient Adaptation to a Changing Climate

Is Resilience the key?

http://fcw.com/articles/2013/07/08/executech-operational-resilience.aspx

Michael H. Glantz (PI), Marie-Ange Baudoin (co-PI), Arielle Tozier de la Poterie, Lino Naranjo, Gregory Pierce, Dhiraj Pradhananga, Tsegay Wolde-Georgis, Bapon Fakhruddin, Atiq Kainan Ahmed, Netra Chapsoporn, P.E.O Usher, Ivan Ramirez

SUPPORT STAFF:

Liz Wiig, Beau Driver, Mark Ferrara

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source: www.forbes.com

Actions based on one's perceptions of reality have real consequences.

Uncertainty

APOGEO SPATIAL

ON THE EDGE

Interpreting What We See

Distance Impacts our Perceptions

Posted by Prof. Hans-Peter Plag, PhD on January 31, 2018 in Columns, Fall 2017, On the Edge

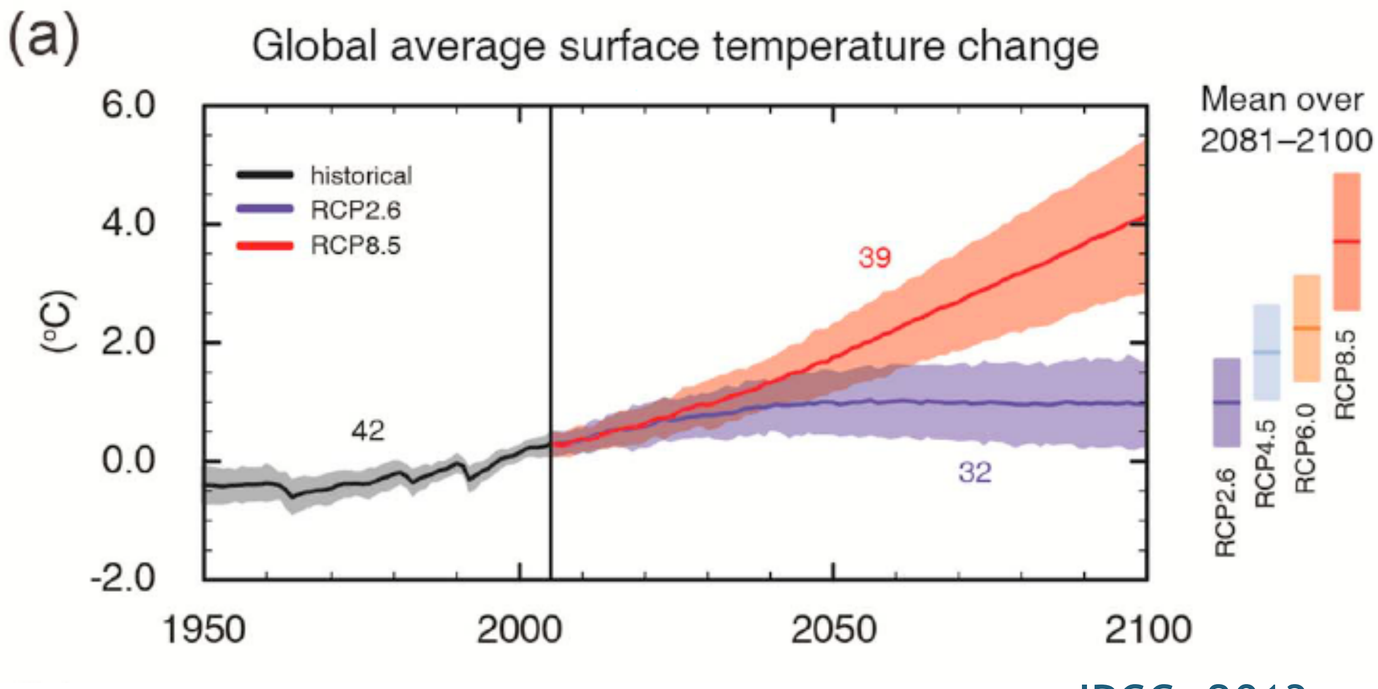
Our Perception of an object changes depending on how far or close we are and on how accustomed we are with it. During a recent visit to St. Petersburg, Florida, I spent several hours at the Dali Museum there. For some of Salvador Dali's paintings, the distance to the

Latest Tweets

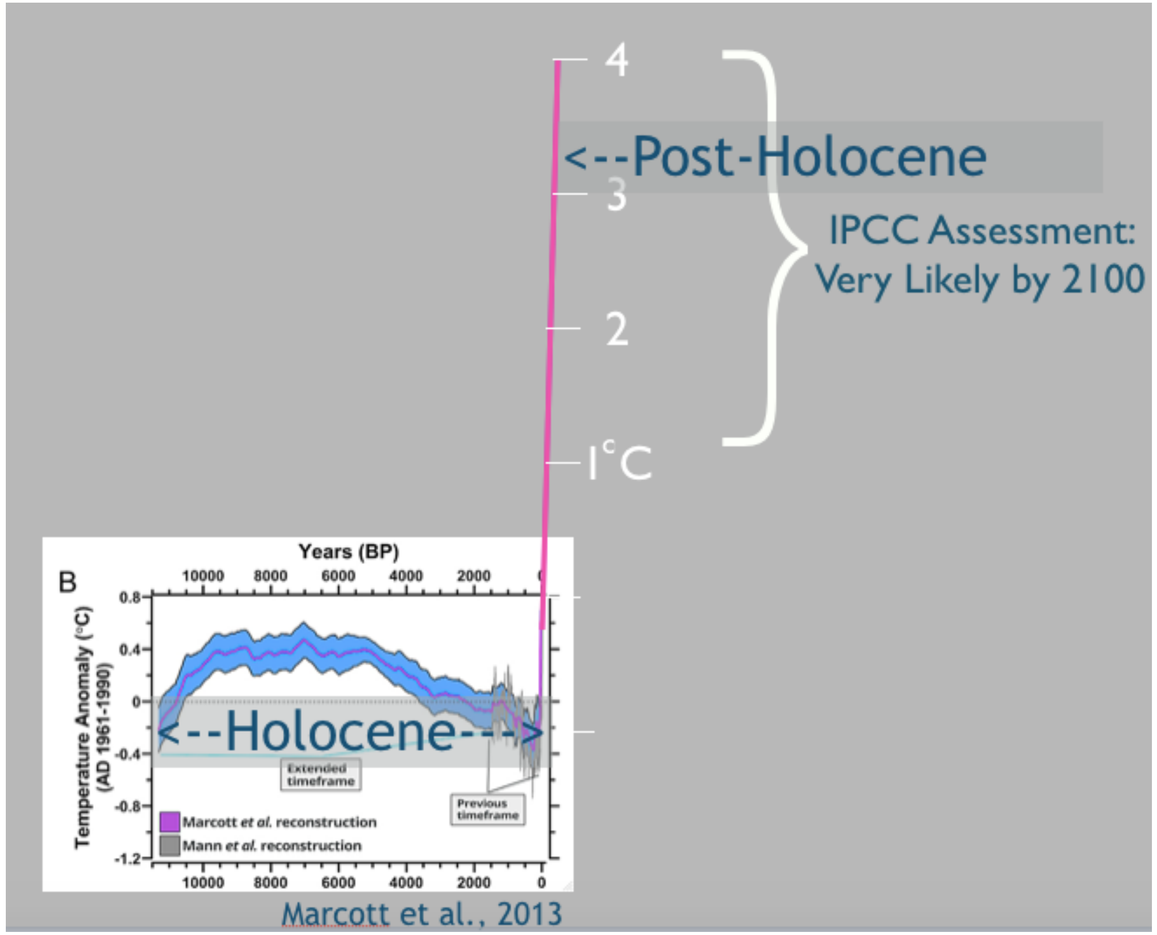
Airbus announces that SpaceDataHighway starts full Copernicus service. This new capability has

Uncertainty

Uncertainty

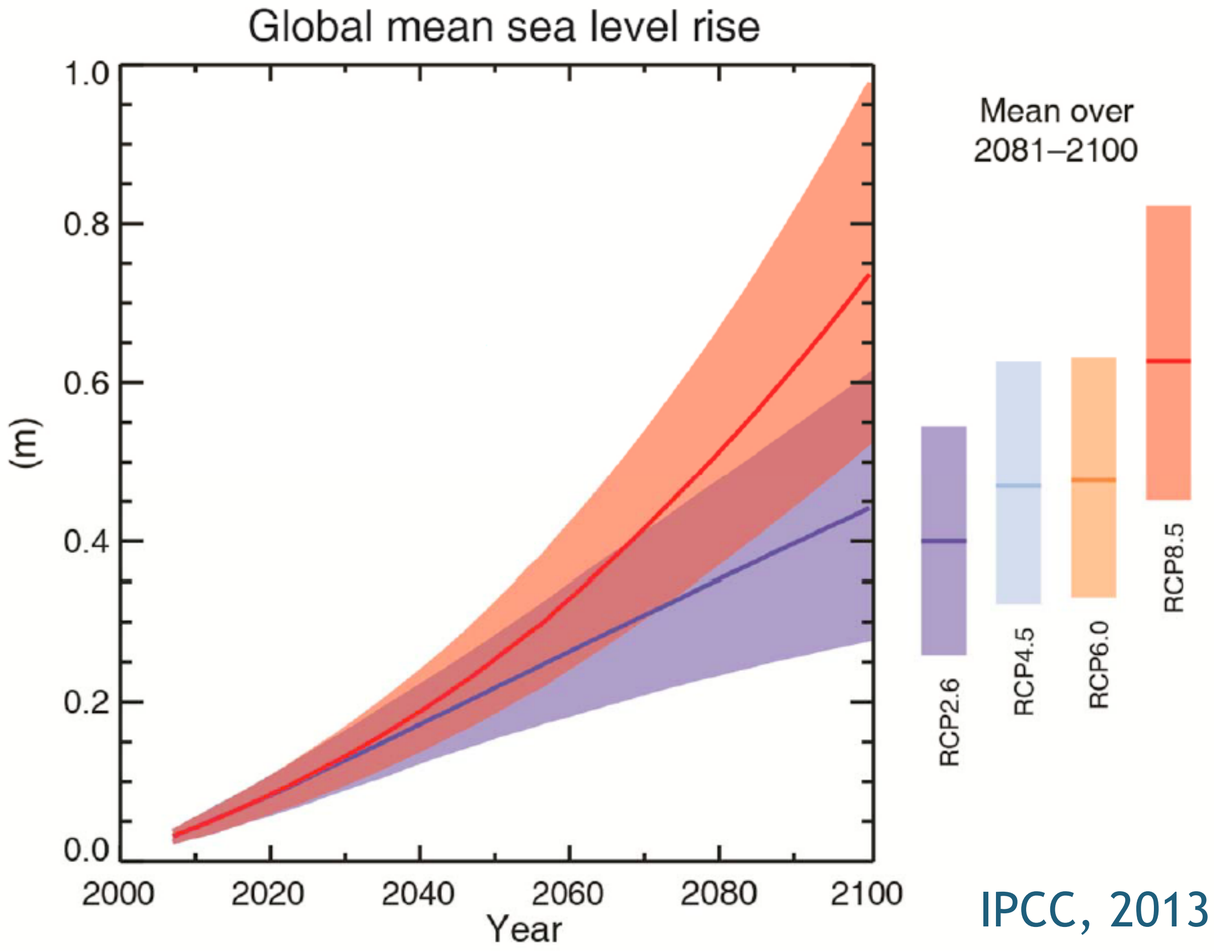


IPCC, 2013



Marcott et al., 2013

Uncertainty



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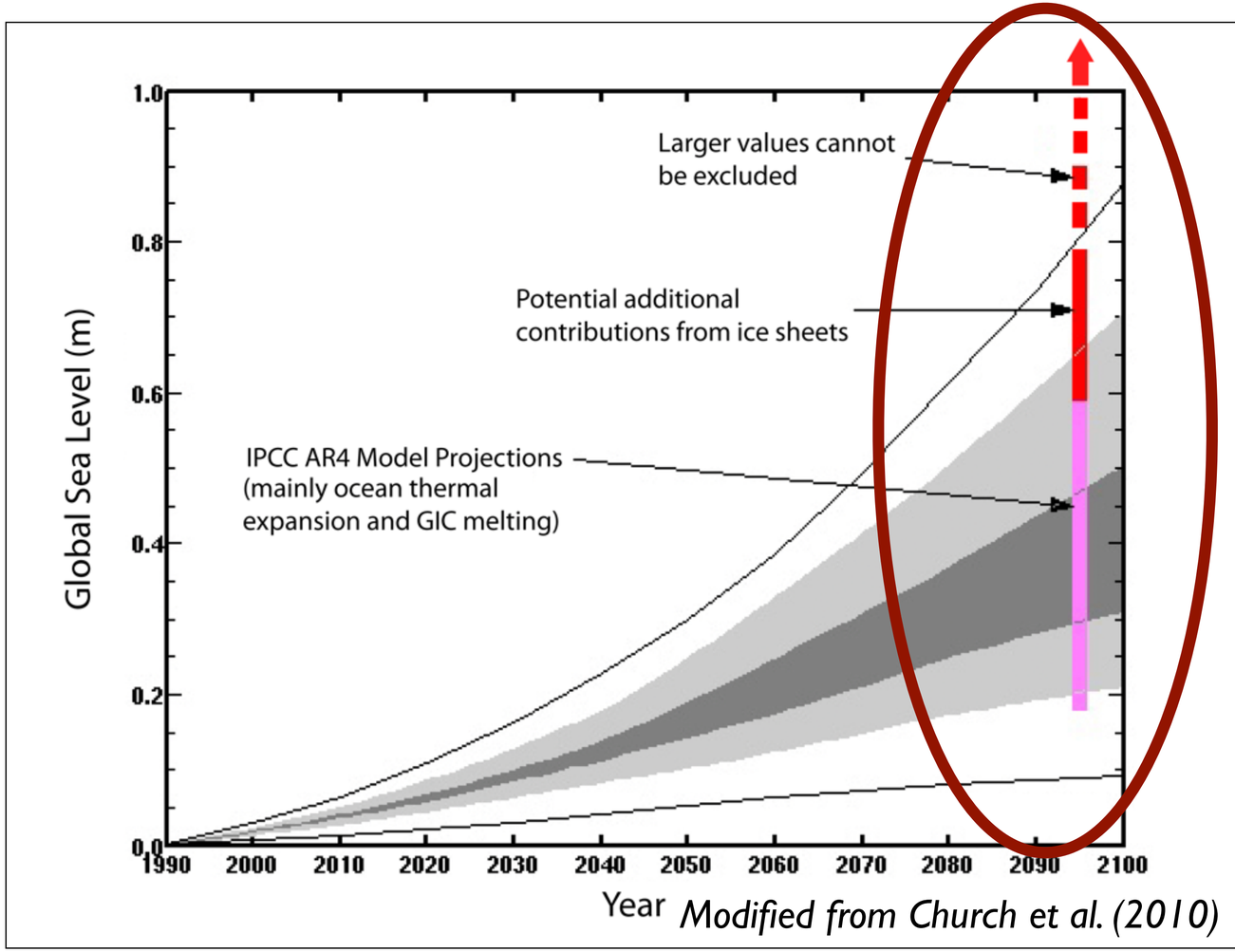
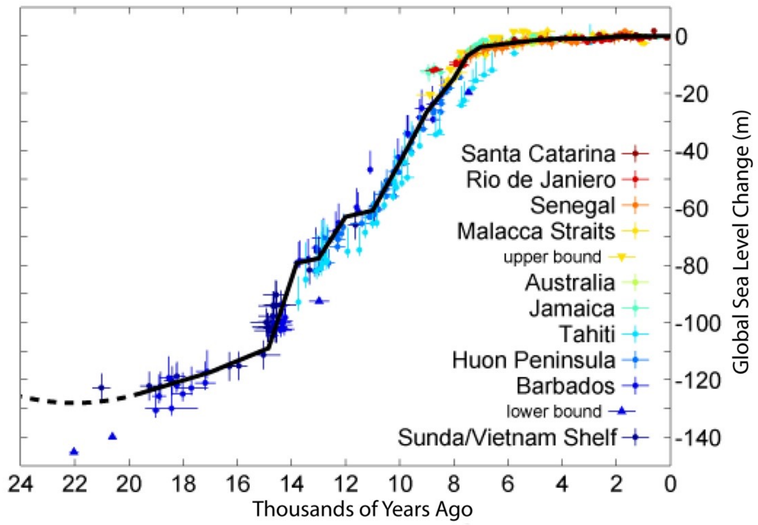
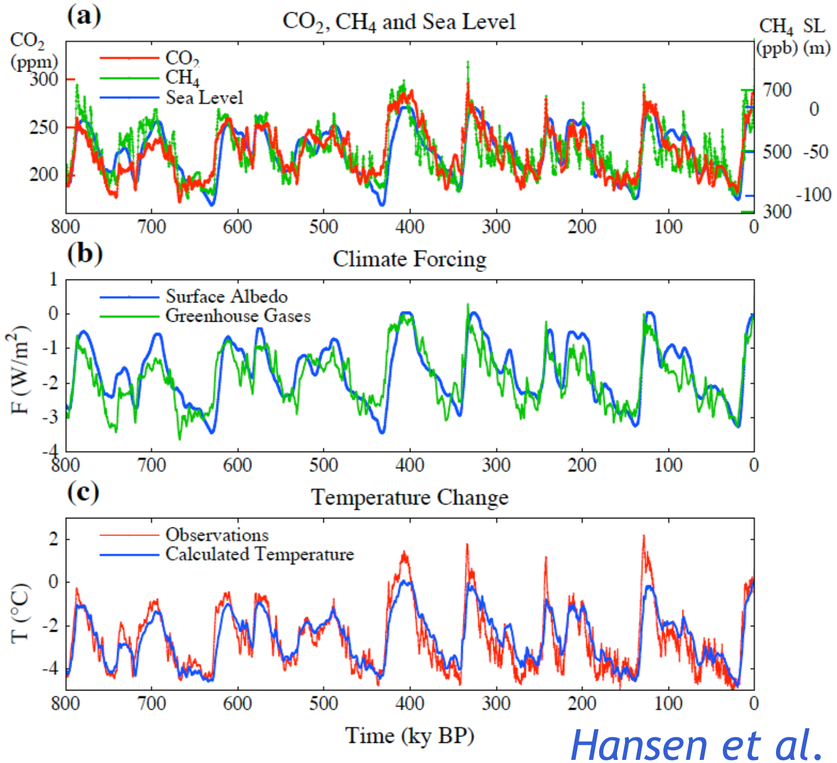


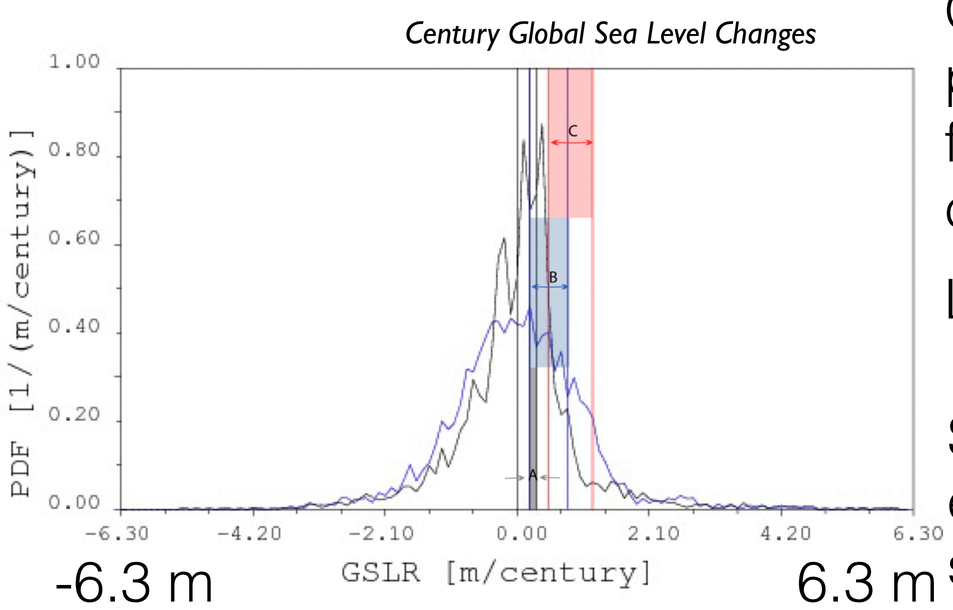
Modified from Church et al. (2010)

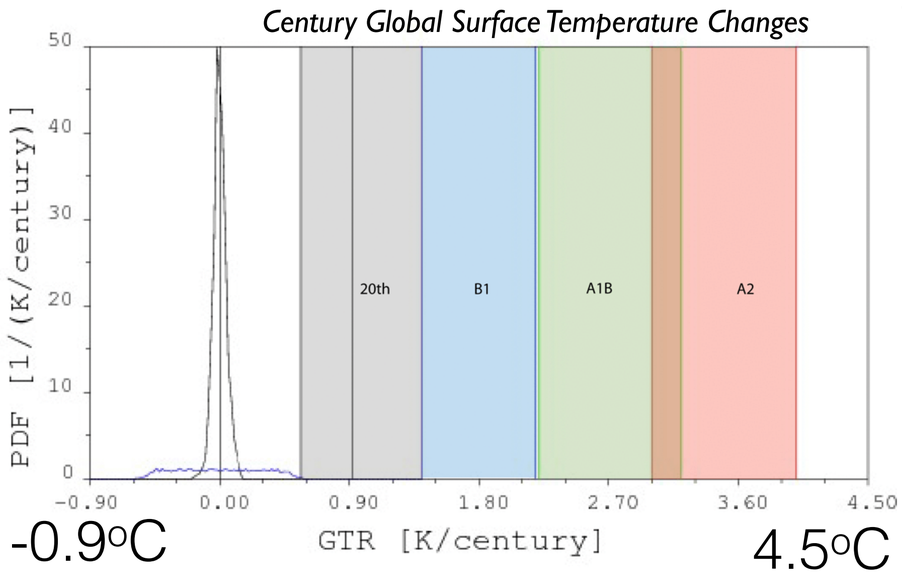
Sea Level Change





Hansen et al. (2008)





Plag and Jules-Plag (2013)

Question: What is the probability density function for sea level change per century?

Look at paleo-data …

Scientifically, we cannot exclude a large, rapid global sea level rise with large spatial variability in local sea level rise.

Mitigation and Adaptation Studies

Contents

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Foreseeability

Source: www.uowblogs.com

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ABOUT LESSONS LEARNED

Why:

Philosopher Santana was noted as having said, "Those who do not learn from history are doomed to repeat it." There are now variations on this theme, uttered by famous as well as the not so famous individuals, but the core message remains: people must know history in order to learn from it. People around the globe, through trial and error, have forever been learning tactical and strategic responses to their local and regional hydro-meteorological hazards and disasters.

Much of what they have learned in their local environments could be of value to others facing similar hazards and disasters far away.

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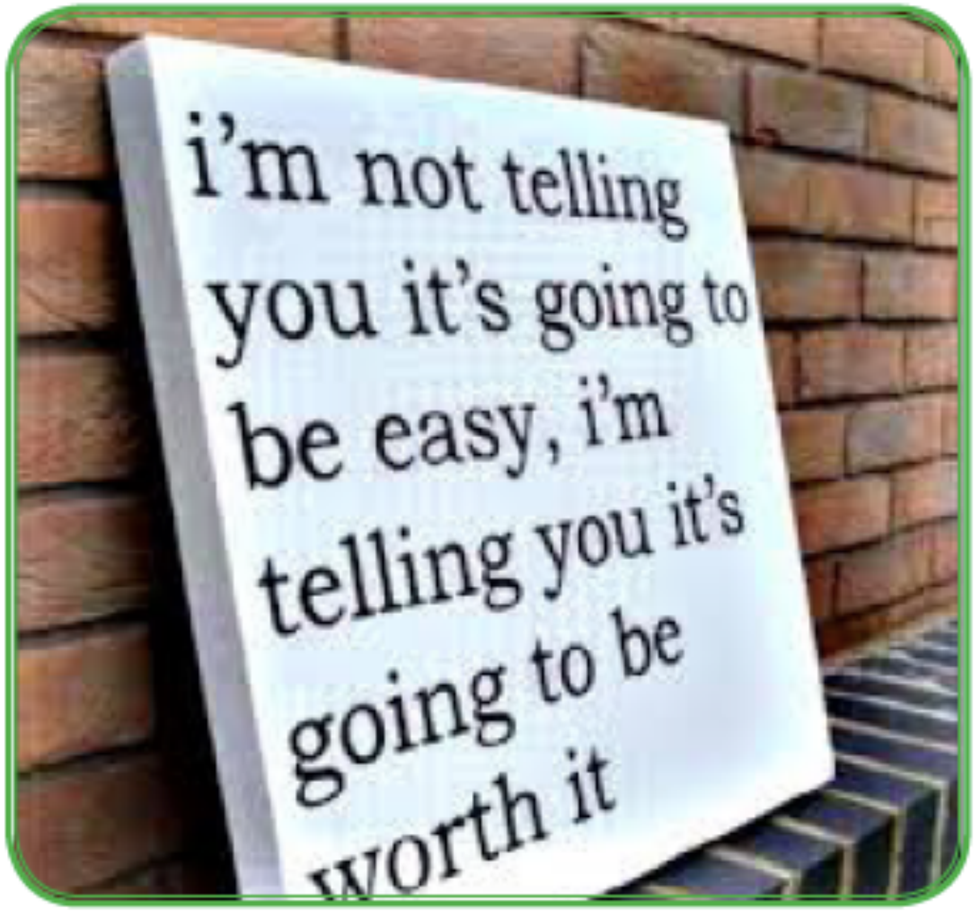


Foreseeability

Foreseeability

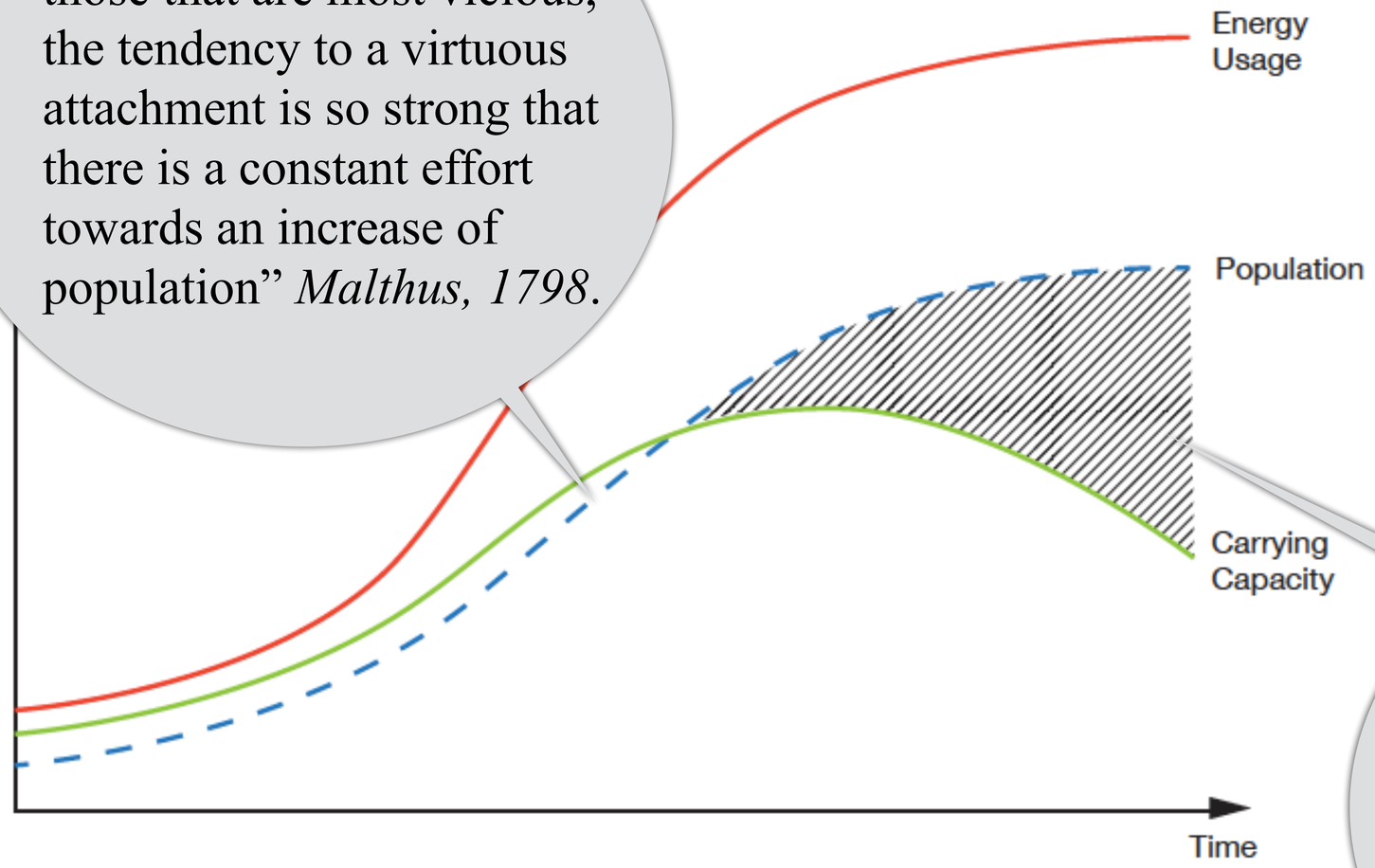
Foreseeability
n. reasonable anticipation of the possible results of an action, such as what may happen if one is negligent or consequential damages resulting a from breach of a contract.

The facility to perceive, know in advance, or reasonably anticipate that damage or injury will probably ensue from acts or omissions.

In the law of **Negligence**, the foreseeability aspect of proximate cause—the event which is the primary cause of the injury—is established by proof that the actor, as a person of ordinary intelligence and circumspection, should reasonably have foreseen that his or her negligent act would imperil others, whether by the event that transpired or some similar occurrence, and regardless of what the actor surmised would happen in regard to the actual event or the manner of causation of injuries.
West's Encyclopedia of American Law, edition 2. Copyright 2008 The Gale Group, Inc. All rights reserved.

Foreseeability: Population Growth

"Yet in all societies, even those that are most vicious, the tendency to a virtuous attachment is so strong that there is a constant effort towards an increase of population" *Malthus, 1798.*



Carrying Capacity = function of: Arable Land, Nitrogen, Phosphorous, Climate, Water, Biodiversity, Land Use, Energy, Degradation, Technology, …

$CC = f(A, N, P, C, W, B, L, E, D, T, \ldots)$

$C = f(E, L, \ldots)$

$W = f(C$

"That the increase of population is necessarily limited by the means of subsistence, That population does invariably increase when the means of subsistence increase, and, That the superior power of population is repressed, and the actual population kept equal to the means of subsistence, **by misery and vice**."

Malthus, 1798.

Lovelock: Carrying Capacity will be down to 1 Billion in 2050

Foreseeability: Population Growth

Millions in South Sudan in Urgent Need of Food, U.N.

By JEFFREY GETTLEMAN FEB. 20, 2017

Women who fled fighting in South Sudan waited for food to be
The United Nations has declared a famine in the country. Kate

NAIROBI, Kenya — War and a collapsi
South Sudan, the United Nations anno
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AFRICA

Why 20 Million People Are on Brink of Famine in a 'World of Plenty'

By SOMINI SENGUPTA FEB. 22, 2017

Nigerians displaced by Boko Haram insurgents last February at Dikwa can
United Nations raised the alarm on Wednesday about the risk of famine in
Agence France-Presse — Getty Images

function of: Arable
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Africa hit by worst famine crisis, 20 million people face death

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ISTANBUL

Published March 12, 2017

A Somali woman walks through a camp of people displaced from their homes elsewhere in the country by the drought, shortly after dawn in Qardho, Somalia on March 9.

The world faces the largest humanitarian crisis since the United Nations was founded in 1945 with more than 20 million people in four African countries facing starvation and famine, the U.N. humanitarian chief warned

Lovelock: Carrying Capacity will be dov
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Foreseeability: Population Growth

Death toll of World War 2: 50 - 80 million

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Foreseeability: Land use changes

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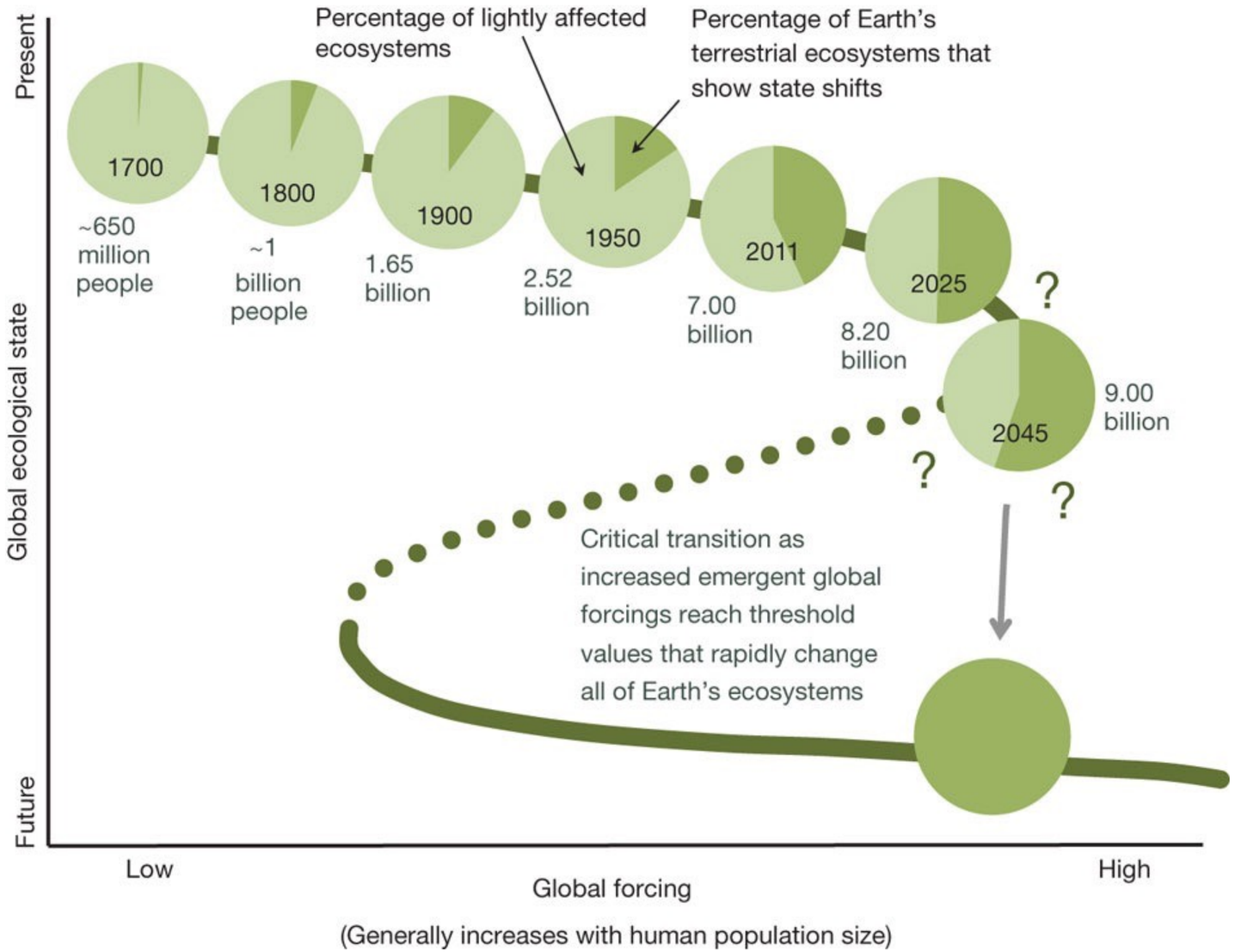


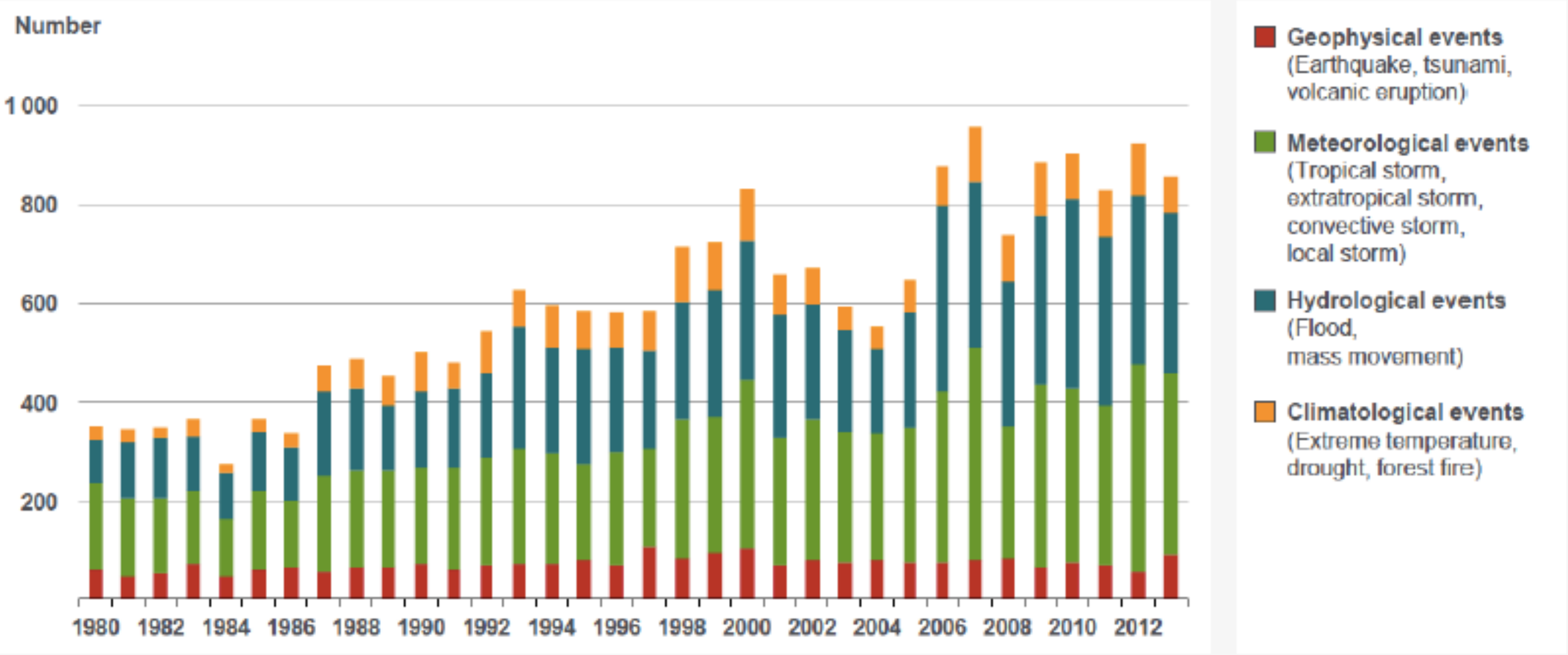
Foreseeability: Hazards and Disasters

NatCatSERVICE

Loss events worldwide 1980 – 2013

Number of events

Munich RE



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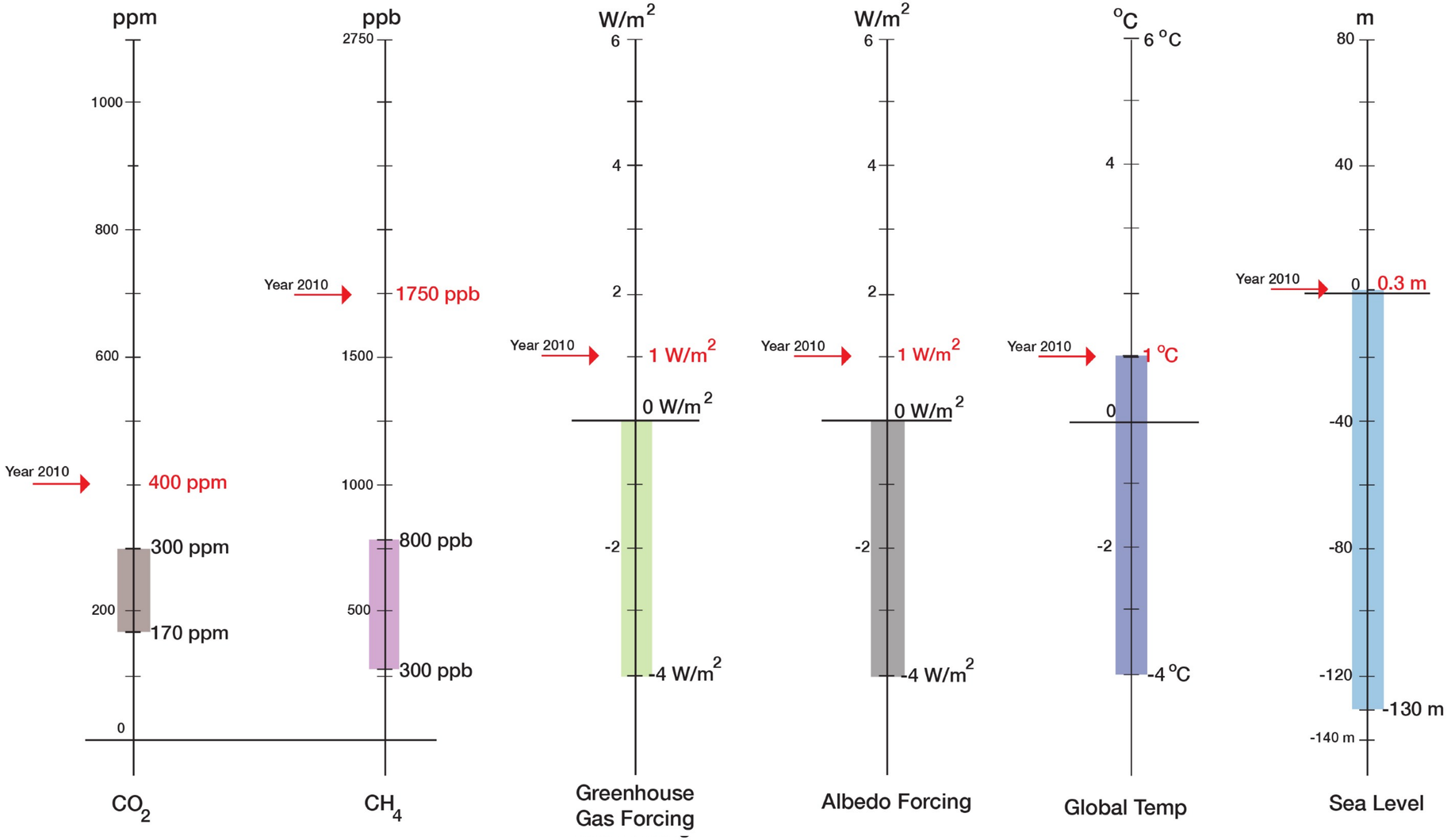
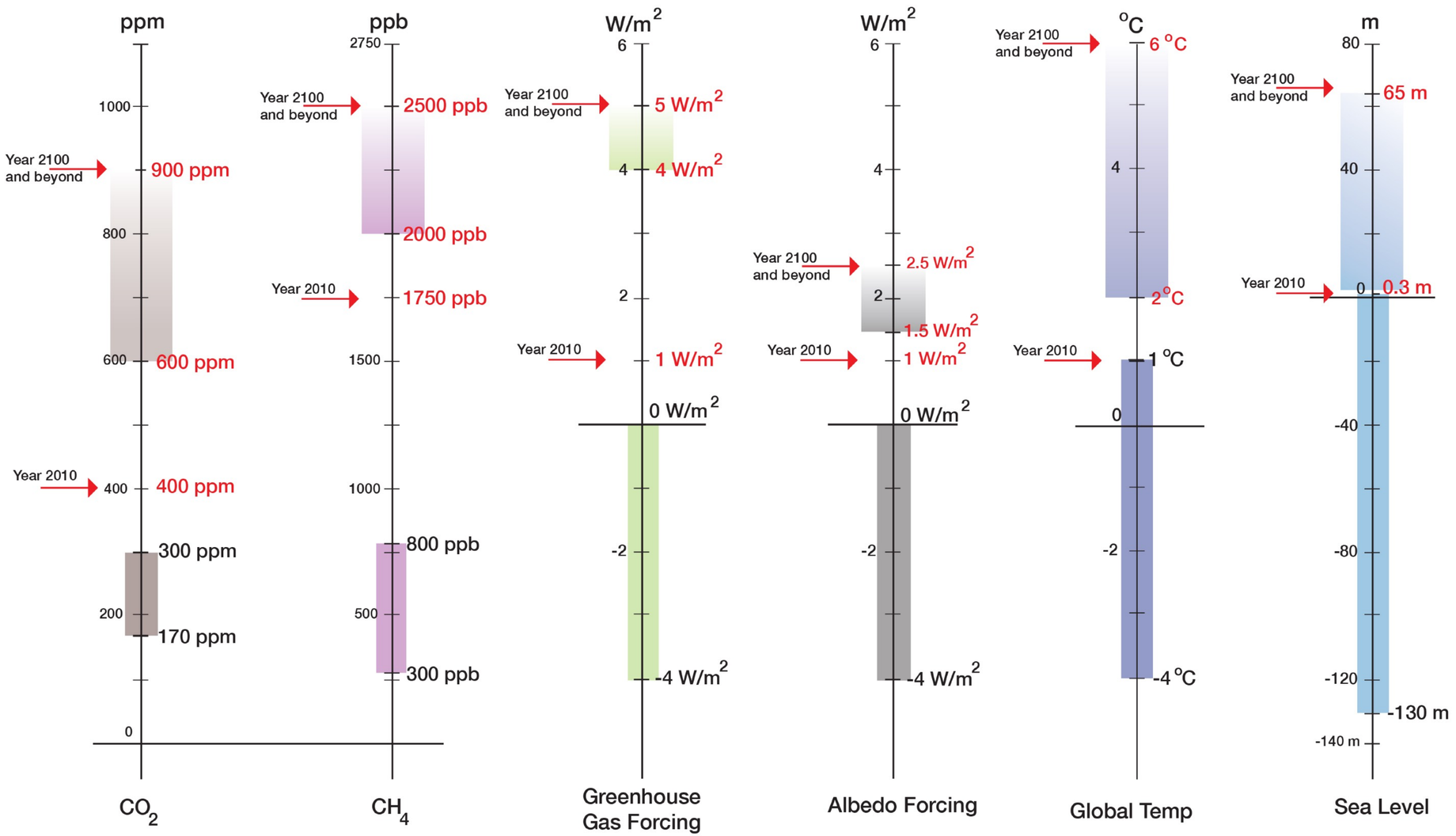


"Current State"

"Normal Range"
(800,000 years)

Foreseeability: Hazards and Disasters



"Prognosis"

"Current State"

"Normal Range"
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Foreseeability: Hazards and Disasters

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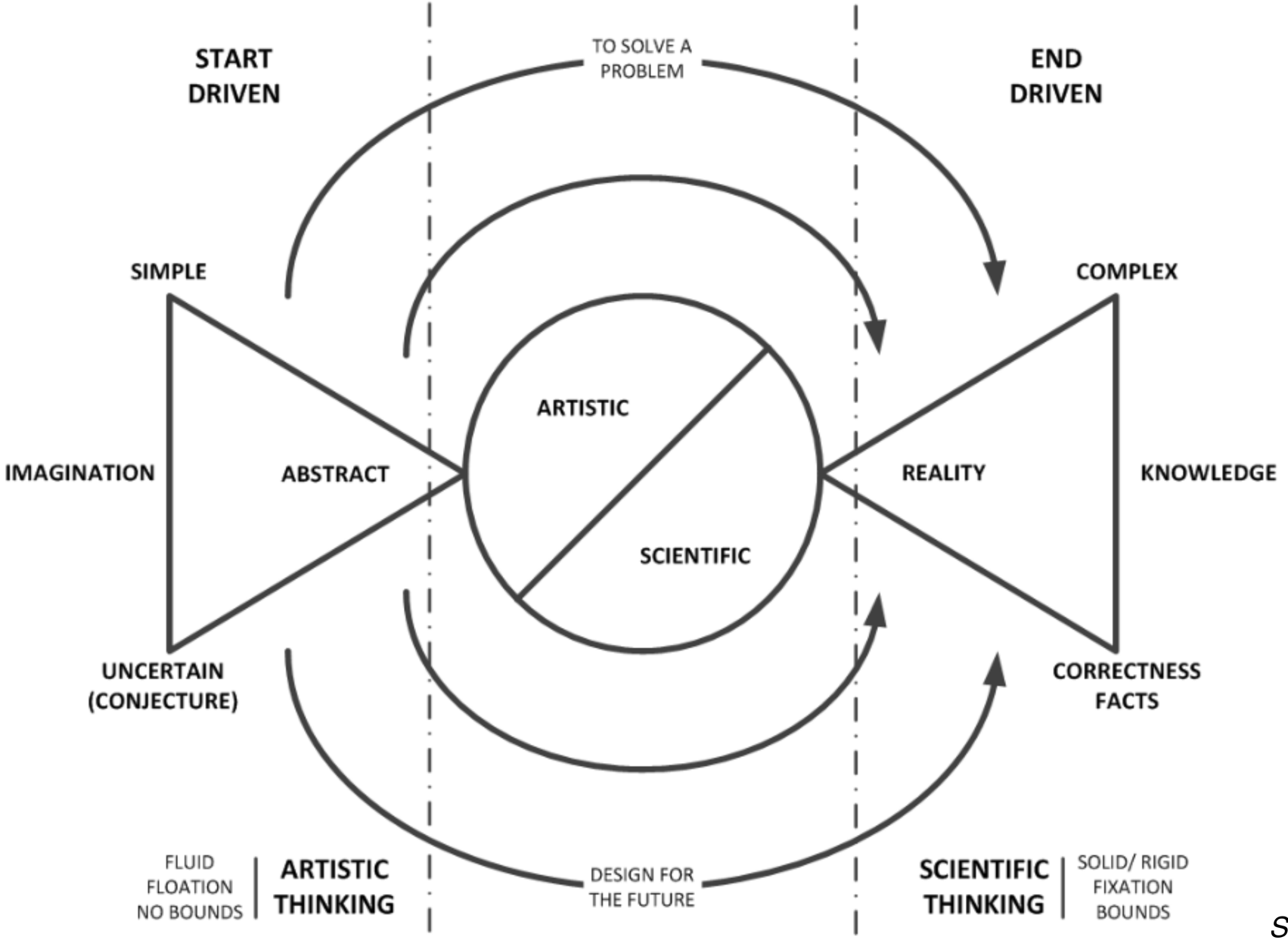

Smith, 2015

Foresight

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How we work — Strategic approach
Events — Engagement and outreach

HOME > HOW WE WORK > PLANNING, MONITORING, LEARNING AND EVALUATION

Foresight and Priority Setting

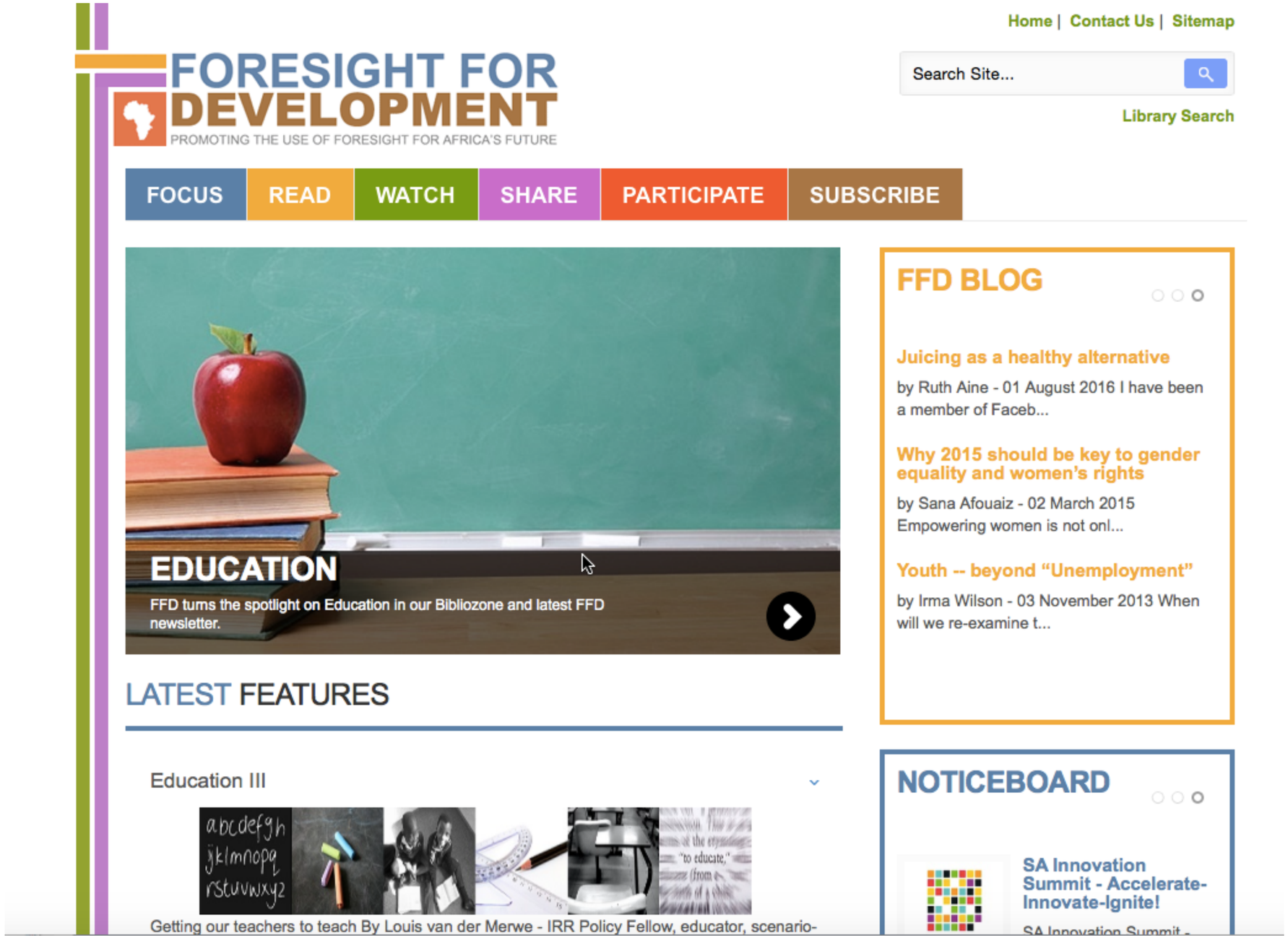
Food security, poverty reduction and sustainable natural resource management interventions need to be robust if they are to meet the challenges of a changing and uncertain climate. Ensuring their success, requires a strong *ex-ante* analytical capacity to diagnose points of vulnerability and intervention and the trade-offs between environmental and socioeconomic impacts.

Major components of CCAFS involve foresight studies, vulnerability assessment and *ex ante* impact assessment. These components have a strong capacity enhancement component, ensuring that the methods are used outside and

8

Our research flagships

Foresight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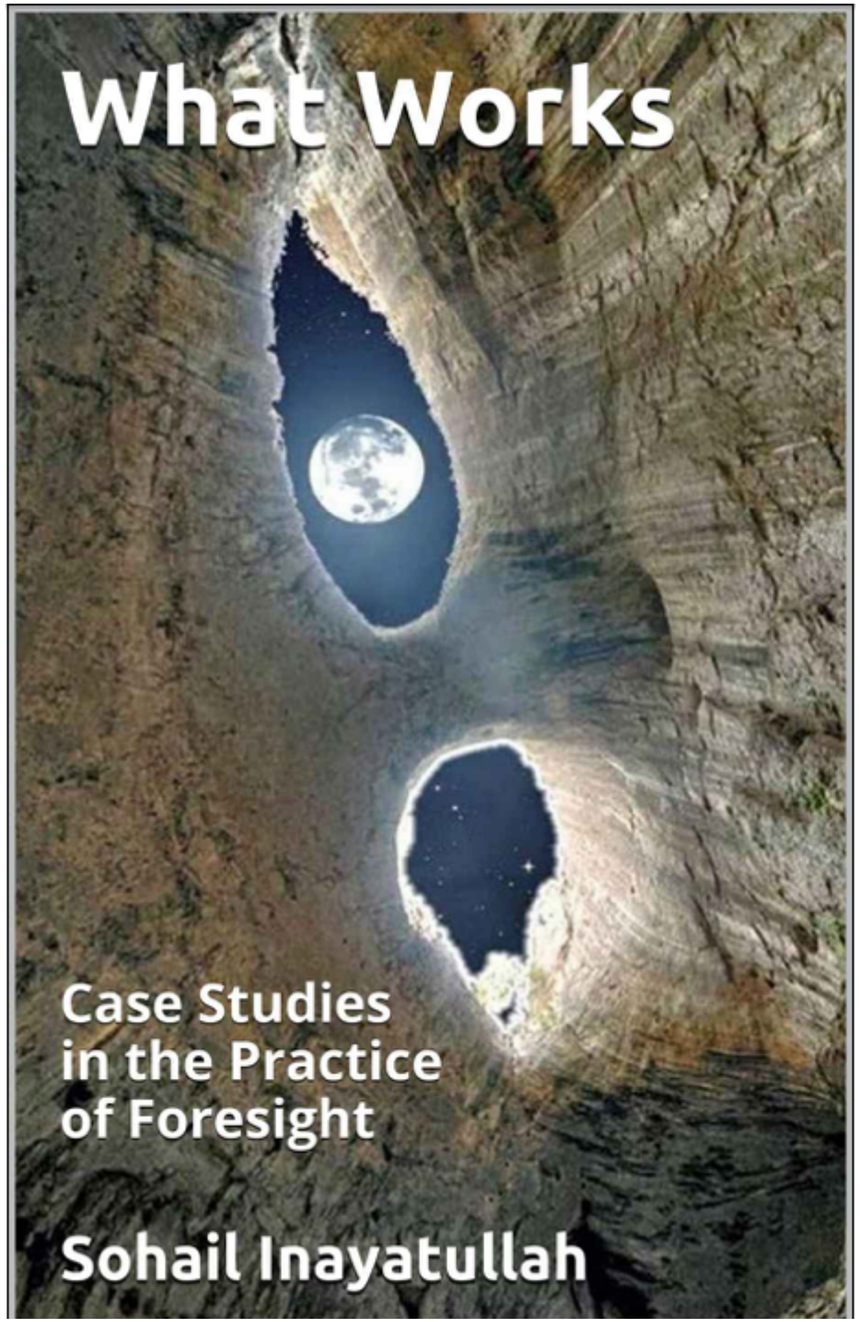
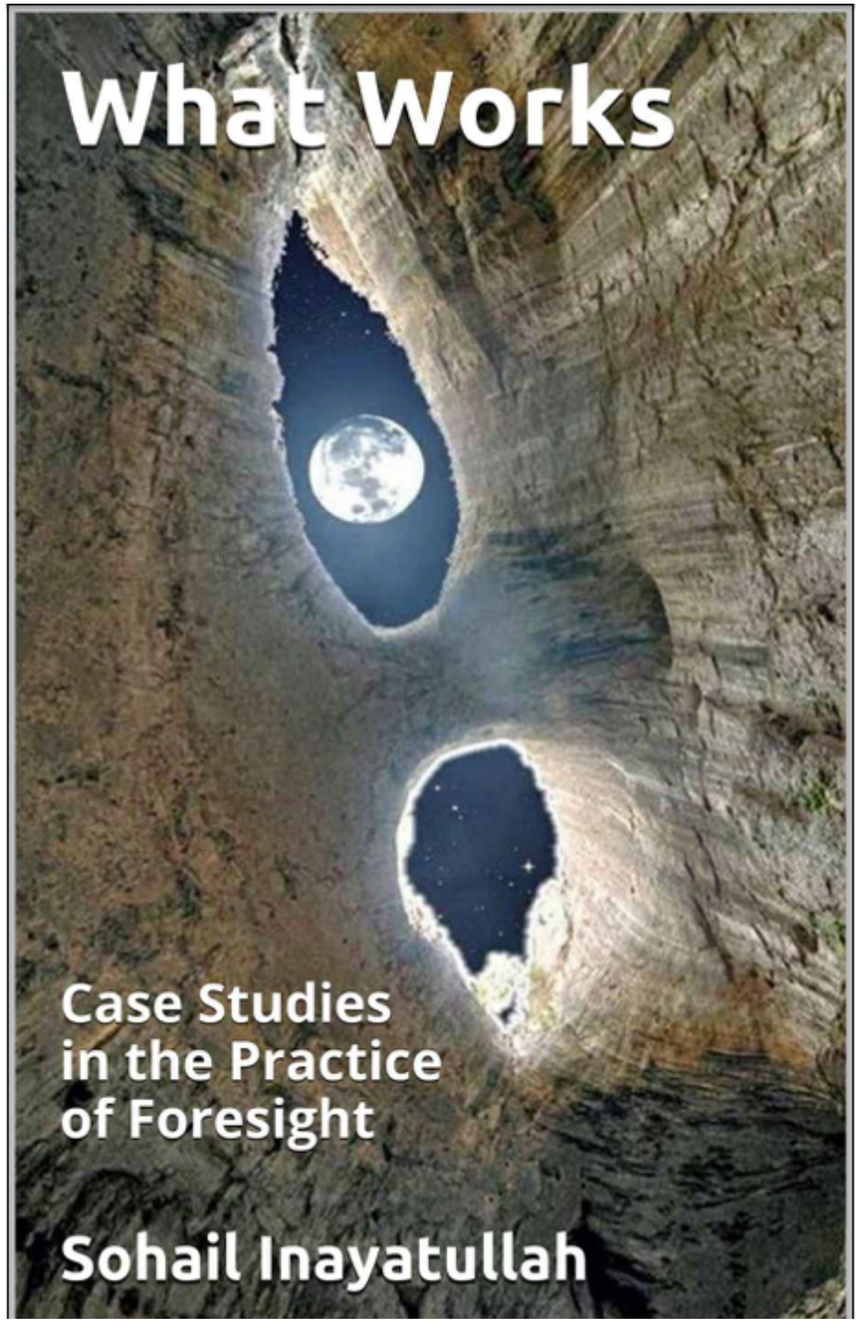
Foresight


What Works
Case Studies
in the Practice
of Foresight
Sohail Inayatullah

Foresight

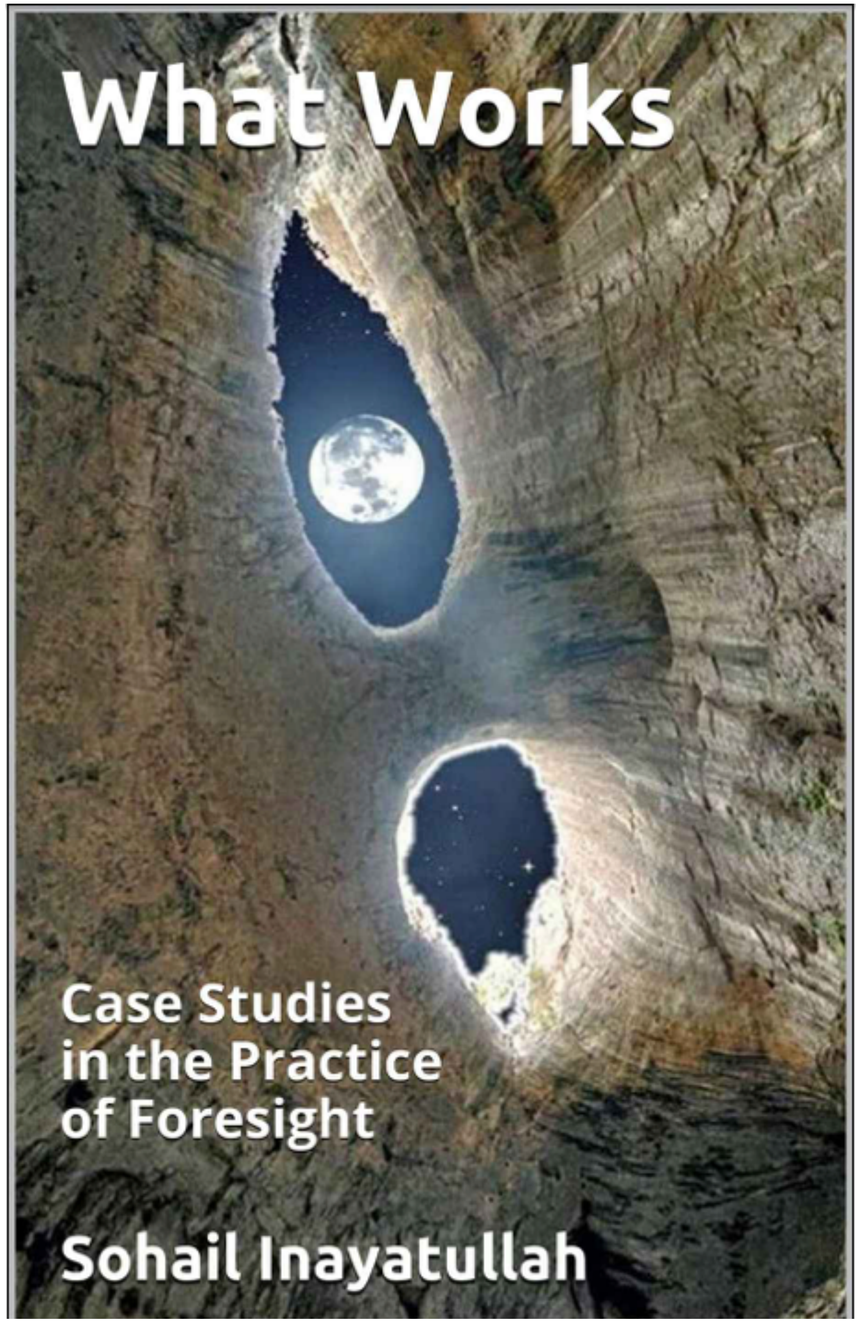


Futures study is the **systematic study** of preferred, probable, and **possible futures** including the worldviews and myths that underlie each future. Futures research has moved from external forces influencing the future—astrology and prophecy—to structure (historical patterns of change, of the rise and fall of nations and systems) and agency (the study and creation of preferred images of the future).

Futures studies has been eagerly adopted by planning departments in organizations and nations. Yet there are clear differences between the planning and futures framework. **Planning seeks to control and close the future**, while **futures studies seeks to open up the future**, moving from the future to **alternative futures**.

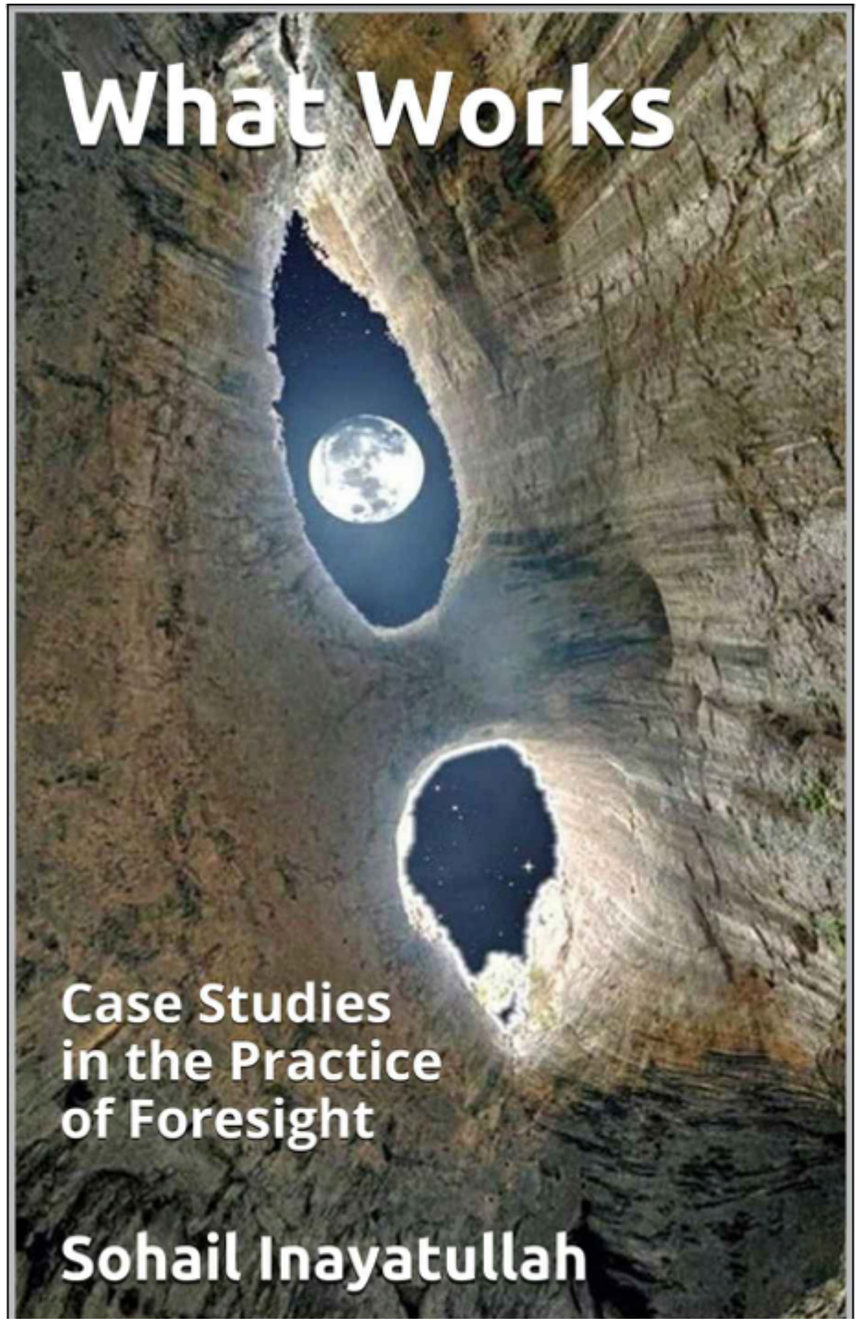
Inayatullah, 2013

Foresight



From a focus on **predicting the future**, the modern discipline of futures studies has broadened to an **exploration of alternative futures** and deepened to investigate the worldviews and mythologies that underlie possible, probable and preferred futures.

Foresight



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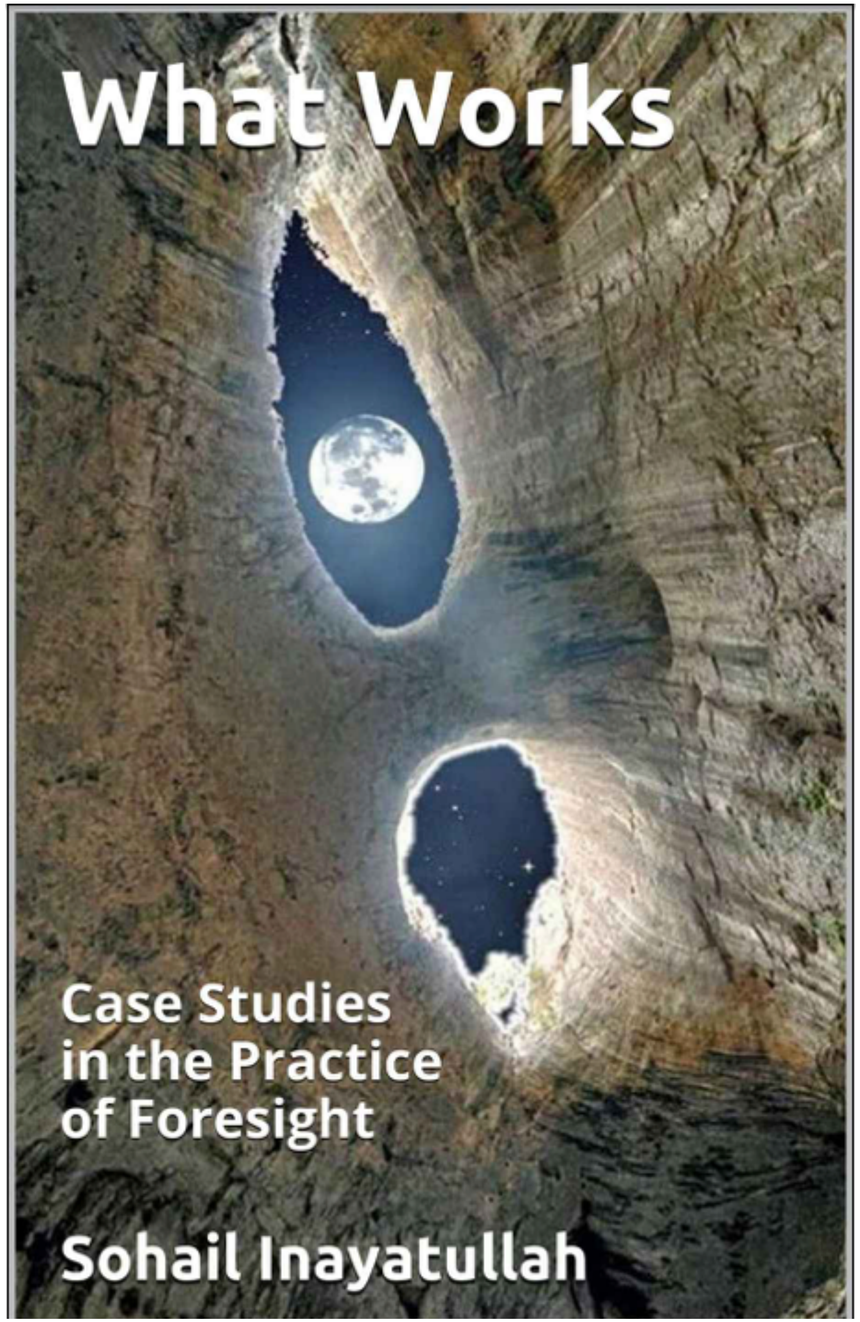
To understand the future(s), one needs a cogent theoretical framework. Four approaches are crucial to foresight (Inayatullah, 1990). The first is **predictive**, based on empirical social sciences. The second is **interpretive**, based not on forecasting the future but on understanding competing images of the future. The third is **critical**, derived from poststructural thought and focused on asking who benefits by the realisation of certain futures and which methodologies privilege certain types of futures studies. While truth claims are eschewed, the price of epistemology is not: every knowledge decision privileges reality in particular ways (Shapiro, 1992; Foucault, 1973). The fourth approach is **participatory action learning/research**. This approach is far more democratic and focuses on stakeholders developing their own future, based on their assumptions of the future (for example, if the future is linear or cyclical) and what is critical to them (Inayatullah, 2007).

Foresight



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The six pillars provide a theory of futures thinking that is linked to methods and tools, and developed through praxis. The pillars are: **mapping, anticipation, timing, deepening, creating alternatives and transforming**.

Mitigation and Adaptation Studies

Contents

- Uncertainty
- Foreseeability
- Decision Making and Foreseeability

Mitigation and Adaptation Studies

Class 17: Developing Foresight

Contents

- Uncertainty
- Foreseeability
- Decision Making and Foreseeability

Decision Making and Foresight

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- based on predictions with some level of uncertainty
- focus is on what we don’t know

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Replace:
Decision Making Under Uncertainty (DMUU)
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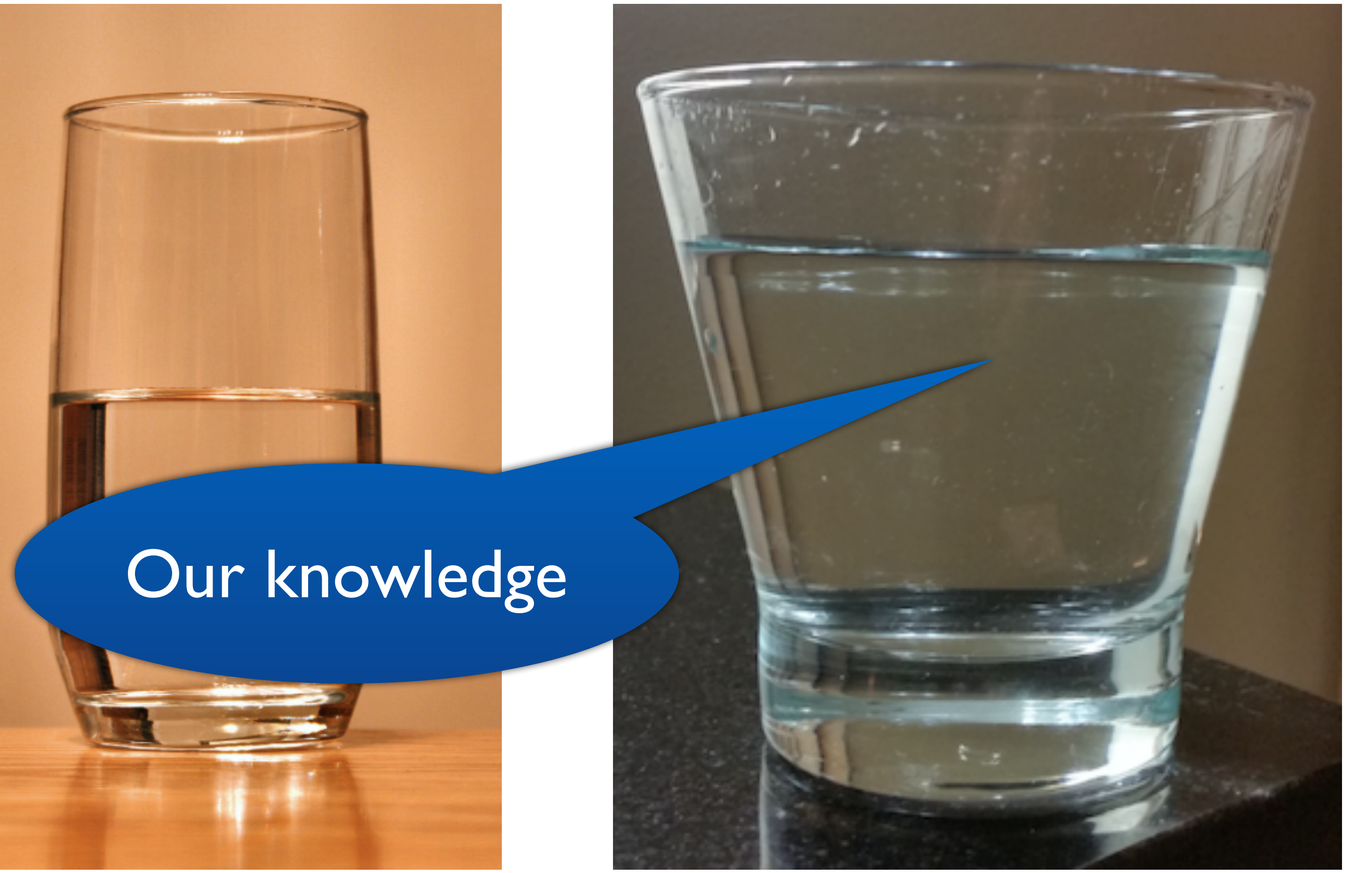

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Task: Developing Foresight

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Knowing the “worst case” and facilitating adaptation to unpredictable future:

- understanding the vulnerabilities and comprehensively assessing the risks
- including the worst cases (food, water, heat waves, droughts, storms, sicknesses, social unrest, wars, ...)
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Knowing the paradigms our decision making is based on …

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Paradigm shift to overcome normalcy bias:
Instead of “Sea level is stable” (last 6,000 years)
assume “Sea level is variable!”